CHEMICAL HERITAGE FOUNDATION

YUE XIONG

The Pew Scholars Program in the Biomedical Sciences

Transcript of an Interview
Conducted by

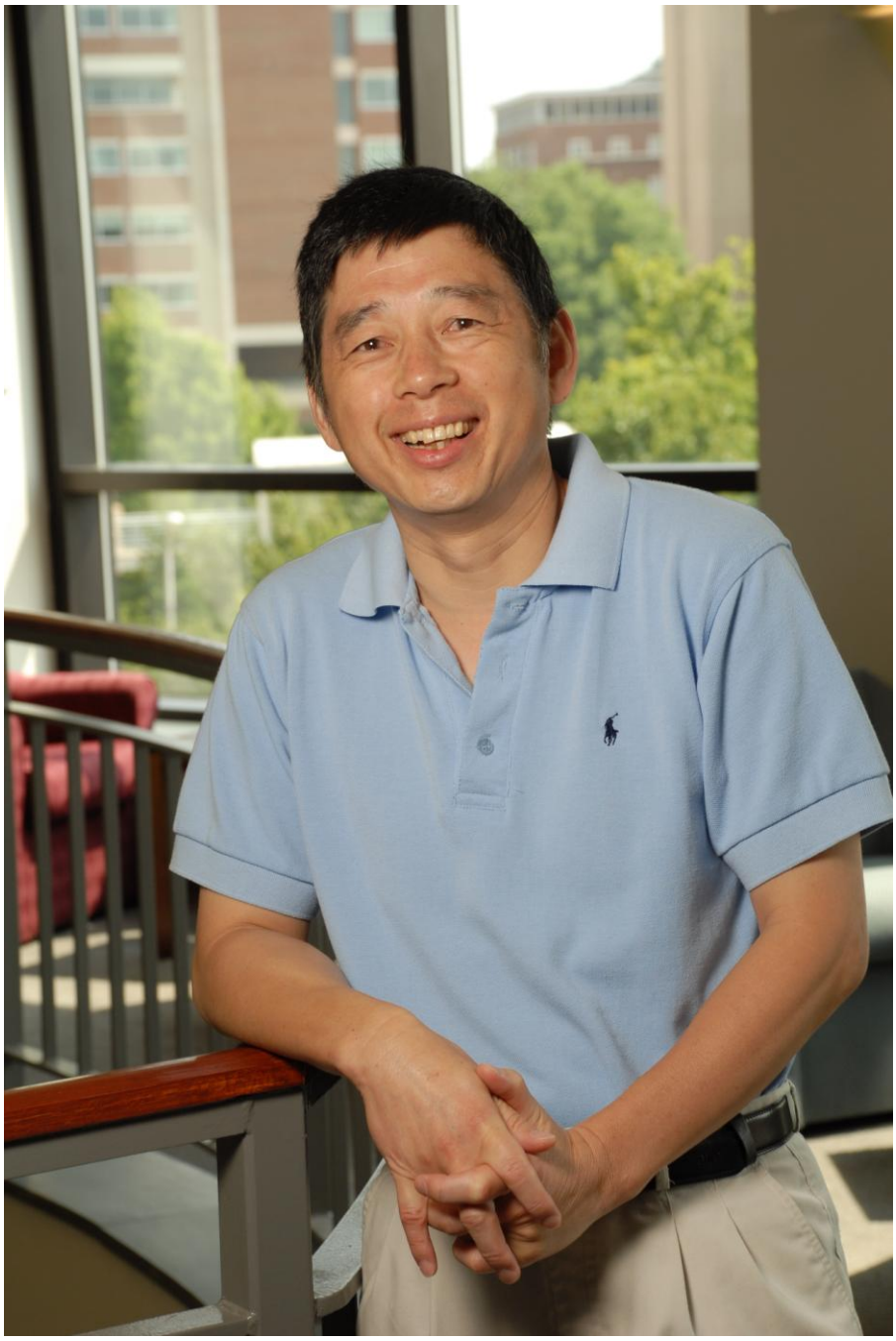
William Van Benschoten

at

University of North Carolina
Chapel Hill, North Carolina

on

9, 10, and 11 October 2000



Yue Xiong

ACKNOWLEDGEMENT

This oral history is part of a series supported by a grant from the Pew Charitable Trusts based on the Pew Scholars Program in the Biomedical Sciences. This collection is an important resource for the history of biomedicine, recording the life and careers of young, distinguished biomedical scientists and of Pew Biomedical Scholar Advisory Committee members.

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REFORMATTING:

Kim Phan, Program Intern, Oral History, Chemical Heritage Foundation. B.A. expected 2011, Anthropology, Cornell University.

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UNIVERSITY OF CALIFORNIA, LOS ANGELES

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This Interview Agreement is made and entered into this 29th day of November, 2000 by and between THE REGENTS OF THE UNIVERSITY OF CALIFORNIA, a California corporation, on behalf of the Oral History Program at the UCLA campus, hereinafter called "University," and YUE XIONG, having an address at 22-012 Lineberger Comprehensive Cancer Center, Campus Box 7295, The University of North Carolina at Chapel Hill, Chapel Hill, North Carolina 27599-7295, hereinafter called "Interviewee."

Interviewee agrees to participate in a series of University-conducted tape-recorded interviews, commencing on or about October 9, 2000, and tentatively entitled "Interview with Yue Xiong". This Agreement relates to any and all materials originating from the interviews, namely the tape recordings of the interviews and a written manuscript prepared from the tapes hereinafter collectively called "the Work."

In consideration of the mutual covenants, conditions, and terms set forth below, the parties hereto hereby agree as follows:

1. Interviewee irrevocably assigns to University all his copyright, title and interest in and to the Work. This assignment applies to University, its successors, and assigns, for and during the existence of the copyright and all renewals and extensions thereof.

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5. To insure against substantive error or misquotation, Interviewee will have the right to review the manuscript before it is put into final form. University therefore will send Interviewee a copy of the edited transcript for review and comment. Interviewee will return transcript and comments to University within 30 days of receipt of the transcript. In the event that Interviewee does not respond within 30 days, University will assume that Interviewee has given full approval of the transcript.

6. All notices and other official correspondence concerning this Agreement will be sent to the following:

If to University: Oral History Program
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Attention: Director

If to Interviewee: Yue Xiong
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Chapel Hill, North Carolina 27599-7295

University and Interviewee have executed this Agreement on the date first written above.

INTERVIEWEE

X Signed release form is on file at the Science History Institute
(Signature)

Yue Xiong
(Typed Name)

The University of North Carolina at Chapel Hill
(Address)

Lineberger Comprehensive Cancer Center

Chapel Hill, NC 27599-7295

X Date October 9, 2000

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

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Dale E. Treleven
(Typed Name)

Director, Oral History Program
(Title)

Date November 29, 2000

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Interviewee's Name Date

Chemical Heritage Foundation
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YUE XIONG

1958 Born in Nanchang City, People's Republic of China, on 5 June

Education

1982 B.S., Biology, Fudan University
1984 M.S., Shanghai Institute of Plant Physiology
1989 Ph.D., Biology, University of Rochester

Professional Experience

University of Rochester
1989-1990 Postdoctoral Fellow, Department of Biology

Cold Spring Harbor Laboratory
1990-1993 Postdoctoral Research Associate, Howard Hughes Medical Institute

University of North Carolina, Chapel Hill
1993-1999 Assistant Professor, Department of Biochemistry and Biophysics
1993-present Member, Program in Molecular Biology and Biotechnology, Lineberger Comprehensive Cancer Center
1999-present Associate Professor, Department of Biochemistry and Biophysics

Honors

1995 Pew Scholar in the Biomedical Sciences
1999 United States Department of Defense Breast Cancer Research Career Development Award
1999 UNC Hettleman Award for Scholarly Achievement

Selected Publications

Li, Y. et al., 1994. Cell cycle expression and p53 regulation of the cyclin-dependent kinase inhibitor p21. *Oncogene* 9:2261-68.

Li, Y. et al., 1994. Transcriptional repression of the cyclin-dependent kinase inhibitor p16 by the retinoblastoma susceptibility gene product, pRb. *Cancer Research* 54:6078-82.

Guan, K-L. et al., 1994. Growth suppression by p18, a p1 6INK4/MTS 1- and

p14INK4B/MTS2-related CDK6 inhibitor, correlates with wild-type pRb function. *Genes & Development* 8:2939-52.

Yee, A. et al., 1995. Molecular cloning of CDK7-associated human MAT1, a CDK-activating kinase (CAK) assembly factor. *Cancer Research* 55:6058-62

Guan, K-L. et al., 1996. Isolation and characterization of p19INK4d, a p16-related inhibitor specific to CDK6 and CDK4. *Molecular Biology of the Cell* 7:57-70.

Ohta, T. et al., 1999. ROC proteins constitute active ubiquitin ligases with all cullins and are protected from proteasome-dependent degradation by their cullin partners. *Oncogene* 18:6756-66.

Franklin, D.S. et al., 2000. Functional collaboration between different CDK inhibitors suppress tumor growth with distinct tissue specificity. *Molecular and Cellular Biology* 20:6147-58.

Furukawa, M. et al., 2000. The CUL1 C-terminal sequence and ROC1 promote nuclear accumulation and NEDD8 modification of CUL1, resulting in efficient ubiquitin ligase activity. *Molecular and Cellular Biology* 20:8185-97.

Ohta, T. and Y. Xiong, 2001. Phosphorylation- and SKP1-independent in vitro ubiquitination of E2F 1 by multiple ROC-cullin ligases. *Cancer Research* 61:1347-53.

Zhang, Y. and Y. Xiong, 2001. A role of p53 N-terminal nuclear export signal inhibited by DNA damage-induced phosphorylation. *Science* 292:1910-15.

ABSTRACT

Yue Xiong was born in Nanchang, in Jiang Xi province, in the southern part of China, the eldest of three siblings (he has two younger sisters). His father was a forestry scholar who was sent to a labor camp during the Cultural Revolution. His mother learned some accounting work from an uncle, and she supported Xiong and her mother-in-law for several years while her husband was gone, all the while suffering with the effects of nutritional deficiency. When Xiong's father was finally allowed to return to his family, he was assigned to Nanhu, where Xiong lived until he left for college. After he finished high school Xiong worked on the farm where his family lived and taught elementary and junior high school. When the Cultural Revolution ended and the colleges reopened Xiong was able to take the entrance exam and finally to attend college.

He matriculated at Fudan University, which impacted both his farm and his community, pursuing a broad education until deciding to become a scientist. Xiong entered graduate school in the lab of San-Chiun Shen, at which time he found molecular biology in China to be out of sync with the performance of science elsewhere. Nevertheless, he had a keen interest in learning modern molecular genetics, and James Watson's book on the molecular biology of the gene had a great impact on him; he worked with David Ow on a nitrogen-fixation gene. Interested in the China-United States Biochemistry Examination and Application program (CUSBEA), Xiong spent time at the Guangzhou English Learning Center (GELC). Subsequently, Xiong's CUSBEA application to the University of Rochester was accepted, and on Dr.Shen's advice he went there. Transitioning to American culture took time, but he soon entered Thomas Eickbush's laboratory researching DNA sequencing and transposable elements of the *chorea* gene. Xiong helped develop the mild-extracting method for isolating linealized and supercoiled DNA and he also worked on the evolution of transposable elements and the analysis of reverse transcriptase. He considered several postdoctoral positions, including one with Harold Varmus, though finally decided to accept an offer in David Beach's lab at Cold Spring Harbor Laboratory in New York. He participated in a genetic approach to isolate G1 cyclinin mammalian cells; helped discover cyclin gene activation during the G1 phase; and studied the effect of p21 and CDKon cyclin. From Cold Spring Harbor he accepted a position at University of North Carolina at Chapel Hill looking at cell-cycle control and tumor suppression.

At the end of the interview, Xiong talks about the possible applications of his research; the future path of his research; his lack of bench time; the impact of the Pew Scholars Program in the Biomedical Sciences award; the impact and importance of technology on Xiong's work; and collaboration and competition in science. Xiong concludes his interview by explaining how he attempts to balance career and family responsibilities (his parents are still in China).

UCLAINTERVIEW HISTORY

INTERVIEWER:

William Van Benschoten, Interviewer, UCLA Oral History Program; B.A., History, University of California, Riverside, 1990; M.A., History, University of California, Riverside, 1992; C.Phil., History, University of California, Los Angeles, 1995.

TIME AND SETTING OF INTERVIEW:

Place: Xiong's office, University of North Carolina at Chapel Hill.

Dates, length of sessions: October 9, 2000 (133 minutes); October 10, 2000 (180); October 11, 2000 (147).

Total number of recorded hours: 7.7

Persons present during interview: Xiong and Van Benschoten.

CONDUCT OF INTERVIEW:

This interview is one in a series with Pew Scholars in the Biomedical Sciences conducted by the UCLA Oral History Program in conjunction with the Pew Charitable Trusts's Pew Scholars in the Biomedical Sciences Oral History and Archives Project. The project has been designed to document the backgrounds, education, and research of biomedical scientists awarded four-year Pew scholarships since 1988.

To provide an overall framework for project interviews, the director of the UCLA Oral History Program and three UCLA faculty project consultants developed a topic outline. In preparing for this interview, Van Benschoten held a telephone preinterview conversation with Xiong to obtain written background information (curriculum vitae, copies of published articles, etc.) and agree on an interviewing schedule. He also reviewed prior Pew scholars' interviews and the documentation in Xiong's file at the Pew Scholars Program office in San Francisco, including his proposal application, letters of recommendation, and reviews by Pew Scholars Program national advisory committee members. For technical background, Van Benschoten consulted J.D. Watson et al., *Molecular Biology of the Gene.* 4th ed. Menlo Park, California: Benjamin/Cummings,1987; Bruce Alberts et al., *Molecular Biology of the Cell.* 3rd ed. New York: Garland, 1994; Horace F. Judson, *The Eighth Day of Creation.* New York: Simon and Schuster, 1979; and recent issues of *Science* and *Nature.*

The interview is organized chronologically, beginning with Xiong's childhood in Nanchang, China, and continuing through his undergraduate work at Fudan University, his graduate work at University of Rochester, his postdoc at Howard Hughes Medical Institute, and the establishment of his own lab at University of North Carolina at Chapel Hill. Major topics discussed include his family's persecution under the Chinese Communist Party, his education at Fudan University, his research in the Thomas H. Eickbush lab on DNA sequencing, and his current research on cell-cycle control and tumor suppression.

ORIGINAL EDITING:

Deborah Kolosova, editorial assistant, edited the interview. She checked the verbatim transcript of the interview against the original tape recordings, edited for punctuation, paragraphing, and spelling, and verified proper names. At Xiong's request, minor grammatical changes were made by the editor. Other words and phrases inserted by the editor have been bracketed.

Yue Xiong reviewed the transcript. He verified proper names and made a number of corrections and additions.

William Van Benschoten, senior writer, prepared the table of contents. Deborah Kolosova assembled the biographical summary and interview history. Romi Keerbs compiled the index.

TABLE OF CONTENTS

INTERVIEWEE: **Yue Xiong**

INTERVIEWER: **William Van Benschoten**

LOCATION: **University of North Carolina**
Chapel Hill, North Carolina

DATE: **9 October 2000**

VAN BENSCHOTEN: We'll start with when and where were you born.

XIONG: June 5, 1958, in a city called Nanchang. The city of Nanchang in China, in the south part.

VAN BENSCHOTEN: Okay, could you tell us a little bit about that city? What is it like?

XIONG: It's a city about the size of—let me see—Charlotte, and geographically it's also similar in that it is not on the coast, but it's not very far away. But it's a pretty poor city. The whole province is relatively poor, and that was not a good time in China, back in 1958, and I obviously don't remember anything. But from what I heard from my parents and from what I read in books or newspapers, those were pretty bad years in the modern history of China. The whole country was— There were two things. One is a disaster from a drought. And another thing is political. The government is regulated by the Communist Party; it was really messing around, and so combined, it was really causing a very bad situation for the next three years, '59, '60, and '61. Those were the famous—what did they call it?—three bad years or three disaster years, and a lot of people died of famine during those years.

VAN BENSCHOTEN: And so part of that I have heard was natural, but a part of it, again, was due to poor administration.

XIONG: Right. One was a natural disaster, and in different areas for different reasons. I don't know what the natural [disaster] was in the southern part where I lived, but politically, the government, the Communist Party, they started the so-called—what's it called?—the Long Jump Movement or something along those lines.

VAN BENSCHOTEN: Oh, the Great Leap Forward.

XIONG: Yeah, that's what's it called. My first name, if translated directly, is "jump." Yeah. And that's because that's the year I was born.

VAN BENSCHOTEN: Oh, really?

XIONG: Yeah. [mutual laughter] Yeah, so in China a lot of people, when they heard my name, would guess I was born in 1958. Yeah, the Great Leap, that's right. That just totally [does] not follow the rule or law of how the economy should be governed. So combined, the effect of natural disaster and the misguidance from the top was really causing a terrible situation for the next few years. I don't remember anything myself, but from what I heard from my parents [Shenggao Xiong, Zhiyeng Peng], especially my mother, it was pretty bad.

VAN BENSCHOTEN: Right. Okay. What are some of your earliest memories of growing up in Nanchang City?

XIONG: I'll try to see what is the earliest I remember, and it's difficult now to tell what you actually remember or what you've been told repeatedly by your parents. [laughs]

VAN BENSCHOTEN: Right.

XIONG: Yeah. So the earlier days were not very good. I really had a very strong family even though the situation was so tough. It was pretty tough, actually. From what my parents told me, I think it was like one week after I was born, my father was almost thrown into prison.

VAN BENSCHOTEN: Why?

XIONG: Because there was the famous movement called the anti-Rightist Movement, starting from '57.

VAN BENSCHOTEN: Oh, right. I've heard of that.

XIONG: It was started by Chairman Mao [Zedong] and the leadership of the Communist Party. From what you read from the newspapers, they said initially that they had this good intention to invite intellectuals to criticize them, to make comments, to make suggestions about the

leadership, about where the country should go, along those lines.

VAN BENSCHOTEN: To criticize the Communist Party.

XIONG: Or the government.

VAN BENSCHOTEN: Right.

XIONG: Both the central government as well as the local government. So my father was one of those people being invited. He was only like three years after graduating from college. Back to the early 1950's, graduating from college was not very common, because not many people could attend college. He made some comments and the funny thing is— I keep asking him nowadays, I say, "Exactly what did you say that got you into trouble?" He says, "To be honest, I can't remember specifically what I said, but certainly it was not anything that threatened the government or was anticommunist, anything on those lines." It must have been something pretty specific about trying to increase efficiency of the government, along those lines. But that was enough to get him into trouble. Right. He was not making any outrageous comments or anything like that. It was because the whole government, or the Communist Party, felt that they were being threatened, because the comments or criticisms, a lot of them, were also pretty widespread or critical. They probably felt they were being threatened somehow, so the whole thing was turned around. Instead of inviting them to give comments, they let them speak and then said, "Well, a lot of them are making comments or starting to throw off the government or be anticommunist," so the whole thing became like just letting them speak and then saying, "Well, I caught you."

VAN BENSCHOTEN: Exactly, brought them out, in a way.

XIONG: Yeah. Brought them out. That's what exactly happened to my father. And so in late '57 or the early part of '58, he said the whole thing was supposed to be going pretty well and he was pretty happy making these comments, and it looked like the leadership and local government were coming down to listen to you. But then in the spring of '58, things started turning around.

So the worst came during my mother's pregnancy or at the time when I was born. So six days after I was born, he was handed a piece of paper saying he was stripped of his profession and his job. He lost his job and he was supposed to be sent to prison.

VAN BENSCHOTEN: Wow. That's pretty severe.

XIONG: Well, it's very severe. Almost got him killed. He said he was sent to one of the hard-labor camps. He could hardly do anything. He was pretty thin, pretty slim, and he's one of these people that's always writing things, and he was studying the forest at the time. He's highly technical, not really involved in management actually.

VAN BENSCHOTEN: I'm sorry. Just to be clear, he was studying— He was in forestry?

XIONG: Forestry.

VAN BENSCHOTEN: Oh, just forests?

XIONG: Yeah, studied forestry, like wood development, forest development, along those lines. It's a very technical job and it's not managing anybody or, you know, some kind of position to do any kind of management, right? So after— I don't how long he actually stayed in the camp, but he was discovered by one of his previous bosses from when he was working in the city. Oh, by the way, the city of Nanchang was the capital of the Jiang Xi province. That's where he was working.

VAN BENSCHOTEN: Okay.

XIONG: Right. And so that guy said, "Man, you could die here," and so he dug him out. He said, "If you stay here working like this, you're not going to survive." So they relocated him to another farm. So that's relatively less severe than the labor camp, and otherwise he would not have been able to survive. So that's my father. I didn't get to see him in the next four years.

VAN BENSCHOTEN: So from '57—

XIONG: '58 to almost '62 or '63.

VAN BENSCHOTEN: That is a long time.

XIONG: It's a long time. I don't remember my father at all. All I remember, I guess. And a lot is what I've been told rather than what I actually remember, because after he left I stayed with

my mother. My mother was also sent out, not stripped of her position or job or anything, but it's not a whole lot different. So she was sent to a county government to do accounting. She was doing accounting for an insurance company in the capital city of Jiang Xi, and it's the same city with my father, but after that she stayed for a couple of more months, then she was sent to a local county office and worked as an accountant. And my mother said when I was only a few months old, she just took me and filled a briefcase and just left the city where they lived for the last five or six years, a lot of good memories.

VAN BENSCHOTEN: Now, was her leaving punishment, partly, because of—?

XIONG: Well, it's not directly, but obviously it was associated with my father. They officially told her, "We'll relocate you for another job," but the understanding is that it was a kind of punishment. So I lived with my mother for the first almost five years, the three of us: my mother, myself, and my grandma—my mother's mother.

So the early days, what I really remember was not the hometown I was born in. Instead, it was this small city called Gao An, where I spent my first five years with my mother. My grandma died when I was two years old, I believe.

VAN BENSCHOTEN: And what was her name?

XIONG: Who? My grandmother?

VAN BENSCHOTEN: Yeah.

XIONG: I actually don't remember her name, and I know her— No, I don't think anybody actually told me what her name was. I don't even know— She had her own name after marriage. In the early days, those old Chinese women, they actually, once they got married, they seemed to just use their husband's last name. They didn't have their own name, in most cases. And they didn't have a job, obviously. They just stayed home taking care of the kids and they didn't go out for jobs for anything. And only vaguely, I remember, my grandma was short, very thin. I can't remember much about her.

VAN BENSCHOTEN: This is a good transition though. We'll get to the five years that you spent pretty much fatherless, but if you could maybe discuss a little bit about your father's background, his family, I guess.

XIONG: My father was born in a family of four in the countryside outside of Nanchang City, about fifty miles away.

VAN BENSCHOTEN: Right.

XIONG: Depending on what standard you use— If you use a standard of today, it was a pretty poor family, but at that time his family had a some small piece of farm or land, and they could survive and feed their kids relatively better than other people in the same village. My grandfather had a small piece of a business. It's just shopping or selling something. I don't know exactly what he was selling at that time. I never saw my grandfather. My grandfather and my great-grandfather, they both died three months apart, when my father was nineteen years old. That was pretty devastating to him.

VAN BENSCHOTEN: Sure.

XIONG: And my father was just married and still young and had not even gone to college yet. And before that point, they seemed to be fine until both his father and his grandfather died in their early forties and late fifties. So that really devastated my grandma and my father, because my father was the only male left and in those days if you didn't have any strong male in the family it was very difficult. In those early days, the females didn't make many decisions and they couldn't really help anything outside the families, and even though you still had some property, that was not going to last for long. Everyone knew. Especially my father didn't know anything about how to farm, and then he was sent to schools and high school, so he didn't know anything about farming. So that was pretty difficult.

So one of the most difficult moments that came to my father was [when] they had to sell some farms in order to bury my grandfather and great-grandfather. In the early days, selling your property was considered something very, very bad—or you're so incapable—very shameful, and the success of the family is measured by how much property, how much farm land you can continue to accumulate. But now you're selling them, so that was very, very devastating for him, and so for that part— And he quit school after high school and stopped for a few years and [did] not enter the college after graduating from high school. He tried to get some kind of job so he could make some income to support the family. I think that was two or three years, he was nineteen— Either '47 or '48 or '49, I don't know which year.

VAN BENSCHOTEN: So just before the end of the civil war.

XIONG: Right, right. You actually know the history pretty well. Right. So that was the country situation and it was really tangled, a lot of unsettled business going on across the country. The

Communist Party had just taken over from the Nationalist Party control, the whole country was really changing dramatically. I think a year or two later, after the Communist Party took over the country, my father's family was labeled as so-called landlords. Direct translation means you have a piece of land, but landlord was bad at the time. Yeah. [mutual laughter]

VAN BENSCHOTEN: You didn't want to be a landlord.

XIONG: It was not good. Yeah. And then, I mean, the whole family just lost all their properties, all their land, anything, so—

VAN BENSCHOTEN: They lost it because that land was collectivized.

XIONG: Yeah, just basically stripped off. Stripped off and given to the poor people, and that's across the country, not just to their own family.

VAN BENSCHOTEN: Right. And they received nothing in return, right? The land was just taken from them.

XIONG: No. Just like that. It's very simple. Just your whole property, all your land, your house, everything just was taken away. Overnight. So overnight, my grandma almost became homeless. Yeah, and so she could only stay with her relatives and they still gave her a small house she could stay [in]. My father now really had to work, somehow, to support himself. My mother at the time was married with my father for a couple of years; [she] was the one actually supporting my grandma.

VAN BENSCHOTEN: Really?

XIONG: Yeah, and she got a job at a local insurance company. Through my uncle she started learning something, because my mother couldn't afford to go to college, or go to school. Not that she was not able to afford it, it's because traditionally women didn't go to college in China so she did not attend any school. And she actually learned from my uncle; he graduated from college and he was the one [who] really taught her some basics. And for that my mother up to nowadays still remembers those days. She said if not for my uncle she would not have had any skill to make a living, but things changed so dramatically and because of the limited amount of knowledge she learned from my uncle, she was able to go out looking for a job and got a small job and supported my grandma while my father just basically didn't know what he could do. And then I think it was 1949 or '50 and my father [took] an exam and finally he applied for

college. He was accepted by a few, but he picked the one at a place called Wuhan University.

VAN BENSCHOTEN: I'm sorry. What was that called?

XIONG: Wuhan. And the reason was pretty simple, because that university, supported his tuition and also [gave] him some stipend so he could live by himself.

VAN BENSCHOTEN: Oh, how did he get that?

XIONG: He just applied to a number of the ones. Wuhan University was not the best one he got in, and he got into another university that's even more prestigious in China, but he could not go to it. And Wuhan University was a public school at the time that took them, and the student could live there and support a living. It was not a whole lot, but to him at that time it was very important. So I think that was probably '50 or '51. So finally, he got into college. And he had the first few years—that was from '51 to '58—and he said he had a few good years. Studying in college, finally the life become more or less normal or stabilized, and after '54— I think he graduated in 54' or 55' from college, and then got this job right away in Nanchang City, the capital of the province, and reunited with my mother after graduating from college. Had three good years together and then—phew—it's over.

VAN BENSCHOTEN: Chaos. So when he was going to college, he didn't live with your mother, then?

XIONG: No, they separated from—gosh, that was pretty long—'50 all the way until '55, after he graduated. Not only were they separated when he was in college, but before that when he was just traveling around anywhere he could find a job. He did several different jobs as a teacher or as a helper, and several things—I don't remember what else he did—and tried to find a way to support himself. He was not even allowed to support his family back then.

VAN BENSCHOTEN: Really?

XIONG: Yeah, well your family was the landlord, the enemy of the country. My mother was okay, because she was poor, relatively, and so when she made a living, she wanted to send some money back to my grandma, but she had to get permission from the government. She [had to] do that because my grandma was labeled as an enemy of the people. So if you wanted to do that, you had to get permission. The early days were not so bad; the Communist Party had only started taking over, so people [did] not draw the line so clearly but still considered that this is

your mother-in-law and that your supporting her is reasonable. So they let her do that. My grandma actually died in a relatively peaceful situation, even after all this chaos for a few years. My mother [took] care of all the burial while my father was away. So there were a few years when they were— And for four, five years they were not living together and they were pretty much just on their own.

VAN BENSCHOTEN: Right. But from about maybe 1955 to ‘58, they’re together briefly.

XIONG: Oh, there were good times. Yeah, they actually remember a lot of those good days, and I remember when I grew up and they took me back to Nanchang and pointed out, “Well, that’s the little apartment we used to live in for those three years,” and I can tell they had a lot of good memories and finally they were able to live together, and—

VAN BENSCHOTEN: He was making money.

XIONG: They had a reasonable income and they were not any burden, and no kids yet, and so they were able to go to, like, a party once a week. And they were young, and my father had just graduated. That was pretty rare at the time, for a college graduate to come to a city like that. So they had a very good time for a few years.

VAN BENSCHOTEN: Right. Sounds good. Why don’t we talk a little bit about your mother’s family.

XIONG: My mother’s family was doing business or retailing, and it was a big family—she had three sisters [Lan Ying Peng] and three brothers [Jia-Liu Peng, Jia-Pin Peng, Jia-Bin Peng]—and it was not very rich using today’s standard, but at the time they had a shop and that was a pretty big deal back in the late forties or early fifties. But unfortunately, during the transition from 1949 to the 1950’s, because they were working so hard that they had a piece of property and business, they were labeled as enemies of the people just like my father’s family. As I just mentioned, my mother, just like most other Chinese women, could not receive any reasonable education and was not sent to school at all, and just stayed home to help my grandfather while every one of her brothers, all three of them, went to school. The biggest one went to college. She still remembers the early days, and really envies her brothers, [who were] able to go out for school and then come back and just know more and more and more and more. But they, especially my mother, had such a close relationship with her brothers and every summer, when her brothers [came] back for summer to help the family, they taught her a lot. Those early teachings from her brother—not from her father, not from her school—really made a huge difference for the later part of her life. If not for that, she would have just stayed at home just like every other woman. She married my father just before the chaotic transition, and all of a

sudden both her family and my father's family lost all the properties and were just almost like not much better than homeless. And all the family was pretty much just gone at that point. So that made a big difference to her, the encouragement of her brother, and she realized that she had to try to get a job to support herself.

She went out looking for a job and found one in a small bank. Not only [did] that [make] a huge difference to her, but also made a huge difference to myself and my two sisters [Yifeng Xiong and Wen Xiong], because from early on she had been teaching us to be independent, to work hard, to make your own living. To hear that from your father is not too unique, but to hear that kind of education or that kind of teaching from your mother, that's pretty rare, because traditionally Chinese women, they didn't go out to work. They didn't go out to work and so they just wanted to make sure you were healthy or you're happy. They didn't really teach you a lot [about] working hard or studying hard and pursuing a career. That had a lot of influence on me and my sisters as well, because my mother really had learned in a good way, and a hard way, and if not for her brother, she would not have been able to get this job, but if not for the revolutionary change [Chinese Civil War], she probably [would have] just stayed home as a housewife.

VAN BENSCHOTEN: Right.

XIONG: So just like my father's family, after 1949 and the 1950's, her part of the family also lost all their properties. And her brother actually ended up in the labor camp as well, later.

VAN BENSCHOTEN: Oh, he did?

XIONG: Yeah.

VAN BENSCHOTEN: The one who went to college?

XIONG: Yeah, the one who went to college. And even worse—my father was at least studying forestry, that's pretty technical—my uncle was studying law, so that really got him in trouble.

VAN BENSCHOTEN: Right. Okay. I was going to ask if you had sisters or brothers. You have two sisters, then?

XIONG: Yeah, I have two younger sisters.

VAN BENSCHOTEN: Right. Okay. And what do they do?

XIONG: Right now?

VAN BENSCHOTEN: Right.

XIONG: One [Yifeng Xiong] is living at San Diego. She graduated from UC [University of California] Irvine and got her Ph.D. in organic chemical synthesis. And I have another younger sister [Wen Xiong], right now in China, and she is a high schoolteacher. So my family had five of us.

VAN BENSCHOTEN: Where does she teach there?

XIONG: In a city in China called Shenzheng, teaching English in high school.

VAN BENSCHOTEN: Right. And how are the three of you related? In other words, who's the oldest?

XIONG: I'm the oldest and my sister in San Diego is the second one–she is seven years younger than I am—and the other one in China is nine years younger than I am.

VAN BENSCHOTEN: Oh, okay. So how did you get along with your sisters?

XIONG: And the part of reason you realize how old you are—I'm seven years older than my second sister in San Diego—is probably because my father and my mother were separated—

VAN BENSCHOTEN: Oh, that's right.

XIONG: —for five years. So then they were living together.

VAN BENSCHOTEN: So they had another child. She was born in '65.

XIONG: Yeah, and only after 1964 when they're living together, and then they had my second sister.

VAN BENSCHOTEN: Right. Sort of pick up again and continue their family life.

XIONG: Right. Now my sisters and I had a very close relationship, and I think a lot was influenced by the close relationship between my mother and her brothers.

VAN BENSCHOTEN: Now is that both of the sisters, or just the—

XIONG: Both of them.

VAN BENSCHOTEN: Both of them.

XIONG: Yeah.

VAN BENSCHOTEN: Okay, if you could talk a little bit about your sisters.

XIONG: I had a pretty close relationship with my both sisters, and very early on when they were little, that was pretty much as I was like a babysitter for them. When they were growing up they really looked up to me; I was their teacher for a year or two. And after I graduated from high school, I went back to where my parents lived and was not studying and was working on a farm for four years before I was able to apply for college; we [will] come back to that later. And so I did all kinds of jobs. I worked on a farm and also taught in the middle school. Actually middle school and the elementary school for two and a half years. I was my sister's teacher.

VAN BENSCHOTEN: Oh wow. [mutual laughter]

XIONG: Yeah, for a couple of years.

VAN BENSCHOTEN: Now, when you say teacher, you mean her real teacher in the classroom?

XIONG: Real teacher. Yeah, yeah. Real teacher.

VAN BENSCHOTEN: Okay. In what other ways was your relationship close with your sisters?

XIONG: Okay. At the beginning it was more of they would listen to me and respect me and look up to me and just try to follow my example. And I— Especially after 1978, when the country was finally out of this chaotic situation led by Mao Zedong, the country tried to get back to normal, and one of the things was the reopening of the colleges and universities, which were completely shut down during the ten years of the Cultural Revolution. And that year, 1977, the country—for the first time in ten years—reopened college and university, allowed kids, young men and women, to apply to it, and they were accepted, admitted by examination. That was not happening for ten years, and for the first time we realized we actually could go to college. And so I got in in 1978 and that was a huge deal to my family.

VAN BENSCHOTEN: Right.

XIONG: To finally realize that, politically, they could have a normal life. To start changing from being an enemy of the people to become like normal people. And my father wrote a memo, I remember. And in that memo, as to what was many of in his conversations, he said that 1978 was a big turning point for the whole family. And one of the major things happening in 1978 was that I was able to go to college. And to them, that was really a turning point of [their] whole life.

VAN BENSCHOTEN: So that had a big influence on your sisters?

XIONG: A huge one.

VAN BENSCHOTEN: Yeah.

XIONG: A huge one, because now they realized— They were young, they probably [did] not fully appreciate, but then, just looking around the whole farm, the whole village, I was the only one [who] got into the college. And before that point, I was not even allowed to apply. One of the funny things that happened was during the ten years of Cultural Revolution, from 1966, when the university and college was first shut down, to 1977— The first seven years, the whole university was shut down, nobody could go anyway. But then in the last three years, from ‘73,

‘74, ‘75, they reopened the universities. But you could only go there upon recommendation, not by taking an exam. The recommendation was funny; you were recommended by the people you were working with. Those were people that were working on the farm. They’d say, “Yeah, there’s a good kid, he should go to college.” I don’t know how I’m going to explain this in the future to my daughter [Jessie Xiong].

VAN BENSCHOTEN: Right

XIONG: Yeah, it’s unbelievable. So my chance to go to college and get a recommendation by the workers was out of the question, because of my family.

VAN BENSCHOTEN: Right.

XIONG: Yeah, so that was out of the question. And so after ‘78, they realized, well, now things seemed to be turning around and I could go to college. And it was a huge deal for my family and it was also a huge surprise for the village. “Wait a minute! How come the kids from ‘the enemy of the people’ go to college? Why can’t my kids go there? Why would people need to take an exam to go to college?” So they just felt very, very surprised that people could go to college by taking an exam. [laughs] Yeah.

VAN BENSCHOTEN: Right. When we get a little bit further along into your education, that would be interesting to talk a little bit more about that transition, because that sounds fascinating. It was not only for your family too an amazing transition, but for the entire country, wasn’t it?

XIONG: Oh, yes, it’s unbelievable, yeah.

VAN BENSCHOTEN: Okay, well, let’s go back a little bit, chronologically, and talk a little bit about your early schooling, sort of elementary school.

XIONG: Yeah. My first couple of years, I was taken care of by my grandma, my mother’s mother, and she died when I was between two and three years old and I don’t remember much at all about her. And after that point, my mother was practically a single mother, taking care of me while my father was separated from her, from 1958 all the way to 1962, I believe. Luckily, I was in this county government, the county and the government, had this day care center. The day care center was not common in China in those days at all. So I was lucky; I was able to attend one of those. I was able to receive some early education. And it was pretty good, compared with a lot of kids: 90 percent of them lived in the countryside; they couldn’t go to any

day care or the preschool at all. So that part actually had a lot of good things happen to me. And I was able to go to day care and the preschools and learn something early on, while my mother went to work.

VAN BENSCHOTEN: So why do you think you were allowed to do that? Are you—?

XIONG: That's partly because I was separated from my father, and my mother herself— She was very poor when she married my father. So she herself was not labeled as an enemy of her country. She was labeled differently from my father. So they kind of were still implementing this policy that if you were the one guilty, you were the one that should be punished, not your family. They tried not to associate. And so that was my mother, and once she was separated from my father in living, she was working very hard. And they still treated her as herself, not as the wife of my father.

VAN BENSCHOTEN: Right.

XIONG: And so she was still receiving normal treatment. And together with the fact that she worked very hard and she performed better than a lot of her colleagues at the time and the coworkers, she had a few good years. During those bad years and being separated from my father, when she was alone for those few years— And she did pretty good on her job. And had a lot of good friends. And I was able to just go to day care just like every other kid.

VAN BENSCHOTEN: Right.

XIONG: In the city council, I guess that's what it's called.

VAN BENSCHOTEN: Right.

XIONG: Yeah. And so that actually made me [different] from a lot other kids in the countryside who couldn't find a school to attend.

VAN BENSCHOTEN: Right. And how did you like school?

XIONG: I don't remember a whole lot of the preschool. I don't remember anything bad. If I remember anything specific— And those were pretty heavy days for me. I was a wild boy and I

was running around, was pretty smart in the class— What my mother keeps on telling me is that I was very competitive when I was young.

VAN BENSCHOTEN: Really?

XIONG: I don't know if she made it up or not, but she keeps on telling me how competitive I was. For example, she said the school actually rewarded kids [for] coming on time. And early on, my mother said I was always trying to get up earlier and go to school and try to be the first one in the school instead of staying home.

VAN BENSCHOTEN: Right. [laughter]

XIONG: She said that a couple of times I was not the first one and I was pretty upset. [mutual laughter] Yeah. There aren't a lot of details; from what my mother said, that was not bad, except I just never remember anything about my father. And he was allowed later, in I think it was '60, to come to visit my mother once a year. And later, when their condition was a little relaxed, I don't know, maybe twice a year. He came for up to a week. And I don't remember anything about him. Yeah.

VAN BENSCHOTEN: I'm sorry, for a week then, you could see your mother and your father?

XIONG: My father [would] come visit us. And he brought some food, because he was working the farm himself and they would be allowed to grow something like vegetables or yams and then he brought some with him when he come to visit us. In those difficult years that meant a lot, because nobody had enough food. My mother says I ate a lot when I was growing up. Allowances were very limited for everybody, and it was never enough for me. And so she had to just keep on letting me eat her part for that, and she never had enough food herself and developed a disease of nutrition deficiency.

VAN BENSCHOTEN: Yeah, which was common. I mean, the Great Leap Forward, one of the problems was that.

XIONG: Oh, very common. Very common. And the people were hungry all the time. [There] was just not enough food for anybody to eat. Especially my mother; there's just nothing you can do about it. The stern government and the very restricted rules— You cannot go anywhere to grow something yourself, you cannot buy anything yourself [from the free market], because that's against the rule. So all you can do is just eat whatever you are rationed. And it was never

enough for her to begin with.

VAN BENSCHOTEN: So rationing was common, then, at that point.

XIONG: It's the only thing allowed. Yeah. It's the only thing you have. There was not even enough for herself, not to mention that I was eating twice as much as I was allowed, as I was given. So she suffered this nutrition deficiency for about three years.

VAN BENSCHOTEN: So you're going to school, you're getting there earlier than all the other students. Did you have many friends? What were your interests at that time?

XIONG: I don't remember the early days. I was a pretty good at making friends. My mother always said even early on I had a lot of good friends, pretty close friends. And even when I was little. One of those things is I— My mother always said that when we occasionally got the chance to [buy] some candies and cookies at home, I would be so good to my friends. And so I would [bring] them, just open the candies, or they would finish eating in one bite. [mutual laughter]

VAN BENSCHOTEN: I could imagine.

XIONG: Yeah. And I don't remember this, but my mother said that when my father came and visited us and brought some peanuts—and he [grew] them himself, and that was pretty rare at the time—I was so happy. I just brought all my friends. [mutual laughter]

VAN BENSCHOTEN: Wow.

XIONG: Yeah. So the kids, I guess they must have been happy.

VAN BENSCHOTEN: Right, yeah. They probably liked you quite a bit. When you're about six—which I guess is what, 1964?—your father has returned.

XIONG: Yeah, right, so after—I think it was 1963 or '64, I don't exactly know what time—the country was getting back to living more normally after three years of disaster across the country. My father was— How to put that? He was technically not in the prison, but it was called being released from the farm. So it was half prison, half the farm work. So it's not like a typical prison

[where] you are sentenced for many years, but it's not a normal job either. But after '63, 1963 or early '64, he, I presume it was, completed or— Whatever you call it, it's not a sentence, but the punishment or whatever, okay. And so he was allowed to come out. Then he was not to go back to his job anymore. So he was sent to a farm outside Nanchang City, in the pretty rural country. But he was allowed to reunite with my mother. So my mother [gave] up her job in the county as accountant, then moved in with my father. And then [there were] three of us, my father, my mother, and myself, finally lived there.

Then we move to a new place called Nanhu farm, where I lived for quite some years. It's a farm in the rural country called Nanhu. I have a lot of memories of that place. So I [grew] up pretty much in that place. That is where I actually remember something.

VAN BENSCHOTEN: Right.

XIONG: I was four and half or five when I first moved there and I left in 1978, when I went to college.

VAN BENSCHOTEN: You spent a long time there.

XIONG: Yeah, so that's the place I really grew up.

VAN BENSCHOTEN: What was it like growing up there? What do you remember?

XIONG: Yeah, it's a pretty rural country area. And when we first got there, and I actually remember a little bit, boy, it was all woods. It's a pretty rural place. But it was a farm and they started farming the areas, and they had a department from the university, from the agricultural university in the city there. So by that association, we were associated with some kind of educated people, intellectual people. And so that was separate from the really truly rural country, [where] you don't see any outside world, you never know anything about education or the intellectual or anything like that. So that part, and we were associated with a relatively intellectual or educational environment, better than some other countryside kids, yeah. And, so that's the environment actually that I grew up in.

VAN BENSCHOTEN: Now, was that accidental, or did your father just happen to find a job there, or did he seek a job there?

XIONG: No, he asked for it. He asked for it. Because the farm he was sent to from '58 to '61

was a farm associated with this place called Jiang Xi Agricultural University. It's a farm, but for the agricultural university; the students need a farm for their study. So that was the farm that my father was sent to, or was taken out from hard labor in the camp into this place. So when he was released, he asked that he go to another farm also associated with a university that is more rural areas, and so he was permitted, and they went to that place. And the good sense was that there were some students and college students and some teachers. So that actually was a pretty good environment as far as my growing up and my education was concerned.

VAN BENSCHOTEN: Yeah, very much.

XIONG: Yeah.

VAN BENSCHOTEN: When he returns, you say he worked on a farm; did he have any tie to the university as well, though?

XIONG: Not really, and he was never allowed to go back to teach.

VAN BENSCHOTEN: Yeah.

XIONG: Yeah, and it was not until 1979 that he was asked, "Well, do you want to [go] back to the classroom to teach again?" And he said, "Well, what can I teach them now?"

VAN BENSCHOTEN: Yeah.

XIONG: He said, "I mean, there's nothing I remember, it's all forgotten. So, I might just retire now." [laughs]

VAN BENSCHOTEN: Yeah.

XIONG: No, he was never able to go back to teaching after he was stripped of his job in 1958. But he did do some technical work when he was in the farm, For example, they tried to build up this big dam along the lake to create some fields for growing rice and because he studied forestry, he [knew] how to design things like that. And so that was the part [where] he was able to use something he learned in his college years. And so that was considered technical, and it actually made him feel pretty good for a few years until 1967, when the Cultural Revolution

started and the whole country and whole family became chaotic again. So from 1964 to early ‘67, I think they had two or three years of good life again.

VAN BENSCHOTEN: Right.

XIONG: Well, relatively speaking.

VAN BENSCHOTEN: Relatively, yeah.

XIONG: So at that time they had my first sister.

VAN BENSCHOTEN: Right.

[END OF TAPE 1, SIDE 1]

VAN BENSCHOTEN: You were talking about your family and that sort of brief period before the Cultural Revolution, I guess, when your father had gone to this Nanhu farm. Right.

XIONG: Right, so they had about two or three years of relatively peaceful life— So my mother continued working as an accountant in the accounting office for the farm and my father was able to do some designing job to build the dam and buildings like that, using some of his knowledge he learned from college. That made them feel they actually could live relatively normally. The whole country was going through this transition between the chaotic three years in ‘59, ‘60, and ‘61 to the Cultural Revolution, another ten years. Those were relatively calm years for three years. So when the political environment was relatively calm, my father’s life—like many other intellectuals that were being labeled as antirevolution, antigovernment—also was more peaceful. But they were still labeled as enemies of the people, but they were not treated so harshly as they were. And [they were] allowed to do the work and use their technical expertise, so that made them feel good.

VAN BENSCHOTEN: Right.

XIONG: Yeah. And their colleagues [did] not treat them whole lot differently, even though they [knew] it, and he was not allowed go back to teach. Of course, he could not take any managing job and like that. But as long as he was allowed to use some of his technical expertise

that made him feel very good about it.

VAN BENSCHOTEN: Right. At least he's with his family, right? He's not—

XIONG: Right, with his family, and so that was when my first sister was born; two years later my second sister was born. And then the next ten years—

VAN BENSCHOTEN: Chaos?

XIONG: [laughter] So, that was '67.

VAN BENSCHOTEN: '67?

XIONG: Yeah.

VAN BENSCHOTEN: So between, let's say, '62 to '67, you're eight. No you're nine. You're getting into sort of almost middle school now.

XIONG: Still in elementary school.

VAN BENSCHOTEN: Elementary school. What do you remember— What are your first memories of school there?

XIONG: Very easy. [laughter]

VAN BENSCHOTEN: Right.

XIONG: It was very easy. I didn't have to do anything. And, well, I guess I was smart enough in the class, because— And I did have good education from my mother and from the day care and the preschool before I lived with my father again. So compared with the education of other kids in my class, I had a better preschool education. The class was not difficult at all for me. So that, actually, I remember quite a bit. The school condition was very poor, was so poor that there were always two classes in one room.

VAN BENSCHOTEN: Right.

XIONG: The first and second grade in one room, and the third and fourth in another. The whole school only had four or five teachers, so each had to teach two different grades in one room. So we sit in the half. So one half in the first grade and the other half second grade. So when the teacher was teaching one grade, the other was doing their homework, and then they switched. I remember this, and this is what I remember: the teacher was asking a question for the higher grade and I was sitting in, so I answered the question for them. [mutual laughter]

VAN BENSCHOTEN: Right.

XIONG: Yeah. Well, I knew they were doing their homework, so the kids were just amazed. So I didn't get to study or anything, but it was also pretty easy for me.

VAN BENSCHOTEN: You say your mom was helping you. In what way did she help you, though, through your study?

XIONG: At home. I don't know specifically what she was teaching. Simple math or Chinese, that's the two major subjects the kids study in the fourth or fifth years in the school. Math and Chinese. And they don't start anything like natural science or social until they are in sixth grade. I think that is still the case. So that's one thing different from here, the kids study early on, not just English and math. They also study lots of other subjects. But in Chinese schools, the first four years they only study two things: Chinese and math. Yeah. Those things my mother was able to teach me. And my father taught me some after we lived together again. So early school life was pretty fun for me. And very easy. [laughs]

VAN BENSCHOTEN: You say the focus was on math and Chinese. Do you know if that was the case, too, before the revolution? Or was that something that the Communist Party, that the government—

XIONG: Early education in China— [tape recorder off]

VAN BENSCHOTEN: Okay, you were talking about your school years.

XIONG: Yeah, that was fun, I had enough time to play. That was really fun. The only thing, looking back, I didn't have enough of—like almost everyone else in China—were books to read. Yeah. But fairly speaking, compared with other kids— And I did have a lot of help from my parents. My father traveled quite a bit during those three years when he was responsible to design this dam and building the farm was [being] built up, and he was traveling around for a lot of purchasing. Whenever he traveled around, he always brought back a book for me. That's the one thing I benefitted from tremendously. It was not a whole lot of books, but compared with kids that just have a notebook other than just one book of Chinese, one book of math, I really had the chance to read something outside the classroom. It's difficult to determine specifically what kind of influence that early reading had on me, but that's one thing I do remember pretty clearly. I was given the chance and had the opportunity to read a lot, since even for the children books—

Very few kids had a chance like that. My parents, like many other Chinese parents, traditionally, they really emphasized the education of the children. They really do. They really do. They were pretty poor. We could just barely live and feed ourselves. It was better than a few years early on. [There] was not much money left, but still they tried to buy me some books, as much as they could. When I was five or six years old, my father bought a radio. Boy, that was a big deal, because in the whole village no one had a radio. So my father brought one back and I lived with a radio for a number of years. It was our radio. We listened to something outside, and then again, it's difficult to say specifically how that influenced me. But I remember clearly, every day I would hold the radio and listen to something.

VAN BENSCHOTEN: So what kind of books did your father bring you?

XIONG: Just a children's book. And whatever he could find from the bookstore or from the shop. It did not even come close to the quality and how wide a range [there] are these days. But still—

VAN BENSCHOTEN: You were sustained.

XIONG: These books and the books I could have in the classrooms— And of course, those were the children's books and they talked about stories for children, but it's not like the book you can read today. The content of those books were pretty revolutionary. And of course all those books must pass the inspection by the government, but still, a kids' book.

VAN BENSCHOTEN: Right. And when you had the radio, do you remember listening to any particular program? What would you listen to?

XIONG: Yes, I do. I do. There was this particular program for the kids and it was called— I don't know what's the— There's no equivalent. No, there could be the equivalent in here. It's something similar to *Sesame Street.* But the content was completely different. But it was a regular program, it was not a TV program, it was a radio program. And once every day, afternoon, I remember. I don't remember the contents right now, but that's the program I remember, and when I got home, I listened every day. That really caused a lot of my friends and my classmates to be envious, that I could have a radio to listen to.

VAN BENSCHOTEN: Right.

XIONG: Yeah.

VAN BENSCHOTEN: Did you bring your friends over or did they—?

XIONG: Yeah, well, you didn't have to bring them over, because—

VAN BENSCHOTEN: They're there. [laughter]

XIONG: It's just one big house, and they— In the village, kids always play outside. So when I listened, they would come too, next to me, and read my books and [listen to] my radio. So I remember when I grew up— A lot of kids still remember those days when they'd come to our house and read my books. And then, this is the one day I remember. Father was pretty upset when he brought my new books back, asking me, "Where's all the books?" I'd lost all of them. I'd give them out to all the friends. [mutual laughter] "I'm not going to buy them again. You had almost, like, twenty books. They're all gone!"

VAN BENSCHOTEN: So in a sense you had sort of a lending library there, you know, your friends come in, right—

XIONG: It was always like that. Even later when I was [grown] up and I was able to get more books, people still could come to my house and read some books. They borrow it, I give them, and I never get them back. [laughter]

VAN BENSCHOTEN: In a sense.

XIONG: So my father actually [wrote] down the number; he [knew] how many books he bought for me. I still remember a small box that he made for me, say when I finish it, put those books back in those boxes. There was nothing there. [mutual laughter]

VAN BENSCHOTEN: In a sense there, your father educated the entire community, in a sense. Unwittingly, but he did.

XIONG: Right, he did. And it was not intentional. But a lot of kids benefitted, of course— And I was one that really benefitted the most.

VAN BENSCHOTEN: Yeah.

XIONG: Right. So those were three or four years of peaceful time, and that's one of the reasons why the people in our village made friends with him and respected him, and the revolution was not so strong in the people when the revolution was not so propagandized and when the country was not so chaotic. And the ordinary people, they respect intellectuals. Historically, traditionally, Chinese people respect intellectuals.

VAN BENSCHOTEN: Right.

XIONG: They see you have education and you received some education and they respect you. So my father had a few good years with our neighbors. Most of them were just ordinary, uneducated people. But they had pretty good relations with my father.

VAN BENSCHOTEN: This interesting relationship your father had with, you know, his neighbors, was he under the shadow of being one of the pariahs, sort of—?

XIONG: Yeah. That's exactly right. Because— And he had a good relation with them. And when the chaotic period started up, no one could help him. But later on, some of those early neighbors, they really helped him out. They still are friends up to now. They are still friends up to now, just because of those early days.

VAN BENSCHOTEN: Right. Now, when you're growing up in this period, how aware are you of politics?

XIONG: Nothing.

VAN BENSCHOTEN: Nothing. I mean, do your parents talk about politics?

XIONG: No. I don't know if they did it on purpose or not, they'd never— I don't remember that they ever talked to me, that they were so-called bad people or enemies of the people or enemies of the country or anything like that. I don't know [if] it's because they felt shameful or they tried to not let me be negatively influenced or tried to give me a normal path of growth, but I never had any impression of that at all.And so I was just like every other boy and girl on the farm. I felt no difference whatsoever until 1967.

VAN BENSCHOTEN: When you're growing up, too, I mean, you don't live— Let's put it this way, the situation you were in, let's see, in '62, '63 was better than three or four years earlier, clearly. Were you aware as a boy growing up that your family was not living the life of Riley, definitely, but—?

XIONG: No, I don't remember at all. And I had absolutely no memories in the early years that we were living in a bigger city and a better life or anything like that. And my whole impression was that's where I grew up, on that farm. Nanhu farm is where I grew up. That's the only thing I remembered. Yeah. Those early years were pretty normal. So I only had a good memory of those first three years on that farm.

VAN BENSCHOTEN: Okay, so you're listening to the radio, you're reading books, you're playing a lot, because you're doing really well at school, and that frees up a lot of time.

XIONG: I probably did the best in the school. It's not intended that it's so easy. [mutual laughter] I really don't remember if I was studying hard or anything like that. It was just so easy.

VAN BENSCHOTEN: It just came to you.

XIONG: Yeah. Just so easy. And so I didn't have to do anything, bring any homework. I could finish all the homework before the class even finished.

VAN BENSCHOTEN: Right.

XIONG: Yeah. But probably the homework was not that big a deal anyway.

VAN BENSCHOTEN: So what other activities or interests do you have now on this farm when you're growing up?

XIONG: Oh, that was good time. And I remember, because it was still rural country, right, we could do all kinds of stuff. And I remember one thing we did was go fishing. Not fishing the fish, but fishing the frog. Fishing the frog is fun. You can see the frog is pretty dumb. Yeah, they eat bait, they lose it, you feed them, and they eat it again. [mutual laughter] I remember those early days. That was fun. And I can't believe that if you caught a fish and you lost it, they would ever come bite again. But frogs do.

VAN BENSCHOTEN: What kind of games did you play when you were growing up?

XIONG: Yeah, all kinds of games. And there's not similar games here. I don't know how to describe this. I don't know what you call that stuff. They can rotate. I don't know [if] you know that kind of toy or not.

VAN BENSCHOTEN: Probably like a top or—

XIONG: If you put it on the ground, on the floor, they keep on rotating, but it keeps on— Splash it and they keep on rotating.

VAN BENSCHOTEN: Oh, I see, yeah.

XIONG: I don't know what kind of— I don't see kids here play that kind of stuff. That was fun. And we could play along the way to school or on the way back. Of course, like other kids, we would play a lot hide and seek, games like that.

VAN BENSCHOTEN: Right.

XIONG: Yeah. That was a very playful time, my first few years at elementary school. First three or four years.

VAN BENSCHOTEN: Right.

XIONG: Yeah. I went there for three years. The class was so easy. After my first grade and they said, "Man, you don't need to go to second grade, why don't we put you in third grade?" I didn't know what it means, jumping grades, but later on they told me, "We will jump you for one grade." But to me it was not a whole lot of difference, because it was still pretty easy.

VAN BENSCHOTEN: Okay. Your parents, I mean, are helping you at school. Your father is bringing home books. Did they express to you their expectations about, you know, what you should do when you get a little older, about college?

XIONG: Not much.

VAN BENSCHOTEN: No.

XIONG: Not much. And I don't remember that. Thinking back, I can understand why is that. It's because they didn't know what kind of expectation they could have. And I was too young. And they were still living in the shadow. They didn't know what kind of future I could have, because even though they were saying that you're not guilty by association, you are. You are. And a lot of kids born in family like me, they were not allowed to have opportunities available to other kids. So they were pretty aware that those situations could happen to me.

VAN BENSCHOTEN: Right.

XIONG: Even though they were still trying to give me a normal life and encourage me, try to be positive, I don't remember that we talked about a lot what I want to be. What I could become when I grow up. I remember that I dreamed a lot of things I wanted to be when I was little. But that was out of reading those books, not really from my parents.

VAN BENSCHOTEN: Right.

XIONG: But one thing I did not dream was to become a scientist. I didn't know what a scientist looked like. I had no way to dream that one. The thing I did dream for was I dreamed of being a surgeon. One was to become a surgeon. I just somehow, I guess, saw an image, I said, "Man, that's pretty powerful. It's pretty simple. Straightforward. You take a simple knife and you cut and you cure the patient. That's it." [mutual laughter] The second was to become a general in

the army. I said, "Man, that's pretty powerful, too." And the third thing was to become an astronaut, not really fly in the sky, but to study. So that's one thing I learned by my father. He liked that kind of stuff. So I remember in the summer it was pretty hot to stay inside, so we all stayed outside and just had leisure time in the early evenings. We'd look at the sky, and I remember quite clearly, he would tell me the names of individual stars and how to recognize them. That was pretty fascinating.

VAN BENSCHOTEN: About religion, did you have any type of religious training? Did your parents have?

XIONG: No, that was not even allowed to be mentioned in China. Yeah. Religion in China is a pretty interesting phenomenon. There is not a religion like Christianity in Western countries. But Chinese culture does have a religion, but not the one that could overwhelm in the history or the whole country. If you call the culture as a religion, that's the one being consistently and educated people for thousands of years, they inherited and the people learned. But that's not really religious. It's Confucius. It's more a philosophy and it emphasizes education, but it's not religious. It's nothing to worship.

VAN BENSCHOTEN: Right.

XIONG: Right. And of course, by the time I was growing up, after 1949, even the culture was not allowed. And the only thing you can study religiously is communism.

VAN BENSCHOTEN: So even Confucius, that was—

XIONG: Was not allowed.

VAN BENSCHOTEN: Prohibited?

XIONG: It's prohibited, yes. And the only thing you can now study is communism. Yeah, there was not even an emphasis on socialism. Of course, capitalism was the worst thing in the whole world.

VAN BENSCHOTEN: Right.

XIONG: When I grew up, I read, for instances, very dark images about capitalism, about the United States, about the whole Western country. I knew very little, but every time we thought about this, it was bad.

VAN BENSCHOTEN: Right, and how did you come—? I mean, how did you learn about the United States? How did you receive this propaganda?

XIONG: Not much at all. And it was all based on the government's control of the propaganda and everything was bad. In the sixties, the only thing we learned was America is invading everybody, particularly Vietnam. They send their troops to invade, to occupy other countries. They are bombing other countries. And the United States or the Western countries are full of drugs and violence. There's nothing good at all. We were never told that science and technologies were pretty advanced or that freedom is a better world. A free world is a better world. That free world means capitalism, means the bad place.

VAN BENSCHOTEN: So religion is prohibited, but is it still being practiced, though, in some form, underground? No.

XIONG: You could easily go to prison just for that. It was completely prohibited. You could be killed even if you did it secretly. Once discovered, you'd be in huge trouble. You'd definitely go to prison for practicing religion; keep in mind, in those early days it was very much a police country. They didn't necessarily have a policeman living in every village, but the whole country operated like a police country. They controlled on every level, very, very tight. Everything you said, everything you did, and there was no way you could keep any secret. Your bank account was being controlled or there's no bank account, actually, for most people. And how much you are receiving and what do you do and what do you say to your neighbor or to your family—There's nothing secret. The government encouraged, if not required people to report anything your friend, your relative might have said that was not very good or nice to the government or to the Communist Party. They strongly encouraged people to denounce their relatives.

VAN BENSCHOTEN: That's amazing.

XIONG: That's one of the worst things that happened during the Cultural Revolution. Not only the country, but development was delayed. In my view, I think the worst thing that happened during the Cultural Revolution is they really damaged the relationship between family members and between friends. Just a simple word to describe that is "betrayal". The government encouraged that and required that. The husband reporting the wife, and the son and daughters reporting their father or mother saying, "Well, my father said something yesterday. He said something like that." This happened all the time. And at the end, nobody could trust anybody.

VAN BENSCHOTEN: Right.

XIONG: Yeah. That just really broke the basic bone of the human society. If there's no family relationship or there's no friendship between friends, this won't be any stable society. And that I can't say is beyond repair, but I think we are as a society still suffering from it. People always say, "No, don't trust everybody completely." Because they could always [give] an example of something you said to a close friend of yours, and the friend turns you in and only saves himself. This happened just all the time.

VAN BENSCHOTEN: It's interesting, because I remember reading, too, that one of the effects of the Great Leap Forward was that it did break down the family, and it seems to me with the beginning of the Cultural Revolution and this sort of self-policing—

XIONG: It was so bad. Self-policeman, yeah. It's really— Everybody experienced that. We were supposed to tell the government, tell the party what you heard about your friend, your family. You could be turned in by your family or your friend. You no longer trust anybody. I don't see what can be worse than that. The factories could be shut down and educations lost, and those things can be repaired. You can get back to normal, and if you lost ten years, you say, "Well, I'll spend the next ten years in development." But the people's relationship like that is fundamental to society. And it takes a generation to repair it. Nowadays, even now, twenty years after the Cultural Revolution, talk to older generations like my parents, they're still real suspicious to people. And to just being hurt. They experienced such a bad experience. And to see so much, experience first hand. They always tell me, "Be careful of your friend." There is no loyalty by the end. Just totally destroyed.

VAN BENSCHOTEN: All right, you've got these three years, then, at Nanhu farm that sound pretty idyllic. They sound pretty nice.

XIONG: Yeah, that was a very good life.

VAN BENSCHOTEN: Right, then your parents have two daughters, your younger sisters, and then the Cultural Revolution starts, which is another entire period of turmoil. Describe a little bit what it was like growing up for you.

XIONG: Oh boy. That was pretty bad. Now, I remember those days and that was pretty bad. So I think '66 was the year the country started on this path, but it was not in effect locally until

1967. I was nine years old; I was already in middle school. And then the whole country was chaotic and my family was chaotic, oh boy. That was probably the worst time I can remember, my whole family when I grew up. So my father was forced to separate from my mother again, from the family. And he was taken out of the family and put into the camp and physically beaten all the time.

VAN BENSCHOTEN: Oh my God.

XIONG: Yeah, all the time. I remember one night, after he came back from the camp, we slept on the same bed. And he held my hand to touch him. He came back with three broken ribs.

VAN BENSCHOTEN: In his rib, just under his [inaudible] right rib.

XIONG: Three broken ribs. I couldn't say anything. He didn't tell me what happened to him. I didn't see the worst part, but I know like many other people, so-called enemies of the people, he was beaten pretty badly, physically, not to mention mentally. That was really, really traumatic for both my father and my mother. Quite a lot, sometimes. It's much worse than the four years between '59 to '62. They were separate, they still worked, but nobody beat you. But this was much worse.

And also it was very bad for me as well. So I was living not with my parents anymore; now I was living in middle school. And everyone [knew] that my parents were bad people. So I was a kid from those bad families and I was treated differently. And I was not— There was no respect from my classmates anymore and they beat me as well. They teased me and they beat me. I was little in the class, because I jumped a class, a grade. And so I— Those were pretty bad years. We try not to talk too much with my parents, but those were very bad memories.

VAN BENSCHOTEN: Now, while this is happening, you're a kid, you're nine and ten. How did you understand what was happening? How do you explain it?

XIONG: I don't. I don't understand it completely. I don't remember now. I felt I was different from other kids, but that was happening to me all the time. I think I don't understand a lot then, I see those big labels on my father. They humiliated him, both of them, my father and my mother. They really humiliated them in a way that nowadays people just cannot imagine. For example, they had to go in the middle of the day in the middle of summer and just on their knees for an hour, and a sign, a big label, hung from their neck saying why they're bad. They had this meeting every week or every couple of weeks. They had to go to stay just on their knees and be beaten by the people and people yell at them. They had to self-criticize and to confess what kind of crime they had committed. Something— I don't know how they did it. There was no crime.

But you had to make up, you are anti-communist, you are anti-party or anti-government and [an enemy] of the people, and you are bad people. You had to keep saying how bad you are, to make a so-called confession. And this time my mother was not able to escape, so she was also out and was treated just as bad as my father. So I knew I was in a bad family and I was different from my classmates.

But that was not the worst part. The whole family of five people was living in four different places, my father in the camp, my mother in the family. I lived in the school. And my mom could not afford or could not have energy, any energy at all and after all this she was taking, to care of my two younger sisters. So both of them had to be sent to their relatives. So my sisters, they grew up in the first couple of years [with my relatives] and they were not even with my mother.

VAN BENSCHOTEN: It's amazing.

XIONG: Yeah. And the worst time came in, I think it was early 1968, and finally they told my mother, "You cannot even live here. So we're going to send you to an even poorer place and now you have to separate from your family, from everyone else. Now we're going to send you to a rural place." That was a very, very rural place, there's no electricity, no running water, no contact. It's not a whole lot different from the regular camp. So she had to move all by herself.

VAN BENSCHOTEN: This was part of a larger movement—right?—to bring all intellectuals back to the countryside?

XIONG: Yeah, yeah. You actually know that pretty well. Yeah, that's part of it. And she had to send out, even though she was already in the country, but in that part of the village, and so that was— There were still, like, a number of families associated with a department of the university, so you were sort of living in a relatively good environment in the farm, but now she [was] sent out to a very rural village. It was only, like, five or six families in the whole village. When she got there, I think it was the first week or so, the Red Guard come into the house and— What do you call this? What do you call when the FBI [Federal Bureau of Investigation] comes to somebody's house and they just check and they examine?

VAN BENSCHOTEN: Oh, yeah, sort of— What's the word for it?

XIONG: This would describe what was happening. They really hung around just looking for anything.

VAN BENSCHOTEN: Yeah, they're doing a sort of search and seizure kind of thing, yeah.

XIONG: Search, yeah. Search and— Probably it was even worse than that, because I don't know how the FBI searches people's house, but when the Red Guard came to your house there was nothing for them to search, you've been searched ten times already. They still came to search you and to see whether they could find anything. I don't know what they were looking for. Anything that could be labeled as antirevolutionary. I mean, like, you would think this is ridiculous and crazy.

They found one textbook my father used when he was in college that was in Russian, I believe. Yeah, my father studied Russian when he was in college. They said, "How can this guy study Russian?" Because the Soviet Union then was fighting with China; that was labeled also as a bad country. So he must be a spy for the Soviet Union.

VAN BENSCHOTEN: That's amazing, because if it had been five or six years earlier, that would have been fine, wouldn't it? Because there would have been better relations between—?

XIONG: Yeah, it was good relations with the Soviet Union [during the fifties]. And they just criticized things like that. And if you had good clothes, "Wow, you're living in such a good life. Where did you get the money for those ones?" You just couldn't reasonably explain anything. But the worst was in the end, when they finished the search and the whole house was like totally messed up, they just left it like that. You cleaned up. But after you cleaned up, they'd come back again. I don't know how many times they searched like that. And anybody could go, anybody could go to our house and search anytime they want.

VAN BENSCHOTEN: In the name of the Red Guard or—?

XIONG: Yeah, at any time they want. They didn't need to get permission from anybody. They just felt, "Well, today let's search somebody's home. Let's go there and just dig it out and just turn it upside down," and in the end they left. And tomorrow maybe some other group would come in again.

VAN BENSCHOTEN: So you had no privacy, either. You were being invaded, in a sense.

XIONG: There was nothing. They could come to your house anytime they want. So it was the worst time my mother could live. Yeah, there was a day she remembered when she had written a suicide note.

VAN BENSCHOTEN: Oh, wow.

XIONG: And so she asked somebody to call me back. She couldn't get to my father, she couldn't even contact him; my sister was sent away. So she asked me back and, I guess, wanted to just talk to me one more time. That's the instance she still remembers nowadays. And whenever she thinks about that one she still would cry. Just so close, on the brink of committing suicide, just couldn't live anymore. She said— I don't remember the details, but I can remember vaguely that I sensed that something was going to happen. So I told her that no matter what happens, you've got to live. I was ten or eleven years old. And my mother keeps on saying I saved her life, yeah, and she still remembers that very clear.

She said I saved her twice. That was once. The second time is the time she had a heart attack; I got her to have the operation. She said she wrote a note and she didn't give it to anybody and she just probably gave to me. And the whole house was just totally messed up. There was a search again that day. And she just lost whole, complete, whole energy to clean up, to put it back. Not like before, not with the searching, that she would put it again. This time it was just give up. There's no point to put it back, because they just—

VAN BENSCHOTEN: It's an amazing upheaval.

XIONG: And for that I was pretty grateful, that my mother was tough enough to survive. Otherwise, I don't know what would have happened to the three of us. There wouldn't be a family. So many people were not able to survive. And you hear people committed suicide all the time.

VAN BENSCHOTEN: Oh, yeah. In fact, the numbers about those who died—

XIONG: I actually know a number of them myself, even [when] I was little. I remember one of our neighbors, and his grandma just jumped in the— Just suicided, just jumped into a well. Yeah, it happened all the time.

VAN BENSCHOTEN: Okay, so this is around '67, '68, '69.

XIONG: Yeah, the worst, I think, it was '68 and '69. That was the worst time in the whole country, as well as for my family.

VAN BENSCHOTEN: And you say they humiliated your family. They went in and searched your house. Are you talking about people that you knew in this community, who would come in? You know them by name and—?

XIONG: I still knew them. I mean, this was the people. They lived with you, and they were your neighbors and your coworkers, and now they just hung around and just treated you like dirt.

VAN BENSCHOTEN: Right.

XIONG: Yeah. So that's why one of the worst things that happened in the Cultural Revolution is not just the loss of technological development or the production like that. They just turned the people against the people. These people were neighbors, were ordinary neighbors. Now, all of a sudden, one comes to another house and just searches and becomes an enemy.

VAN BENSCHOTEN: Right.

XIONG: Yeah, just like that.

VAN BENSCHOTEN: Okay. Your family, then, is separated. It's fragmented at this point. But take us through the years, say, '70 to the time, maybe, when you get up to college or just before college? What are those years like?

XIONG: Yeah, there were three or four years of very, very bad times, and two years were so bad and the whole family was so bad. And so from that point on, I was never really living with my family until I graduated from high school. So I lived outside in middle school and high school for almost six years, in a boarding school in a sense. Educationwise, I was not getting much at all, because there was nobody doing any teaching at the time. It's still called a school, though.

VAN BENSCHOTEN: Right.

XIONG: But they probably studied a couple of hours a day and they were just reading Mao's *Little Red Book.* That's just about it. There was not much education. No mathematics, no chemistry, and no physics teaching, even though it was called middle school. And this was for the first couple of years in my middle school.

Then most of the time, [we] actually worked. I was eleven years old, I remember, and we were having to go to a field to grow rice to feed ourselves. And that was not a good time. That was not. Not only the hardship of the work, but also mentally. I started realizing that even though I'm not necessarily a bad kid, I am from a bad family and that's one thing I could not change. I was being taught and told constantly that I had to make extraordinary efforts to perform better than my classmates so that I can be considered as normal or just like one of them, because I carry this extra burden. And I don't think I understood completely. But I did realize I was different from other kids.

VAN BENSCHOTEN: Right. You knew the punishment. Even though you couldn't understand why.

XIONG: I knew the punishment. I'd been punished, actually, another time. And so I had to make a self-criticism in front of my entire class for something. And, I can't even remember what I said. And something, anything that could be labeled. It might have been my showing any kind of sympathy to my family and then I would self-criticize for that. Anything I said I did, for example if I would go home on the last weekend to help my mother do something, I would self-criticize and confess. So, "That was a mistake, that was wrong, I will not do that again," just things like that.

VAN BENSCHOTEN: How often did that happen, that self-denigration in front of a class?

XIONG: Pretty often, actually. The worst time was probably '69. I did this several times.

VAN BENSCHOTEN: Now, were there other students like you, who were from these sort of "bad families," who had to make these public confessions of wrongdoing?

XIONG: I think I was the only one in the class. I did know a few other kids like me, but not in my class. I don't think I was the worst one being treated. I remember there was a girl one or two grades above me, had a very similar family situation like mine. She was kicked out. She was not even allowed to go to school. And at least I was able to stay in this school with other boys and girls in the class, still as a student, quote unquote, and was able to learn something, even though only an hour a day. That was important; if you were out of school, you could never go back. Which meant you were out, even though you were only eleven or twelve years old. [Being] unable to go to school is probably a more severe punishment than anything else with the kids. Even worse than [if] you had to make a self-criticism or confession in front of your class and get humiliated, but still probably better than not [being] allowed even to go to school.

VAN BENSCHOTEN: In a sense you were lucky, you know, in a strange way.

XIONG: I was luckier than that other girl. I remember that girl and she was never able to get back to her normal life. So after the Cultural Revolution she was never able to go to any high school. And then she just stayed in the countryside.

VAN BENSCHOTEN: Right.

XIONG: There was no career and she was not even able to, even though she was allowed later on to apply for the university, because she never got any education above seventh grade. Just out.

VAN BENSCHOTEN: Why do you think you were allowed to stay in the school? Do you know?

XIONG: Depends on how they treat it. It was so chaotic and it was just depending on one time what a person said and, I don't know, maybe her father did something more—

VAN BENSCHOTEN: So it was unpredictable.

XIONG: —more dramatic or more annoying to some leaders or [inaudible]. I don't know what the different— There was no reasoning behind all this. So I could be the one kicked out and she could be the one [who] stayed in. There was no specific reason for that.

VAN BENSCHOTEN: Now, in class, you said they were reading Mao's *Little Red Book,* about the only thing that's being read, for the most part. What was your conception of Mao? I mean, had you ever—?

XIONG: He's a god. That's all he was described as, was a god. There was nothing. If you ask anything, what's my first impression of Mao? He's not a person. He's not a human being; he's a god. I cannot possibly relate to him and I [did] not try to imagine what he's like in an ordinary sense. Except like a god.

VAN BENSCHOTEN: Okay. What happens after the middle school, where do you go? First of

all, where is the middle school?

XIONG: Still on the same farm, Nanhu farm. I think by ‘69 or ‘70, the country started to calm down a little bit. Still pretty chaotic and that was a time when all these high school graduates were sent to the countryside and that there was no college anymore. But beating was decreasing. People still had to go to work and make a living and grow rice, but it was calming down. So I think my second year in the middle school—

And I spent three years in middle school, from ‘68 to ‘71. From ‘69 or ‘70 or ‘71, it was a little bit calm, but there was not much learning at all. We had, actually, chemistry class, believe it or not. And that was like seventh, eighth grade. And we actually had a little bit of chemistry class, it was amazing. We even had English class, believe it or not. The only thing we learned was the twenty-six letters and one was wrong, I remember. [mutual laughter]

VAN BENSCHOTEN: That’s amazing.

XIONG: Yeah, the teacher could not pronounce the “W” right. And I remember pretty clearly, I think he told us to pronounce “W” as a vowel. I don’t know how he got that class. So I remember the way I learned English, it was, S, T, U, V, Vay! Instead of S, T, U, V, W. So that’s all the English I learned, you know, in high school.

So by the time I graduated from the middle school in 1971, all my education was pretty much at elementary levels. I graduated about when I was thirteen years old, when I graduated from middle school. And I was very little, very short. I just can’t do anything. To do any job physically was just not possible. So my mother was very, very concerned and didn’t know what she could do for me. So there was no further education available to anybody. After middle school, that was it, okay, there was not even high school available to anybody at the time. A lot of high school kids were sent to the countryside. And there, of course, were not any colleges. So I was thirteen years old and then my mother was really wondering what she could do for me, and not much. So I worked on the farm for several months and just went with other people. They were older than I was and a little bit stronger. And I remember the project we were working on was to dig a well. Pretty cold days, and that’s pretty hard labor.

[END OF TAPE 1, SIDE 2]

VAN BENSCHOTEN: We were talking about your schooling, and I think we’ve gotten up to 1971. You just left, I think, middle school. Your mother [Zhiying Peng] was wondering where you should go from there.

XIONG: So that was one critical point in my life. We were at a loss about what I was going to do, so young and going nowhere. So one day— If not for this accident, I don't know what would have happened. My mother encountered one of the people she knew at the time who had just come back from a meeting in Nanchang City, where the headquarters of the university is located. Remember this farm was hosting a department for veterinary medicine, but that department actually belonged to this Jiang Xi Agricultural University. The university itself was not in the farm. The university itself was about a hundred kilometers away from that department.

VAN BENSCHOTEN: Right.

XIONG: In Nanchang City. And so that was a very funny arrangement, because they argued that to run a department of veterinary medicine, you can't have it in the city. You have to go to the farm or the countryside so you can really see those animals. So the farm had a connection with the headquarters in Nanchang City, the university headquarters. People were going back and forth for meetings or business.

So one day my mother encountered a person who had just come back from a meeting, from the university and he mentioned to my mother that things had started calming down a bit, that universities now were considering reopening their high school. I was not alone, apparently. There were so many kids [who] just finished middle school, and they were about thirteen, fourteen, fifteen years old and had nowhere to go, and they [would] think about either they now go to the countryside to start farming or— And they couldn't do anything else. So they were thinking about reopening high school. And so my mother heard this and then immediately she asked, if not begging, for this person—who actually was in a management position on the farm we lived on—asking him for help, whether he could help me to go to high school if it really reopened. And that person said, "Well, yeah, I'll be going to a meeting again next month at the university, I'll look into this," because he was the director running the farm at the time, actually. He was not a very close friend, but he himself is an intellectual, and he appreciated that to get education is important. He also realized how young I was, how little, actually. I just couldn't do the work in the field. So he said he would look into this next time he went to a meeting.

He went to the meeting, came back again, and in two weeks he told my mother that, yeah, he talked to the high school, the principal or the president, and said that, yeah, so they would take me into the high school if I could go there and somehow make a living there, because that meant I would live away from my family. That was almost like boarding school, because that was, like, sixty miles away. So I couldn't come home until, like, summer vacation.

VAN BENSCHOTEN: Oh, yeah.

XIONG: And he was asking, "Well, is your son too young to live there?" My mother, "No

problem, I'll send him over." And so my mother just took me with her and went to the school, and just drove me there and brought all the clothes and left money enough to go to the cafeteria. It was not really a cafeteria, it was like a dining room. Without that, I don't think I would be sitting here.

VAN BENSCHOTEN: You're right.

XIONG: Yeah, I mean, I would just be like the girl I was mentioning. Just go to the countryside just like everyone else. But the middle school education I received, that was virtually nothing compared with what I already learned in elementary school. So even though technically or formally I graduated from middle school, educationwise, it's just like graduating from elementary school.

VAN BENSCHOTEN: Right.

XIONG: Right. So that made a huge difference and I was able to go to high school. That was only the beginning. We come to 1971 or 1972 and there is a guy, Deng Xiaoping. You probably know his name, right?

VAN BENSCHOTEN: Right.

XIONG: So he was allowed to come back and to govern the country again. And that was before the second time he was stripped of his job. He came back and the country was so chaotic. That was the year after this guy called Lin Biao fled to Mongolia and died over there; he was basically tried and then [ran] away from the prosecution by Mao Zedong. Then he was destined [to be] the successor of Mao Zedong, was the second man in the country, in the power—

VAN BENSCHOTEN: Right.

XIONG: —to run the country. So even him, he [felt] life was so unstable and even if he says something criticizing Mao, he could just be stripped overnight. And then Mao also realized the country was just so unstable going like this, sooner or later the country would get into a civil war. So the whole country, after that running away, that flight by Lin Biao, and Mao realized that the country needed to calm down a little bit, because the whole country was a really on the brink of collapse— And economically there was nobody working. Everybody was going to the streets for the Revolution, for the Cultural Revolution. So that was a time when they were hoping to come back and said we need to calm down, we need to do some work, we need get

back to work. And the people in the factory need to get back to work, the farmers need to get back to the farm to grow the rice, and students need to go back to the classroom to study. And so Deng was really trying to reform, in a sense.

And one of the things he tried very hard, which a lot of us benefitted tremendously from, was he pretty much ordered—Deng Xiaoping—that the high schools must reopen. Teachers must go back to teaching, students must go back to learning. And before that point, the student beat the teachers.

VAN BENSCHOTEN: Right.

XIONG: And they said, "You can't do that anymore." And I was lucky that one of the high schools, one of the best high schools in the whole province, Jiang Xi province, in Nanchang City, the whole high school was relocated to this university. Because this was an agricultural university, it's outside of the city. They said that all the high school teachers can't stay in the city, so they just moved them out. And they happened to move into our university. That's the best high school, one of the best high schools in Nanchang City, or maybe in the whole province. So along with the movement of the high school, all those teachers came down. The students had left. They were sent to countryside. But those high school teachers, the whole group of high school teachers were now a part of the university. They didn't know what to do. Until nowadays they said, "Well, we're going to reopen the high school, so you come back to teach." So I was so lucky, being able to attend high school in that two years and exposing and being taught by some of the best high school teachers for that two years.

It's only a year and a half before Deng Xiaoping was stripped again by Mao. You remember, Deng Xiaoping was stripped three times! No, twice, but he came back three times. So that was the second time he came back to work and was stripped again. So that was a lucky two years for me. And all I learned for the high school of six years was pretty much concentrated in that year and a half.

VAN BENSCHOTEN: Really.

XIONG: Yeah. And those are some of the very best high school teachers that we ever had. And I still remember them. Whenever I get a chance to go back, I still go to visit them if ever possible.

VAN BENSCHOTEN: Right.

XIONG: They were good. They were good.

VAN BENSCHOTEN: Well, go ahead and talk about some of them, if you would.

XIONG: Yeah. Oh boy, they were good. They were good. I remember every one of them, and my math teacher, my chemistry teacher, my physics teacher, my Chinese teachers, they were really good. For example, my math teacher, I love him so much, that guy; he liked us a lot. And he was still single at the time, and— They must [have] felt so happy being able to teach again.

VAN BENSCHOTEN: Yeah.

XIONG: And so we were fascinated, and the classroom teaching was actually different from what was being taught in the last three years. We were not learning anything, basically. We were told that there's something called a real textbook. There's a whole book about chemistry, a whole book about physics, a whole book about mathematics. [mutual laughter] Yeah, so everybody was happy. And everybody was so tired and so traumatized by this chaotic three or four years before. And the teachers felt happy that they're not beaten by the students, they're actually teaching students. And we were thrilled that we actually could learn something in the classroom. And those were good days. Those were really good days.

I remember my math teacher was a very smart guy, and he was single and he didn't have a whole lot to do during the weekend and we would hang out with him, even on the weekend. And that was fun. And I remember the way he taught and he had like three classes every morning. You know, we had three classes in our grade, that was the equivalent of eleventh or tenth grade here. And he didn't even bother to go to his office, because there were ten minutes between classes. He would just walk from one class to the next classroom. And just walking in, he would just write a math formula on the board.

VAN BENSCHOTEN: Right.

XIONG: So we just started learning right away. Yeah. And I liked that and that was fun. Yeah. That was fun. I liked spending the weekend with him. It's not common to become somewhat personal friends with your teacher. I don't think I can call him my personal friend, he was, like, much older than I was and was really a good teacher, but I think we had developed some kind of relation even outside the classroom with my math teacher. And I remember my chemistry teacher was a big fellow. He's got so much sense of humor.

VAN BENSCHOTEN: Right.

XIONG: And the teaching comes, and it was so easy for him. And then all of a sudden you learned so much from him. And I also remember my physics teachers. And it's a couple. They were both great. They could explain complicated mathematics and physics in such an easy way. Also I remember my Chinese teacher was this old man and just about to retire. His sight was very— He was very nearsighted, [wore] these very thick glasses, and he taught Chinese in a very easy way for us to remember it, and he really emphasized that what you learn in the classroom should not be separate from your daily life. And students set out writing something and they came back, he criticized and commented on our essays. And we were writing essays. I remember reporting this—what do you call this?—oh, sports event.

VAN BENSCHOTEN: Right.

XIONG: Yeah, I remember it. And he would say, "When you are describing people running very fast, don't you remember you just learned a few days ago, there's an article we studied in the classroom describing how fast these things can happen in the sky, like lightning? And that's a good sentence. Why doesn't anybody remember that, describing how fast people can run?" And he could come up with lot of examples like that and he showed us that what we learned in the book is what you can use in real life.

VAN BENSCHOTEN: Right.

XIONG: Yeah. Those were some first-class teachers and we did not appreciate fully how good they were at the time. Only to realize after they returned back to Nanchang City, to their old high school, after nineteen— I think it's '76 or '75, we realized that those are the best teachers and we were the last class they taught, because after that, when the country really started back—for the normal work they were moving back to Nanchang City. They each— Most of them became like—what do you call it?—the director of central education for the subject. But in the whole city there was like ten or twenty different schools separate in the whole city district.

VAN BENSCHOTEN: Right.

XIONG: And there's a central group that supervises individual schools for mathematics, for chemistry, for physics, and for Chinese, for history, like that. Those teachers who taught us were the directors for each course.

VAN BENSCHOTEN: Right.

XIONG: Yeah, so they were really good teachers. And they— Luckily or unfortunately, we only received three semesters of normal education, because after that, the country moved back to chaos again.

VAN BENSCHOTEN: Oh, it did?

XIONG: Because Deng Xiaoping was stripped of his job, I think it was later, 1973. And then the normal education in high school stopped again. Yeah. But luckily I had three semesters. One of my early classmates from high school just came to see me recently, and she was a visiting scholar at Harvard [University] right now. And we never saw each other for seventeen years. So we met and we were thinking back about the early days. We were so lucky then that we had that three semesters. It meant a lot to us.

VAN BENSCHOTEN: Was there any particular topic that you were very interested in or was this all pretty interesting?

XIONG: Oh boy, I was hungry. I loved everything I learned and I don't remember anything I didn't like. I was not particularly good in physics. I was very good in Chinese, in mathematics, in geography, and chemistry as well. I was not particularly good in physics. And I remember we had a competition, olympic competition for Chinese, and I got number two, and we had an olympic competition for math for the whole high school, and I was number three or something along those lines. I was never able to compete for physics. And that was a good time.

VAN BENSCHOTEN: Right.

XIONG: That was a good time. [mutual laughter] I just remember, gosh, we were so hungry and we didn't realize it was so much fun to learn. And it's very much like you don't feel food is good, but after you've been starved for a couple of days, you say, "Man, food is good."[mutual laughter] That's the very exact feeling I had. Yeah. I remember pretty clearly those days.

VAN BENSCHOTEN: So while you're at this school, are you staying in touch with your family? I mean, do you know where your sisters [Yifeng Xiong and Wen Xiong] are? Your father [Shenggao Xiong]? Mother?

XIONG: They were still living in the Nanhu farm. I was growing up, but I didn't get to see them often at all and was only able to go home for summer vacation and winter vacation and

could not afford to go to see them in the schooltime, because I would take a train. The ticket cost about— Well, you can't use today's dollar number. It was probably ten cents or less to go home, but a dollar meant a lot, and we were very, very poor at the time. The money was just enough to feed ourselves. There was no money left to buy anything, any books or anything. Yeah. But luckily, the teachers were great. Yeah.

VAN BENSCHOTEN: Okay, when these teachers leave, though, what happens to you after that?

XIONG: Right, so I graduated from high school in 1974. Those teachers stayed with us until we graduated. And stayed for two years, but after 1973, the country went back to chaos again and they couldn't do their normal teaching anymore. There was just no examinations and no real formal teaching anymore. So after '74, I graduated from high school and I was sixteen years old. So now I really had nowhere to go but go to the countryside.

VAN BENSCHOTEN: Right.

XIONG: And before that, in 1972, Deng Xiaoping attempted to reopen the university and the college, the workers in the factory and peasants in the farm recommended young men and women to go to college. So you were admitted into a college or university, not by your score, not by your performance in the exam, instead by recommendation from the people that never received any education. I don't know anywhere else this has ever happened in the modern history of the whole world.

VAN BENSCHOTEN: Right. It's not intuitive.

XIONG: It can't be more ridiculous than that. And so I was just totally out of the question for any possibility of being recommended to go to college or universities because of my family. So that was just out of the question, like many other ones. And so I was a graduate from high school in '74. I went to the countryside, I worked in the countryside for four years.

VAN BENSCHOTEN: Wow.

XIONG: Yeah, well, that was— I was sixteen years old. It was not so bad, I had grown up little bit more than three years ago. So at least now I could go to work in the field.

VAN BENSCHOTEN: What did you do for those four years?

XIONG: Oh, all kinds stuff. I grew rice and drove buffalo in the field. I worked in the orchard and grew, like, peaches, pears. All those kind of farm works. I did a number of things. And I also taught two and a half years in the middle school where I used to study myself.

VAN BENSCHOTEN: That's where your sister—

XIONG: Right. That's the time I taught my sister who was just getting to middle school. There was no formal educational college available to anybody and so a high school graduate teaching high school was pretty common. So I was asked to teach for two and a half years in middle school. So I did all kinds of stuff.

VAN BENSCHOTEN: Now, did you split your time between the farming and the teaching? Or did you—?

XIONG: No. I did a year and a half in the farm and then I was asked to go to teaching. After one semester, they said, "Okay, you're done, go back to farming." After several months, they said, "Okay, we need some people to help," I went back again. So I, in total, probably spent a year and a half in the four years in the field and about two years, two and a half years, in the school, to teach. I taught everything. I taught Chinese, I taught physics, I even taught physical PE, or physical education. Believe it or not, I even taught English.

VAN BENSCHOTEN: Right.

XIONG: I taught English.

VAN BENSCHOTEN: How good was your English at that point?

XIONG: Oh boy. That was very funny, I taught English. I didn't know how to read English myself. How could I teach? But at least I knew there was something called English; no one else even knew it!

VAN BENSCHOTEN: So, how did you like teaching?

XIONG: I loved it.

VAN BENSCHOTEN: Yeah.

XIONG: I loved it and the kids loved me. I was very energetic and I loved teaching and had a very close relationship with the students. Some were even older than I was at the time, and I loved it. I was a very good teacher, actually. I heard a lot from the parents and teachers. The one thing I remember the most is that, "This guy," meaning me, "is so bad, he comes from such a bad family, otherwise he'd be a great teacher, and the teachers love him." Yeah. And those kids, those students, they did love my lectures.

VAN BENSCHOTEN: Right.

XIONG: Yeah. I taught a lot. I was one of the best teachers in the school at the time. I enjoyed it a lot.

VAN BENSCHOTEN: What did you love specifically about teaching?

XIONG: I taught physics, I taught Chinese, and that's the two main classes I was teaching. I did a little bit on the math, but mainly Chinese and physics I was teaching them. I think my lecture was energetic and I tried to do as good as I could. In those days, teaching was not difficult if you actually know something, because compared with other teachers in the same office— A lot of them didn't even receive the same education that I did. Not to mention I was a pretty good student. At least I knew the content. And lots of teachers, they didn't understand what they were teaching. Whether or not they could do good teaching is not even a question.

VAN BENSCHOTEN: Yeah.

XIONG: Yeah, so at least I knew the stuff myself. Whether I could communicate with students, at least I could try. For some of them, they could not even try it. All they could do is pretty much just read the book. That's one of the reasons students liked my lectures so much.

VAN BENSCHOTEN: It sounded like you had good models too, because of those teachers that you had earlier, maybe.

XIONG: I think that I really followed them, but I don't think I could, because they had much more education than I had, but they influenced me a lot. Obviously, if not for that three semesters of education I got from them, it would not be possible to teach myself. Yeah. The one consistent and striking feeling I had during that four years from '74 to '78, when I was unable to go to college, that four years, and the one thing I do remember clearly is I was so hungry for anything I could grab. Books. And I just couldn't get enough to read. I was really starved.

At that time the living was getting back to normal and the stomach was not hungry anymore. We could feed ourselves. Life started calming down, was not so chaotic as the early seventies, and so the country was trying to get back to normal. People had a relatively normal life, so to speak. But one thing we really didn't have was— I was just so hungry for learning. There was no chance, no opportunity, because the university was closed, the library was shut down, there were just no books, no one I could talk to, I could learn from. I was not very close with my father. He could teach me something. I don't know, he was just totally beaten down or just in no mood or was so afraid to teach me anything that could cause him trouble or me trouble later on. So I did not learn anything from my father. From a textbook.

So one thing I did that helped me a lot was I was able to bribe one of my high school teachers. Her job was working to maintain the library that was shut down. Just clean up, just watch it. Nothing, it was just shut down.

VAN BENSCHOTEN: That's amazing. All that knowledge rusting away in there.

XIONG: It's amazing, the whole library just shut down. It's a big library, actually, there are all kinds of books, and they just collected them from anywhere. They were just locked in that room. So she was the one just supposed to clean up. And I don't know what the library was for, because it was not open— Nobody was allowed to go in there anyway. So that was her job. And so I was able to bribe her and say, "Please, just let me in," and I brought something to her, we try to make friends with her. She actually allowed me to go in there with a bag and I half borrowed, half stole. I was able to grab a whole bag of books to take home.

VAN BENSCHOTEN: Right.

XIONG: You would not imagine what I was reading. I was reading anything I could grab. It was not by choice. It's by what I could get. I was not reading much about physics or chemistry, anything like that, because that's something you cannot really teach yourself without any teachers. I couldn't find anybody. I was reading a lot of Chinese books, like Chinese literature or history or poems. I was reading the world history books. I read a couple of pretty good world history books. And I was even reading, like, economics books! [mutual laughter] I had no idea what I was reading. I just read whatever I could grab. Yeah. But it made a difference, because

no one else was reading, was studying at all. And after graduating from high school, none of my classmates was studying. And at least I was still studying, I was still reading. So that made me somewhat different from the rest of my classmates.

The worst part in that four years, for me and everybody else, was hopelessness. So all you're feeling was now your education is over, you work there, you find a girl, get married, have kids, and be just like the rest of the farmers. There's no hope— You are not allowed to go anywhere looking for a job. There's no university; you can't get any education. There's nothing happening in the whole farm. So you're just thinking about how you just would be just like one of them. So the first year in the countryside, I still feel somewhat fresh out of the classroom.

But I remember very clearly the last couple of years, especially '73 or '74, [feeling] just totally hopeless. I started growing up, getting to the age of seventeen or eighteen or twenty. And they started finding girls, and they just feel that's your life. That's about it. And there's no hope— You are reading books, but you do not have any dream that you can possibly go anywhere for any further education. [At] that time I knew there was a place called a university or college, and I knew that if you belong to a good family, you might have a chance to be recommended to go to college! That there is someplace called a college, but that's not my dream. I could not go to it. And the hopelessness was a really realistic feeling. And for the last couple years when I was in the countryside, it was very pessimistic.

VAN BENSCHOTEN: Right.

XIONG: So that's the one thing. It was not physically hard, I was growing up, I could work. I was doing pretty well in the classroom and the students liked me, but I just felt that my career or my growing up was about it and that I was going to spend the rest of my life on the farm.

VAN BENSCHOTEN: Right.

XIONG: Yeah. I can't go anywhere, I can't possibly get any education.

VAN BENSCHOTEN: And then, as you know, an important year, 1976, was when Zhou Enlai died first, then Mao Zedong died.

XIONG: Yeah, I remember that year very clearly, from the January Zhou Enlai died. We were very sad about this, because— I don't know how we got this impression, from somewhere, but we had a very good impression about him, even though we [knew] very distantly what he looked like and what he was doing. But he did give the ordinary people the impression that he was the one practically running the country, doing the business, whereas Mao was like a god. At

the time, we could not possibly think that Mao was a bad person or anything like that, but Mao did represent revolution. But Zhou represented normal life.

VAN BENSCHOTEN: Yeah.

XIONG: And so people started feeling that normal life was what they wanted. So he died and a few months later Deng Xiaoping was stripped again, was just kicked out of the party and the government. You just felt the whole country was just about starting another revolution. We did not have a real feeling about what could happen, but you could feel that this chaos was happening again. It's about to happen again. And the people become, like, used to it, and every few years there's a chaotic movement, a political movement, so to speak, from the early fifties, from early days, like [when] my father was labeled as anti-revolutionary or rightist. And every few years something like that happened. You just felt, "Well, this is another cycle." And then, whether you liked, it's almost just like getting used to it. Yeah, it's just, like, happening again. And then, of course, [we] come to September, when Mao died. That was a big shock.

VAN BENSCHOTEN: Right.

XIONG: We could not understand, or appreciate the impact at the time. But that probably was more important than anything else for the country and for myself. So we could not grab the implications in the first few months. And then you just felt, we're going to feel— And the frozen period is becoming melted, until sometime in early '77. You didn't feel anything in the beginning.

VAN BENSCHOTEN: Now, before we move on, I just want us— In '72, it was a big news story that [Richard M.] Nixon went to China and sort of, you know, opened up China to the United States. I mean, were you aware of this trip? I mean, you're fairly young, though. You're what, fourteen, fifteen? Did that make any impact on you at all?

XIONG: It did, actually, because I was very into world politics, even when I was young. I liked it. I was never really into it, but I liked it. I listened to the radio and I was fully aware of this stuff. But of course, all I knew was from the radio broadcast, but the very fact that the American president came to visit China was already big enough to [make you] think, "Well, it cannot be everybody's a monster in the United States."

VAN BENSCHOTEN: He has two legs and two arms— [mutual laughter]

XIONG: Yeah, so that's pretty clear. And that was in the middle of the period when the country was trying to get back to normal. So I don't remember any very bad feeling towards the American president at the time, even though what we heard was very limited and very restricted, but clearly we were not thinking the American people or American president was some kind of monster. It's a bad person still, the U.S., and it still represents capitalism, but it's not like the monstrous impression I had when I grew up. Right. Practically, the only impact it had on me or to people like me at that kind of level was that we realized that there is another world out there. But we were not importing anything, were never getting a chance to see any American product, anything like that. But we did start to have the impression that the outside world, they're more advanced technologically and lifewise. We start hearing words like television and air conditioning. We start to hear those words, even though we don't know exactly what they were.

VAN BENSCHOTEN: Right.

XIONG: But everything was still— The whole media was controlled by the government, and there was just nothing you could— There was no channel [where] you could get any news by yourself. Listening to, like, an American broadcast was completely illegal. That itself could get you into prison. Even though if you had a shortwave radio, you could receive it, but that's illegal. That's illegal, right. So that's the way to categorize that one is less chaotic and people are trying to return to a normal course. But it's very, very still isolated, okay.

VAN BENSCHOTEN: Right.

XIONG: So there was no direct impact by the opening to the West at the time, but we still start to feel there is another outside world out there. Because not only Nixon, but several other leaders from Western countries followed up to visit China. "Wow, there is another world outside." That's how it felt; I can remember it.

VAN BENSCHOTEN: Right. Okay, you say that in '77, after Mao's death, there's sort of a thawing. How did you—? What were signs of that thawing for you?

XIONG: The first, actually, was not a feeling of a thaw; the first was pretty scary. And then my father, I remember, he was pretty scared, he thought this was just another political movement that's just going to come in. You have to be really careful, shut your mouth, not say anything, because when every political movement has come in, the people like him would be the first target to be hit. So anything he says or I say can cause him trouble again. So the first few months or so, we were actually pretty scared at that point. I didn't say anything. It just felt unrealistic, that Mao cannot be— He's a normal human being, he also can die. And it's not like

a god who would live forever, because that's what we were chanting for years, was "Long live Chairman Mao, long live Chairman Mao!" And you know, here he actually died. During the first several months, nothing really happened. They're kind of calm. If you think back to what was the first sign of a thawing, is— There actually was no actual political movement.

VAN BENSCHOTEN: Right. That was the sign.

XIONG: That was the sign. Everyone said, "Now something big is going to happen again." It was not. Nothing was happening. We also [knew] at that time, even for the ordinary people like me, that if we could have people like Deng Xiaoping come back into power, that was good for us. There was a rumor starting around that he might come back. The fact that a rumor could spread around, which means that people could privately talk about a rumor, was already a big sign, because before that point, people could say nothing— Nobody dared to say anything along those lines. People started spreading the rumor that people like Deng Xiaoping might be coming back into power, along with a lot those old leaders coming back. That was a view, that was a sign of changing— The country might come back to normal.

But of course, the big thing that happened, the big thing that happened, the event after Mao's death was the arrest of his wife [Jiang Qiang]. Even we knew that those groups of people represented by his wife were really revolutionary. They were not caring much about normal life, not about normal work, and working to restore classroom teaching or factory work or anything like that. They were really just behind one political movement after another. We knew that's what they were for. So the fact that they were being arrested, that made you feel, "Wow, that's good."

VAN BENSCHOTEN: Yeah.

XIONG: That's good, so if there really was a first sign, that's the arrest. And of course the next— The big thing that happened to me was hearing the rumor in the summer of 1977 that the university might reopen again and this time students would get in not by recommendation, instead, by testing. That was like— I don't know how to describe that. It's unbelievable that could happen. And people started spreading the rumor in the summer of '77 that that could happen. And I didn't hear the rumor until September of 1977. That actually could happen. And everybody was allowed to take part in the exam, including people like me.

VAN BENSCHOTEN: Yeah, that is amazing.

XIONG: And among the classmates, we started talking about that. And finally, I think it was either October or November, I don't know what time, we were told that could happen. We

could register to take part in the exam that would be [held] very soon. And I don't know what time. We started grabbing around what would be tested. So that was like— [For] ten years, there was no real classroom teaching for any high school student except our three semesters I just mentioned. And we didn't even know what this college entrance exam was supposed to be.

VAN BENSCHOTEN: Right.

XIONG: No one had any idea.

VAN BENSCHOTEN: You have to reinvent it all again.

XIONG: Yeah. We had no idea what would be tested and we just tried to remember what we learned. That's the time when the three good semesters of classroom teaching I had in '72 and '73 that made a difference— It's the only thing I remembered. I think the test, the national exam, was [held]— I forgot what day, I think it was in November or something, and nobody had prepared for it. We were just told that we were allowed. So we had no idea what we were anticipating and what would come out. But that was like the biggest thing the whole year. I forgot what was the number. I remember the final statistics say that one in a hundred had a chance of being accepted.

VAN BENSCHOTEN: One out of one hundred?

XIONG: Yeah.

VAN BENSCHOTEN: Wow.

XIONG: One percent of the people [who] participated in the exam could be accepted. So that's a ratio between how many people took the exam and how many could be accepted. So the standard joke was that, like, half the people in this room can go to university, because each classroom of the examination [held] about fifty people. So when we walked in that room for the exam, that's the joke we told. So only half of the people in this room can go. Yeah, but that in itself was already a big enough shock to everybody, that you could go to college by taking an exam, not by recommendation.

VAN BENSCHOTEN: Yeah.

XIONG: Right. And that had a huge impact on every one of us. Even though the first exam I [took] in 1977, I had no idea how to prepare. We didn't even know what to prepare. And we were out of touch with the classroom, with our teachers, for two or three years. So we just grabbed teachers and made something up. I did pretty damn well. I did. But next thing came as shock. So I passed the exam, my score was good enough, but I was stripped, not allowed to go.

VAN BENSCHOTEN: Really?

XIONG: Yeah, because of my father.

VAN BENSCHOTEN: Oh, my God.

XIONG: Oh, that was one of the worst times I had in my life and probably in my parents' as well. Because he had just seen his hope, finally, after all these years. But— You actually did it. Did pretty well. And you feel that you might have a real life now— Boom! It's been stripped.

So that was very devastating and I remember that whole winter of early '78. And so we were just waiting and waiting to get the notification, whether I'd been accepted. And the post office was shut down, so my father and my mother, they walked several miles in the cold winter to another place to pick up the mail, to see when I could get these notifications. But this hope just started to slide and just slide away day by day. And because— And everyday you hear somebody, somebody is being admitted to university.

VAN BENSCHOTEN: Right.

XIONG: And somebody, somebody is being admitted. And I was not receiving anything. The most encouraging time was a rumor that there were a group of people actually coming to our university, the Jiang Xi Agricultural University, to look at my material, my paperwork, which means they were getting so close. They turned it down. The only reason is because my father was still "rightist" or "anti-revolutionary."

VAN BENSCHOTEN: So how did you find out that was the case?

XIONG: The first rumor I heard was somebody came to— What do you call it? Each university sent two or three people to individual provinces to look at exam scores and then they looked at their paperwork, okay. At that time the score was not enough, they would look at the paperwork.

The paperwork meant your family history.

VAN BENSCHOTEN: Yeah.

XIONG: And so my paperwork was asked for by Nanjing University, I heard. And the rumor was I did pretty well. I never [knew] my final score, though. But that was new to everybody. The management was not so efficient. They never told every student what score you have. But I heard my score was pretty good. And this university I applied to was a very good university, a very prestigious one. They looked at my paperwork, I assume my score probably was good enough. But they never sent out an admission letter. And the only reason we found out is [when they] looked at the paperwork, they found my father was still "anti-revolutionary." So they turned it down, my application.

VAN BENSCHOTEN: Right.

XIONG: And yeah, that was a pretty bad time. And my father felt so bad that— He just felt that he—and just because of him—killed my career. I couldn't bear to go home. I remember those days and every time we had lunch or dinner, there was no one talking.

VAN BENSCHOTEN: Yeah.

XIONG: And devastating. There was no one talking. I was so angry. And I just had my hopes lifted and then it just vanished.

VAN BENSCHOTEN: The doors closed.

XIONG: Yeah, shut you out like that.

VAN BENSCHOTEN: You didn't know whether it was ever going to be open, that's the trouble.

XIONG: Well, I know the university will be reopened. But I can't change the history of my father. So I probably will never get the chance to go there if that's the case. Even though the newspaper was saying that the policy is only based on your score, not your family, that's not what's happening in reality.

VAN BENSCHOTEN: Yeah.

XIONG: So, I got so angry. So I wrote a letter to Deng Xiaoping myself. And he actually got the letter. And I found out that later, because they have this national education meeting. The president of our university actually went to the meeting. And when he was in the meeting, somebody from Deng Xiaoping's office [came and said], "Now who's the representative from Jiang Xi Agricultural University?" So the president said, "I am." And, "Do you know this guy Yue Xiong?" And he said, "Yeah, I know him pretty well, actually," because he was a long-time friend of my parents. They knew each other for quite a long time, since the early days [when] my father was sent to the farm.

VAN BENSCHOTEN: Right.

XIONG: Yeah. He said, "What's happening?" He said, "Can you pass the notes to him that his letter was received by our office, Mr. Deng Xiaoping's office, and please tell him that he's not alone."

VAN BENSCHOTEN: That's amazing.

XIONG: "He's not alone, and we will address this issue, nationwide," because there were a lot of people like me and I was not alone. He said "We're going to change the policy and really implement this policy that kids can only be admitted to university solely by the testing, not by associations with their family." But the chance was already past for '77.

[END OF TAPE 2, SIDE 1]

[END OF INTERVIEW]

INTERVIEWEE: **Yue Xiong**

INTERVIEWER: **William Van Benschoten**

LOCATION: **University of North Carolina**
Chapel Hill, North Carolina

DATE: **10 October 2000**

VAN BENSCHOTEN: I had a few follow up questions from the last interview that we had. How did your mother [Zhiying Peng] and father [Shenggao Xiong] meet? Do you know?

XIONG: Oh. They didn't meet. They were married by the arrangement of family.

VAN BENSCHOTEN: Right.

XIONG: Yeah. I think that's pretty typical. I think they probably met. I remember they said they actually met before they actually married. But "met" is in a different sense from [when] we say "met" here.

VAN BENSCHOTEN: Right.

XIONG: When we say met here, they get to know each other, they communicate with each other, then they fall in love with each other. So that's not what happened to them. So they were pretty much arranged by the family even though they had had a chance, saw each other. So "met" probably is more accurately described as "saw each other." Yeah. It's a little bit better than most other people at the time, that never see each other—

VAN BENSCHOTEN: Right.

XIONG: —before they get married. But I don't think they had any kind of communication before they got married.

VAN BENSCHOTEN: Was there a marriage broker involved? Or how did that—? I mean, who arranged that?

XIONG: Oh, family.

VAN BENSCHOTEN: Family did.

XIONG: Family. I don't know how they knew each other, because they were not far away. There's only— My father's family and my mother's family is only ten miles away— So, fifteen kilometers away. So they're pretty close. Yeah. So they kind of knew each other.

VAN BENSCHOTEN: And when did they marry, again? Was that just before the end of the Civil War?

XIONG: Just in the middle of it.

VAN BENSCHOTEN: Oh, in the middle.

XIONG: Yeah, I think it's '47, '48.

VAN BENSCHOTEN: Okay. In the interview yesterday you said that your mother said that you were a "wild boy." What did she mean by that? Or what did you take her to mean by that?

XIONG: Yeah, it's pretty easy to describe that. [mutual laughter] For one thing, I never really studied when I was little. I told you yesterday the homework was so easy so I never really needed to study much. Well, another thing is when I was little, they both had to go to work. There was no day care available after they moved back together in 1960, late '63 or early '64. So there was no one at home to take care of me. And my grandma died early on, when I was two years old. So all they could do was just lock me in the home when they're out, and by the time they come back in one second and then my mother would say as soon as they opened the door, I would disappear.

VAN BENSCHOTEN: Right.

XIONG: Yeah. Before that, my mother always says that when she was raising me alone, before we reunited with my father, whenever I got the chance, I'd run away from the classroom. It was

so difficult to find me. I would always try to be the first one in the class, but as soon as class finished—it was day care, not really class—just difficult to find me.

VAN BENSCHOTEN: Right.

XIONG: Yeah. But that's why I have some pretty good memories from my boyhood. Very playful. There was not much homework, not like nowadays and not even mention the homework, it was so easy. I always just tried to play around.

VAN BENSCHOTEN: I know that sometimes mothers today have pagers on their children so that they can find out where they are. [laughs]

XIONG: No, my mother always had difficulty finding me. She said the one thing she remembers is that there was a river outside where we lived, outside a fence. She said I loved to go there. By the time she found me, very often, there was nothing on me. The clothes were lost and pretty much is a naked boy. They couldn't find my clothes. [mutual laughter]

VAN BENSCHOTEN: That's funny. Okay, at one point, I think in between 1958 and '62, when your father is gone—

XIONG: Right.

VAN BENSCHOTEN: —you said that your mother suffered nutritional deficiency for about three years.

XIONG: Right.

VAN BENSCHOTEN: Because she was feeding you and there was rationing, and it was just a difficult time in general for China. Was there any long-term impact on your mom physically? Or mentally?

XIONG: Yeah. It had. She developed this disease [Oedema], I don't know what it's called in English, but the whole leg swelled up. There's a term for that. I looked for it one time, I couldn't find it. I can't remember now. For that— There was a story for that, actually. Because she actually developed this ugly disease and not just because she was starving; she was given an

extra allowance for beans, yellow beans.

VAN BENSCHOTEN: Right.

XIONG: That was actually considered at the time an actual food. Not everybody could have it. So I liked it. My mother said one time I went to her and said, "Mom, look, I got swollen, too," because of all those beans.

VAN BENSCHOTEN: Right. [mutual laughter] Okay. Just to sort of complete your father's career, and your mother's career as well, at one point you said—this happened in 1979, I think—that there was the possibility of your father teaching, perhaps, but that his knowledge was sort of outdated by that point and he decided not to. Did he remain, then, a farmer?

XIONG: No. I think it was 1979 or '80 and I was already in college— So finally they— What do they call it? There's a specific term in Chinese, to the people they wrongly treated before. Now they tried to clear them. I think that's the word, "clearance." They said, "Well, we wrongly accused you." So they didn't really apologize, they just said, "Well, you were wrongly treated and so now you are back to normal, just like everyone else."

VAN BENSCHOTEN: Right.

XIONG: So they restored his salary. I don't know if they ever actually compensated for what he had lost over the previous—what? From '58 to, what?—twenty years. I don't think they really compensated what he had lost in that twenty years. But I do remember they gave him something like six hundred Chinese dollars. That's about it. I don't know how that six hundred was calculated, but it actually was a pretty big deal at time for him, because it let him feel that he had been somewhat compensated, even though that was by no means complete compensation.

VAN BENSCHOTEN: Is that a large amount or a small amount?

XIONG: At the time, six hundred Chinese dollars was a relatively large amount, the equivalent of about one year of his salary. Yeah, that's about right. But of course that was not even close to what he had lost in the previous twenty years. When he was stripped of his job, not only did he lose his job or position, he also lost all his salary, income. So that was never really repaid back. But even that small amount of money just made him feel somewhat compensated. On top of that, the university, the Jiang Xi Agricultural University, where we associate with, asked him—Say, "Now we'll restore your job as well."

Before he was stripped of his job, he was actually not faculty at the university. He was working in the capital town, capital city of Jiang Xi province, Nanchang, managing forest development, so it was not an education or academic job. It actually was a technical management job. So now, because he moved, they asked him to go back to teach, and he thought about this and then he said, "Well, there's no point for me to go back to teaching after twenty years. I couldn't remember anything. There was nothing, anything in my expertise, what I learned in the college. I can't remember anything. I have not read a single page of my books all these years." So he did not take the offer. And so instead he remained doing his technical job for designing gardens or development of land, landscape. That's what it was.

VAN BENSCHOTEN: Okay. And he did that until he retired, I take it.

XIONG: Pretty much.

VAN BENSCHOTEN: Now, is your father still alive?

XIONG: Yeah. He's here, actually.

VAN BENSCHOTEN: Oh, he is?

XIONG: Yeah, he came here to comfort my mother for her heart surgery a few months ago.

VAN BENSCHOTEN: Oh, okay, good. Okay, then let's finish out your mom's career, too. She started out— Or at least at one point, she was an accountant.

XIONG: Right.

VAN BENSCHOTEN: And then there was the upheaval of the Cultural Revolution. She was on a farm, full time.

XIONG: Very hard labor. For— So my mother actually only has two careers: Accounting and the real farming. For the real farming there was four or five years, really working in the countryside. That was actually a very difficult time. Not just mentally, but actually physically as well. She was short and physically was not very strong. She had not been involved in any hard

labor work until that point. She spent the previous [time] in an office doing accounting work. So all of a sudden she was sent to the countryside, doing the fieldwork with everyone else. It was pretty tough on her. It was very tough on her. Not only the physical part is tough, but also there was a specific disease in that area. There's no such disease [schistosomiasis] in the United States. I think in Asia at one time it was pretty bad, and right now if not completely eliminated, it [has been shrunk] to very small areas. It's a small infective agent that can infect you and infect your liver and enlarge your liver and eventually, if you are repeatedly infected, it could ultimately lead to liver cancer. Yeah, so it was pretty bad at the time.

The government eventually paid very [much] attention. So if you were diagnosed with the disease, infection, you have to undergo treatment. The treatment's very harsh. It makes you throw up and have diarrhea and a loss of weight and loss of appetite for a couple of months. Very harsh treatment.

VAN BENSCHOTEN: Right.

XIONG: Right. So she was infected twice. My father was infected three times. So that was pretty specific in that area along the lake. Yeah. When I finish, I will try to find the name of that. It's not a virus. I don't— It's not a mosquito either. It's— I think it's a type of insect. I'll find the name for you.

VAN BENSCHOTEN: Okay, good. Okay, when she leaves the farm, though, what does she do? Where does she go?

XIONG: I think it was '72 or '71, after Lin Biao died, and remember, Lin Biao escaped or fled. So at that point, the whole country calmed down somewhat. So that was the time I was going to high school, and that was a time when Deng Xiaoping came back to power the second time, tried to restore the normalcy of the country. He said, "Well, the worker should go back to the factory to do their job, the farmer should go back to the farm, the student should go back to the classroom." So that's the time my mother was asked to go back to her accounting job. Yeah.

VAN BENSCHOTEN: Okay.

XIONG: So that returned somewhat some normalcy. That was seventy— I think most likely '71 or '72.

VAN BENSCHOTEN: Okay. And she did that right up until she retired?

XIONG: Yeah, very much so.

VAN BENSCHOTEN: Now, do your mother and father live here?

XIONG: Right now?

VAN BENSCHOTEN: Yeah.

XIONG: No, they still live in Nanchang. They retired about, what? five or six years ago, probably longer than that. But they have been pretty frequently visiting us. This is their fourth visit to us in the United States. Yeah.

VAN BENSCHOTEN: That would be interesting to talk with them at some point and to obtain their impression of the United States. We'll get to your impression as well. Those first impressions are always interesting, I think.

XIONG: Right, right. It has changed quite a bit, but still you can see the difference [between] the impression I have versus what impression they have. So one is that we— Their contact with this world is much less than the way we have been. They can't drive, they can't read English, so what they know about the United States—even though they live here four times—a lot is from what we've been telling them and from reading some Chinese version of the U.S. papers.

VAN BENSCHOTEN: Right.

XIONG: Not through direct contact with the American people or community like that. The other reason is that culturally, the ideology could be quite different. They just subconsciously refuse to take some American culture. They don't say we're doing wrong, but they just simply cannot accept it. Especially [when it] comes to kids' education. They don't like it. They really think we spoil [our] daughter too much.

VAN BENSCHOTEN: Right. Let's pick up, then, where we left off yesterday. And let me summarize that. You had taken a test to enter college, you were denied entrance, probably again, because of the problems that your father had with the government. And then you wrote a letter to Deng Xiaoping, which was actually maybe not personally received by him, but it definitely had an impact. Because then a person from the government had come to your province and said,

"You know, let's look at his record," and told you that you were not alone, that there were other people as well. Go ahead and pick it up there, if you would.

XIONG: Okay. That was a very upsetting time. Finally you saw the hope mentioned. During that four years in the countryside between my high school and my college, the physical labor was not the most difficult part. The most difficult part was the [fact that] you don't feel any hope for your life. You're young, you still want to learn. You have this hunger for the knowledge. But you can't find any books to read. And the worst part is you just don't know where you're going in your life. I clearly remember those feelings and just the feeling that I will be like every other young man and woman like me, being sent to the countryside. I was the youngest one in my whole class. So I just saw them, what happened to them, ahead of me. After two or three years, you just don't know what you're doing. Can't get any good job outside the field, and you can't go to any college. You can't get any further education. So you find a girlfriend or boyfriend, and get married and have kids and that's about it. The farm life will be your whole life. And that hopeless feeling is the most difficult one.

So after '77 and '78, all of a sudden you feel that a whole new world has come in front of you. And you are actually allowed to apply to college, and you could have a chance to have a test. That's what, at least, the government had told us. That's what the newspapers said. And actually, I did pretty well on the first test in '77. And you just feel, God, a whole new world is coming, and just all of sudden, overnight, the dream has been shattered again. "Well, sorry, you still cannot go because of your father." That is something you cannot change. So that was a very, very down time for me and all my family. And very spontaneously, I wrote a letter to Deng Xiaoping. He was the real leader at the time for the country. We all knew that he's behind this whole reform. The country tried to get back to the so-called Four Modernizations. So he's really the one behind all this. I wrote to him pretty spontaneously. I don't remember if I told anybody or mentioned it to anybody afterwards. And I was actually surprised that the letter was actually received. I didn't really expect that the letter would have any impact. I was just feeling so upset, not hoping that something could happen or the letter could solve something or help me. So that's the situation as I remember it.

It was so surprising the letter was actually received. And a few months later was a meeting in Beijing, a conference discussing how the country should reform its education. And all the major universities sent a representative to Beijing, including the president from Jiang Xi Agricultural University, where we lived. And the president of the Jiang Xi Agricultural University is actually a longtime friend of my mother and my father, because they know each other very long, through the bad time and okay time previously. Because during the Cultural Revolution, he himself was beaten down as well, just like my father and my mother. So they actually [knew] each other for a very long time. So he went there for the meeting, and he was very surprised at being called up by Deng Xiaoping's office. "Well, is the president of Jiang Xi Agricultural University here?"

He said, "Yeah I'm here. What's up?"

He said, “Well, is there a young man in your university called Yue Xiong?” He say,

“Yeah, I know him.”

He says, “He wrote a letter to our office.” He was really surprised by that; he didn’t know I wrote. He said, “Please tell him we got his letter. I don’t think we are going to reply to him individually, because we got many letters like that, and tell him that his case is not alone. So we need to set and implement a policy to deal with a situation like this around the country, and start dealing case by case. And tell him that the policy will be implemented, that admission to the university will be solely dependent on merit, your testing score, not by association with your family.” And even though they said that beforehand in the first test, the policy was never really implemented. And then locally he said “We’re going to really enforce implementation of this policy. We’re going to do a better job in the second year, and tell him to prepare for the second test.”

So that was a very huge encouragement for me. So you felt that for the first time, your comment could be heard by someone in the top, and you could see the whole country’s moving forward.

VAN BENSCHOTEN: Right.

XIONG: They had a lot of this discussion in the newspaper. They did actually publish someone else’s letter, not my letter. And it was a very similar situation: Someone else from another province, and the kid had very good testing [scores] but couldn’t go to school for the same reason, because his father or his mother was still labeled as a bad person or enemy of the people. So they used that as an example, and said the policy will be implemented this year, solely based on the merit of the applicant, not by the family. And in parallel, they tried to clear us, to apologize to a lot of people that were wrongly accused for all those years, but that was an accumulation of twenty years of political movement. So that takes time. So my father was not cleared [until] after— Two years after I was in the university, actually. So you can see— You can feel that the whole country’s moving forward.

So I was able to get, like, I think about two months of leave of absence to study full time, to prepare for the ‘78 exam. And I did pretty well; I was second in terms of score in the whole area. I don’t know how many applicants participated in that test. It was just as big as the first year, and the number we heard for the first year was, like, ten million people participated—

VAN BENSCHOTEN: Wow.

XIONG: —and less than one million people were admitted. So the chance was— No, less than

that, it was just about one hundred thousand, because the ratio was just about 1 percent that could be accepted by the university. And the second year was even more, because people felt, "Wow, this is real, this is not joking, that you can just participate in the test and if you do well you can go to college." So I did pretty well in the second year and got in. That was a huge deal for me. It's almost impossible to overstate how big an impact it had on me and for my family, as well as the whole farm.

VAN BENSCHOTEN: Right.

XIONG: Because on the whole farm, there's more than a thousand people working the farm. They couldn't believe that one actually could go to college just by having a test, not by the recommendation from somebody who never even received a high school education.

VAN BENSCHOTEN: Right.

XIONG: That's what had been in the previous ten years. So that had a lot of impact. And I was the only one who got in that year.

VAN BENSCHOTEN: You set a precedent. Now other people in the province look up and say, "Well, you know, you got through, so—"

XIONG: It's probably more a political signal to the people that things are really changing. You can read from the newspaper, you can hear from the radio, but at least it's an actual person we know for years, and he actually comes from such a bad family and his father is antirevolutionary, his mother came from this bad family—because my mother's family also had a piece of property before 1949, so this is by any definition a bad family—and is an enemy of the people or the country or government. And yet he was able to go to a university, one of the best in the country, just because he had a good score on the test. So that was a pretty [big] shock to many people, and they really scratched their heads. They couldn't believe this.

And then my mother told me the story, I didn't hear this myself, and said there was another family and—it was actually a friend of ours—this was a very, very poor family before 1949. So by definition he was a good person, good family and revolutionary family, because they were really poor. So he was the poorest one in the whole farm, which meant he had the best family history, according to the standards of the Communist Party. He was really confused. He said, "Why is Yue Xiong going to the university, not my daughter?" He was genuinely confused. Why? How could that happen? Because that was just totally different from [what] he had been taught all those years. Yeah.

VAN BENSCHOTEN: Okay, so you eventually end up, though, at Fudan University, right?

XIONG: Yeah.

VAN BENSCHOTEN: And the first couple of years you take basic requirement courses, really, and it was very intense, right?

XIONG: Very intense. Although actually, pretty much a whole three years, except the last semester, when we were doing the graduate thesis experiment. For the first three years, if not three and a half years, it was very, very intense. Every semester we were taking a lot of classes, and not only because the traditional Chinese education is to try to feed students as much as possible—they're still doing that right now, it's different from here—but also the system of education is different from here in that the students didn't have a whole lot of choices. They just take whatever is being given. Here a lot of classes [are chosen] by the student; you have a curriculum, you have a requirement, and there's a core, but on top of that, that's not enough for your credit, and then you have to choose some classes yourself. But in China, pretty much you are given what you're supposed to be learning. And another thing that's different is the student was accepted into college in their major already. Here, you decide after you get into the university. You are accepted by the university, not by a specific department. That was different in China. You are accepted by a specific department in a university. So I knew I was going to study biology even before I got into college.

VAN BENSCHOTEN: Oh, you did?

XIONG: Yeah. Yeah. I was accepted by Fudan University biology department, even though I didn't know anything about biology at the time. [mutual laughter] At that time, high school was— Biology was never taught in high school.

VAN BENSCHOTEN: Now, is that because you scored well, too, on the biology part of this exam, or was this simply—?

XIONG: No. No. Because biology was not part of the test.

VAN BENSCHOTEN: Right.

XIONG: Okay, so the test consisted of six subjects: Chinese, politics, mathematics, physics, chemistry, English. So biology was not part of it.

VAN BENSCHOTEN: Okay, so you get on to Fudan University. Talk a little bit about those years. What were they like?

XIONG: If you're asking me now what's a single word or single sentence to describe those four years, it's "hard study." It's very hard studies, because we actually went into the university with a deficit from high school. I mentioned that in the six years from my middle school and high school years I only had three good semesters. And then the rest of the time was pretty much just working, never really sitting in classroom learning anything. So we have two things to finish. One, to finish what we were missing from high school, and the other, to catch up on the college classes.

But the good thing is that we were so hungry. We were working so hard, studying so hard, and all the faculty were so willing to teach. They felt so happy about it. They knew us for years. This was such a class of students. They were so hungry to learn. They really wanted to learn. They were such a positive group of students. So they must— They had as good, positive a feeling as we did. Because, well, obviously, I mean, we felt so positive, so ecstatic, so happy just because we were able to go to college. Professors were so happy that [they were] again able to teach, to teach someone who really wanted to learn it. And I mentioned yesterday that during the ten years of the Cultural Revolution, the whole system was upside down in that for a few years, where the college was reopened, it was faculty teaching students, but then students managing the university, because students were being recommended by the workers and the peasants. And they were coming to university not only for learning—actually, not many for learning—it was actually to reform the university, to manage the university. Just something, you just never can imagine it. So the teachers got very confused. They didn't know if they should listen to students or if they should teach the students. So it was a very upside down relationship. So all of sudden now the whole thing [got] back to normal. So they must have felt so happy as well, just like we did.

VAN BENSCHOTEN: So a sort of a euphoria in a way, on both sides.

XIONG: Absolutely. Absolutely. So it was very intense, and looking back, it was incredible how much we were able to learn in that four years. Not only [did] we learn what we missed in the high school years— So we had to start from scratch, really from actually below the scratch. And from what we were missing for the mathematics, for the basic chemistry and basic physics, because they had to teach us back to make sure we all came to the standard before teaching us what [we were] supposed to be learning in the college. So we got an extra load of curriculum to learn. And we did it. We did it. So that's the one thing to describe those four years.

There's one thing, I don't know how specifically I can describe how much I benefitted from it, but subconsciously I do know that I personally benefitted a lot and, different from my classmates, is that I had this habit to learn something outside the classroom, always. The interest is— My interest was always obviously broader than my classmates' and sometimes that got me into trouble, because I didn't spend enough time on my textbook, on my courses. So I was never doing outstanding or excellent in my class. For all the tests in those four years, my class had about between thirty or thirty-three students, depending on each year. So we had a lot of tests every year, midterm and the final. The scores were open to everybody, so we all knew everybody's score. I hardly scored on the top in those four years. Occasionally I was on the top, and I think we had about twenty or twenty-five courses. I probably did pretty well on a few ones I like, like genetics and math, I don't know what else. Probably in no more than five courses I reached the top five, but for most courses, I was average. And I was ranked— In the class of thirty-something, I was ranked consistently, like, number ten, eleven, twelve, along those lines.

VAN BENSCHOTEN: Now, because of this broad curiosity you sort of brought, you were doing a lot of outside study.

XIONG: That's part of the reason. I was really studying hard as my classmates into the textbook. And I liked it, I studied. But I always tried to find some time and always wanted to spend some time to read something else that I could grab. And at the time, actually, I think I was doing the right thing. No one knows how important that would be. It was not very emphasized back then that you learn broadly. Instead, traditionally the Chinese education emphasized textbook education. So you learn what you are given and you try to memorize your textbook and you are not really encouraged to learn broadly, to think yourself. So I think that's the one consistent deficit of a Chinese traditional education.

VAN BENSCHOTEN: Right.

XIONG: I think a lot of people realize this now and try to change it. But still, it's difficult to change it, because even from high school, from elementary school, students just learn very narrowly in what they learn. They carry so much homework directly derived from their textbook. They have little time to study outside the textbook. All the way from elementary school to high school to college. It's still the case right now. So they train the students, including a lot of smart students, but in very narrow vision.

VAN BENSCHOTEN: Right.

XIONG: So that's one thing the system is not doing good. But on the subject, they know really, really well, they know so much, so deep, just not broad enough. So I was a little bit different.

Well actually, quite obviously different than a lot of my classmates in that standard. It was almost getting me into trouble, not being outstanding, because at the end of your graduation, what kind of job you get, whether you can go to graduate school, [has] a lot to do with your GPA [grade point average] and the accumulation of four years. And my GPA—if GPA was a critically important factor—was not outstanding from college. Because no matter how much you learn, how much you read outside of the textbook, there's no way it can be tested and it will not be counted. Or [there is] no way to count it, anyway.

VAN BENSCHOTEN: It doesn't fulfill any of the Four Modernizations, right, if you learned about Greek architecture.

XIONG: Right, and so it was only for my own interest. And subconsciously, the more you read, the more you realized that the good scientists, they do emphasize that you need a broad knowledge to make discoveries. But that's something you cannot teach in the classroom.

VAN BENSCHOTEN: Right.

XIONG: And the fact is that they don't emphasize those. But something just made me feel that is the right thing to do, ultimately.

VAN BENSCHOTEN: So did you have any teachers or mentors that stood out at college, at this time, at Fudan?

XIONG: Not the first couple of years. I don't remember anybody my first couple years, because— The way they taught in the university is somewhat different from here in that the department of mathematics—that's not my department somehow, because I was supposed to be in the biology department—provides the math education for the whole university. So they have this whole section of faculty that just does this basic mathematics education for the first year college students. So after that, we never got to see them. We never got to see those faculty.

And I do remember then, my math professor was a woman and did pretty well, but was not very— She was a very good professor teaching and explained everything very clearly, but I don't have the impression that her teaching was very inspiring. It was very formula dependent in the sense that— And just teaching exactly what the textbook says, and very clear. It was very competent, and she could explain very clearly, but never beyond that. So I was never inspired to anything by that. And the same thing applies to my early chemistry teaching. And we learned a lot of good chemistry, like quantum chemistry and physical chemistry, but I don't remember clearly that anybody was particularly inspiring. Yeah, it was very basic and it was very solid, very solid. Solid is the word to describe it.

VAN BENSCHOTEN: Right.

XIONG: But I don't remember that any of my early physics, chemistry, and math professors would inspire me to research around the direction they were teaching, which I would assume was what a professor was supposed to do, inspire your students. Get them interested. That didn't happen to me in the first two years.

But in my third year, that happened. I actually remember very clearly, it had a lot of impact on me in my biochemistry class. Okay, so biochemistry was taught by a faculty, and her last name was Shen, [Dr. Ren-Quan Shen]. She and her husband [Dr. Zhu-Jia Sheng] were both educated at Columbia [University] early on.

VAN BENSCHOTEN: Wow.

XIONG: Yeah. And they must have had a tough time during the Cultural Revolution as well, because they were so happy to go back to the podium, to teaching students. And at the time [there] was not even a textbook available, so they had to write a textbook, they had to incorporate what they had just read and just try to remember what they had been taught years ago. And so that was as contemporary as possible. And so she walked in class— Boy, she was great. She was great and I remember a lot of the details she taught us. And it was a big class. We had a class together with the '77 class, they just combined the two together. It was a big class and she had several TA's [teaching assistants], and that just made that even more extraordinary, because a TA was not common back then in China. The TA is not like here. Here the TA job is carried by a graduate student. The TA was carried by actual faculty. Junior faculty. So you just feel, "Wow, this must be pretty serious." Because those junior faculty—and we called them teachers, we called them professor—now they were actually sitting in the same classroom just like us, learning this. So that just made you feel even more serious about this class. And that was just a really heavy class.

I remember for that whole semester, whenever the biochemistry class was, three times a week— When it started— And it was a filled, a condensed hour and very dense in the class. We were studying from basic biochemistry all the way to modern molecular genetics and the way she taught was chronologically, and very inspiring in one specific way. That is, she would describe an original experiment, all right, and she would pause. After describing the original experiment, she would ask what interpretation could [there] be for this experiment, and what was the question the experiment was designed to answer. She was very a good teacher. Very organized. The content was the best ever, because that was describing the golden stage of modern molecular biology.

VAN BENSCHOTEN: Right.

XIONG: And we're talking about from the establishment of the law of genetics, from the early days of T. [Thomas] H. Morgan, and then studying more and more, concentrating on molecular biology between 1940's to 1960's. That was a period during which DNA was discovered as genetic material and then the double helix structure was elucidated. Then a lot of the experimental approach was taken to demonstrate semi-conservative DNA replication and the illustration of genetic code. And that was— There was a time for the biology, and together with the best teacher I ever had, I just felt fascinated.

VAN BENSCHOTEN: So she taught not only basic concepts and language, the terminology, but also the history.

XIONG: Right.

VAN BENSCHOTEN: Which we don't always get even today in a U.S. college.

XIONG: No, you don't. And that was a very, very good way to teach, so that— It was very clear how the molecular biology was developed, and it had a lot of impact on me. And I remember not long ago, last summer when I was on a beach vacation, I was reading this book, *The Eighth Day of Creation [: Makers of the Revolution in Biology* by Horace F. Judson]. I thought, "Gosh, where do I remember this?" And it was in 1979, 1980's when I was in college. It was amazing I actually learned those early stories.

And I always try to think about [whether] I should do the same thing to the students here and I never get a chance, because I am not involved in teaching any undergraduates here. I was only teaching graduate classes. So I never get a chance to really give me enough time to teach a class on a basic level and to tell students how molecular biology was developed, because this is very good science. And people argue—I think it's a very reasonable argument—that the only other discipline of science that has a comparable golden age as molecular biology during the fifties or later forties is quantum physics early in this century.

VAN BENSCHOTEN: Right.

XIONG: Yeah. It was just one major discovery followed by another and they just totally revolutionized how biology was studied. And together with the fact that Dr. Shen was such a terrific faculty, teacher, I think I was not alone in being inspired by that. We were so ecstatic, [we] realized, "Wow! This is biology." That was a time— And it's such a sharp contrast that

we were learning the anatomy of animals, anatomy of the frog. You can't have more a contrast than that, because you're learning all this anatomy of the frog and— And I think boring is not an exaggeration.

VAN BENSCHOTEN: Right.

XIONG: I can't tell you those ones. I was amazed that some of my classmates were able to [be] interested in and remember the terms, and I couldn't. I tried hard, I just couldn't. I was joking, I said, "How can you possibly remember all this?" This is just memorization, this is— There was no thinking anymore, they just memorized that this particular frog is in the same family or genus with this one, and so on and so forth. I say— It's completely descriptive. I said, "There's no thinking behind this." Only a little bit of evolution, that only takes a couple of lectures, all the rest of the whole semester is descriptive. The shape of the leaf, the height of the tree, and the distribution of this particular species. I mean, that's— You can't remember all this. And so it totally suppressed your interest in biology if that's what I would be learning in the rest of two years. And so fortunately, we started learning biochemistry and molecular bio— It was not even called molecular biology, actually.

VAN BENSCHOTEN: Right.

XIONG: Yeah. And we had a couple of lectures by another faculty [Dr. Jia-Zhen Tan] at the time. He had a big impact on how the department ran the classes, even though he only taught us for a few lectures. He was a student of T. H. Morgan.

VAN BENSCHOTEN: Wow.

XIONG: Yeah. And he actually had a class early on at Columbia. So this Dr. Shen actually was his student and after taking his class, he sent both to Columbia. And he's an alumni. So traditionally, Fudan University was the best during those years—I don't know what's now in terms of molecular biology and molecular genetics education—in the whole country. They got so strong.

For those people who actually remember this early argument between the molecular genetics represented by T. H. Morgan of the United States versus Miqui Lin of Soviet Union— There was a big argument, not in the academic field, but also politically in China. And there's strange things happening here. Because even though the United States of America was considered the enemy of the communist world, socialist world, because China had this big argument with Soviet Union, Mao Zedong actually got involved in this for some unknown reason. I never figured why he would be interested in genetics. He actually met with Dr. Tan

three times and tried to learn genetics, and tried to learn the genetics of Morgan and Munder [Gregor Mendel] and then— So that Soviet genetics was never introduced seriously into China. And that's one of the main reasons why the molecular biology was so behind in the Soviet Union, because they were really hurt by this pseudoscience championed by Lishengke and his associates. That hurt the Soviets a lot. But that was not really brought into China, especially in Fudan, because all the professors, all the senior professors, a lot of them were taught in the United States in the late '40's, so they never taught Soviet genetics to us. So that was another strange thing happening during those days.

VAN BENSCHOTEN: Yeah. It was very fortunate, then, just to be at Fudan.

XIONG: Right. And so that was the time— And he only taught us a few lectures, but his students were the real ones teaching us the real biochemistry or molecular biology as we know now and that was very inspiring. Yeah. It's hard to over-describe those experiences.

VAN BENSCHOTEN: Right.

XIONG: Every class we had, it was so quiet. People just listened. There was more than a hundred in the class; it was so focused around just listening. And I heard that was the last— That Dr. Shen only taught three years, then she started teaching graduate school. So we were fortunate, as the first of three classes of the Cultural Revolution, and everybody was so eager to learn and faculty to teach.

[END OF TAPE 3, SIDE 1]

VAN BENSCHOTEN: As you're getting near the point where you're going to graduate, how are you conceiving of your future? What were the your goals?

XIONG: It's probably quite clear, and we don't know whether we can reach that goal, but it was quite clear. Because by then, the whole higher education was getting back to normal pretty rapidly and the first was the reopening of the university and having a standard entrance exam, nationally standard. Then the next thing happening was the opening of graduate school. For the first time we learned there's something beyond college education called graduate school. We never heard this one. We [did] not understand what that means. We [did] not understand why would people still need education after graduating from college. So we heard that. And probably my second or third year in college, the goal for me, as well as many of my classmates, was very clear. And the best students go to graduate school. Yeah.

So by the third year, or by the late third year or maybe early fourth year, we all concentrated on preparing the graduate school exam. Again, that was given nationally and together with individual research institutes or research universities. Each of them come with their own set of questions together with—I think it was two or three national exams. One is English—that's national, doesn't matter what major you're going to apply to—and one is politics; I think they still have the politics exam.That's pretty strange. Yeah. And then probably general biology or general physics or general mathematics for the big disciplines, the big areas. And after that, then each research institute had their own set of questions. Yeah. So our goal was very clear. At the latest my fourth year, my senior [year] in college, the goal was to try to get into graduate school, because the alternative would be that if you did not get into graduate school by the time you graduate, you'll be taking a job assigned by the government.

VAN BENSCHOTEN: Okay. You eventually take the exam. You clearly pass it. And what was the next step after that?

XIONG: Right, a lot was happening in that year. That was 1982. We were graduating. The last semester was not very busy; I think we were only taking, like, one course and then we were doing the lab research, in the lab. I was doing some kind of fermentation research, because I was majoring within the biology department, I was majoring in microbiology. And then we were taking the graduate class exam. And then, the student or applicant had choices as to which faculty or which professor do you want apply to? So I picked Dr. [San-Chiun] Shen. Not the same Dr. Shen, another one.

VAN BENSCHOTEN: Oh, okay.

XIONG: Okay. In the Chinese Academy of Science, and it's not in a university because—[It's] still the same case—research, most research in China was not carried out in universities, unlike here, instead it was carried out in the research institutes, [which] belonged to the Academy of Science.

VAN BENSCHOTEN: Oh, that's interesting.

XIONG: Yeah, it's totally separate.

VAN BENSCHOTEN: Right.

XIONG: They're totally separate and the Chinese Academy of Science, they don't carry any

teaching, they only do the research. Now they were starting to do graduate school teaching, but no undergraduate teaching involved at all. Zero. It's completely separate. But here there are some small research institutes around the country, like the one [where] I [went for] my post-doctoral research. But the situation's very different from China, because my estimation was like 75 or 85 percent of research was carried, not in the university, but in the research institute. So if you really want to do research, you go to the Academy of Science. Yeah. Only a few major universities like Fudan University or Beijing University have decent basic research programs. I mean real researching programs, beyond undergraduate teaching. Yeah.

So I picked out Dr. Shen, first name San-Chiun. I didn't know him that much, and so we were looking for the categories and how many openings were available to us. And what was already clear to me was I want to study molecular biology or molecular genetics, and so we were just looking for anything along the molecular, and there were very few back then. And a lot of research positions or graduate positions opening were still doing the traditional biology research, and, like, microbiology or animal research or plant physiology, along those lines.

VAN BENSCHOTEN: Right.

XIONG: Very few people studied real molecular biology. And the reason was pretty simple. It's because after, I think, the late fifties, the country was shut down from contact with the outside world. That was the time molecular biology was really taking off. And so China was just shut off.

VAN BENSCHOTEN: So it had never been established.

XIONG: Not established. No one knew what is molecular biology or what is molecular genetics. They heard the term. They didn't know how to study that.

VAN BENSCHOTEN: Right.

XIONG: Yeah, and only a few people who came back after receiving their education from the United States or in western Europe in the early fifties knew what it was about, but after that the whole training was disconnected. So that's why there were only a few people doing molecular biology or molecular genetic research. And Dr. San-Chiun Shen is one of them.

VAN BENSCHOTEN: Right.

XIONG: He got his Ph.D. at Caltech [California Institute of Technology]. I think it was later—Probably late forties or early fifties.

VAN BENSCHOTEN: Wow.

XIONG: And he was involved in the golden stage of molecular biology training. And [it was] also amazing because in the middle thirties to early forties a lot of early genetics was carried out by T. H. Morgan and his associates or his students in Columbia University, then they moved to Caltech and that was supposed to be the origin of molecular biology. A lot of people like Max Delbrück, Linus [C.] Pauling, and a lot of those early people were starting to do research at Caltech. And that's the time Dr. Shen was starting his Ph.D. over there and he had the first direct contact with early molecular biology. So he knows all those ones. And a lot of early friends of his are still, not acting, at least not acting right now, but still at Caltech right now. Including people like E. [Edward] B. Lewis and a number of other people. And so Dr. Shen took a lot of classes from those people. So he knows them. So that's why he's one of those people, few people, in China in the eighties, working on the molecular genetics—

VAN BENSCHOTEN: Right

XIONG: Because of his early training. And he had his own story. He came back to China in nineteen—early fifties—and got through a lot of troubles. He was almost prohibited from coming back and he really went back and he loves the country and he really wanted to do some science, and he did great. He really made some key contributions to the early molecular genetics in China, no matter how small an operation was there in the whole country. And he was [one of] a few people actually doing that. That's [what] got me attracted in the first place. I didn't know him in person in the first place. All I knew was he has such a strong background and was one of a few people doing real molecular genetics. That's what I wanted. So that was very clear to me. And I didn't want to do anything else.

VAN BENSCHOTEN: Right.

XIONG: Not traditional biology as we had been taught. Instead, I wanted to learn some modern molecular genetics. I don't think I was alone in thinking that, but I don't think there were many people thinking along those lines. And so I have to say, I have to attribute some of that kind of thinking or conviction to the outside of classroom reading I had been doing.

VAN BENSCHOTEN: Right.

XIONG: And so I— Through those readings I learned that molecular biology is a really hot topic, really represents the contemporary biological science studies. One book I read had a lot of impact on me. In China at that time the English textbook was not readily available. It's pretty limited, and I am trying to remember how did I get my hands on that book. I couldn't remember it. But the book was written by Jim [James D.] Watson.

VAN BENSCHOTEN: Oh, yeah.

XIONG: *The Molecular Biology of the Gene.*

VAN BENSCHOTEN: Oh yeah, I know that's a really famous book.

XIONG: Very famous book.

VAN BENSCHOTEN: Very small, but very large in its impact.

XIONG: It's not *The Double Helix,* though; it's the other one. It's a textbook.

VAN BENSCHOTEN: Oh, okay.

XIONG: It's a textbook on *The Molecular Biology of the Gene.* Looking back, it's very simple. And molecular biology in the early seventies and was just taking off, and was [very] primitive if using today's standard. But the way he wrote the book was such an easy way. That was very critical to me, because my English was still limited. I couldn't read the very complicated ones, nor could I read any textbook containing a lot of contemporary ongoing research. But the textbook was written by Dr. Jim Watson for the undergraduate, the first and the second year at Harvard [University], initially, so it combined his lecture notes. So it was not taught for the grad student; it was for the undergrad student. I was in my fourth year, so I was just about able to understand the book. So that was terrific. The way he had written was so clear, so simple. But it was fascinating, it complemented so nicely what I learned from the biochemistry class by Dr. Shen and I said, "Man, this is great! This is fun! This is really fun!" Because I learned chemistry and physics and mathematics, [which] emphasize a lot of logical thinking. But then there's— Once I was entering my third year for biology training, you're taking a lot of classes, don't need much thinking, just memorize, memorize and memorize, and you feel pretty bored by that. Now [you] come back to realize, "Hey, you can study biology and do all the thinking, logical thinking." And it was somewhat similar to math, that was my favorite. I said, "Wow, this is

great." And that really combined with what inspired my biochemistry class and got me convinced into wanting to study molecular biology or molecular genetics.

VAN BENSCHOTEN: Right.

XIONG: Right, so those two things now I remember pretty clearly.

VAN BENSCHOTEN: So in a sense, then, the Watson book is about problem solving. I mean, you had the information you had to memorize, but there's also now a way of thinking through biological problems.

XIONG: Right. It's probably more important that it is— And the way he wrote the book, the way that he described molecular biology—

VAN BENSCHOTEN: Right.

XIONG: —is posing the question first.

VAN BENSCHOTEN: Yeah.

XIONG: And that's different from traditional biology, [where] you go out and just observe and then you think and you summarize, but you don't know what you might be observing. You don't have specific questions before you start doing the research.

VAN BENSCHOTEN: Right.

XIONG: But the molecular biology is different. It has questions, very specific questions. What is the structure of genetic material? What is genetic material, chemically? And what's in those DNA? You want to know, what is the structure of DNA? And why would DNA be capable of carrying genetic information? And how is the DNA replicated? Those are very specific questions and he had these questions, and you'd design an experiment and then you test those questions. That's what today we call hypothesis-driven research. So you have these ideas and then you test them. Unlike anatomy of animals, and then— Yeah, you can ask, "I want to know, what is the structure of the pig?" And you open it. And you just write down what you observe. You don't need much thinking about this.

VAN BENSCHOTEN: Right.

XIONG: You can't design a pig to test; you just take whatever you have to test it. And so that's what's really fascinating to a lot people, myself included.

VAN BENSCHOTEN: Okay, so what did you begin to work on, then, in Dr. Shen's laboratory?

XIONG: Oh, I didn't do anything at all, actually. A lot of things happened during the summer of 1982, and first we took exams, and so we passed the written exam part. Then we had to go to an interview, to meet Dr. Shen directly, one by one. He asked me questions and I had no idea how well I was doing, but later on he told me I did great, and both my interview score and my written score were far better than the second guy. Yeah, so I did pretty well, so that I have to credit to my college teachers, because it is not something you can study yourself, only a small part of it. And on his own test I did very well. So that was not covered by textbook, and that I actually have to credit somewhat to myself, to the outside readings. He was amazed, actually, that I knew more than I had been taught in the school. And after the interview I was formally accepted by the Chinese Academy of Science and into the graduate program under the supervision of Dr. Shen.

And that was a time, that was a year that a lot of things happened in China in terms of opening to the outside. One thing happening was a group of American faculty, American professors or American-Chinese professors— They were born in China, were Chinese, but they came to the United States and received an education and stayed here, working here, established in the United States. So now they felt the country is back to normal, they wanted to go back to China to help them. And led by Dr. [Chen Ning] Yang at [State University of New York] Stony Brook, he's a physics [professor], and Dr. [Tsung-Dao] Lee at MIT [Massachussetts Institute of Technology]— They both shared a Nobel Prize for the discovery of this famous Yang-Lee formula in physics, I think it was 1980 they initialized the program. The way they did it is they realized that China, actually the whole country, didn't know how to send student abroad to study.

VAN BENSCHOTEN: Right.

XIONG: The whole process was unknown to anybody. And we didn't even know how to— The country didn't even know how to apply it. How to contact and how to take an exam and what kind of questions [would be] asked, anything like that, so they decided to help by initiating this program in conjunction, in collaboration with the higher education committee in China. So the

way they did this was they were the ones organizing the test, so they were responsible for organizing a program. And the China part, they selected a couple of hundred students in China to participate. So once they passed the exam, those few American professors would send letters out to a number of American universities, tell them, "This is a group of students we selected from China. They have not received any education in English or abroad. They have only been taught in China, but they are smart kids. They're brilliant, and we had a test, just one test. And so this is our recommendation. Would you [be] willing to participate in accepting this student?" That helped a lot, because otherwise the American graduate school would not be able to determine how good those students were.

VAN BENSCHOTEN: Right.

XIONG: There's no way they can test, because no one met any student in China and all the courses, the whole curriculum is different from here. They can't determine it. But with those famous faculty behind this program, a lot of programs say, "Well, yeah, we know the people giving the test, we are going to take part in." Dr. Ray Wu at Cornell University at Ithaca, he was the one [who] organized the biology program. And so the program was like this, he invited a couple of American faculty—one from the University of Chicago and another one from, I think, MIT. I forgot his name—and organized a committee and came up with a test, questions in English. They send this test—pretty extensive, I think it took a whole two days to finish up—to China. The Chinese Education Committee would organize fifty top universities and together with the Chinese Academy of Science, select— I forgot how many, I think it was two to three hundred graduate students who had just been accepted into the graduate school in various universities or in the Chinese Academy of Science, and recommended by each individual university and Academy of Science to participate in this written test. So those students were selected after they already had passed the national exam for the graduate school; they were doing the best in their individual university undergraduate program. So about two hundred across the country. So about seventy or eighty were selected after the written exam. And then the three U.S. faculty, led by Dr. Ray Wu, would fly to China and interview us one by one.

VAN BENSCHOTEN: Very elaborate.

XIONG: Yeah. And the program is called CUSBEA.

VAN BENSCHOTEN: Oh, yeah. I've heard of that.

XIONG: Yeah, it stands for China and the United States [Biochemistry Examination and Application] program. I think that's what it stands for. Right. And so I was selected by Dr. Shen and the Chinese Academy of Science to participate in the exam. So the exam was taken just like

a month later after my previous exam that got me into the Chinese Academy of Science, so I passed this exam as well. And then I had an interview with the people from the United States, I think that was in early September. It's very fast paced. As soon as we finished the exam, the exam was graded right away, and then those people just flew into China and just interviewed us. I think by the middle of September everything was determined already. So of those seventy or eighty applicants being interviewed, fifty were selected.

And [we were] all sent to Guangzhou for one year of English training. And during that English training we started applying for individual graduate programs in the United States. So that's how we came to the United States.

VAN BENSCHOTEN: Oh, I see, okay. So it's sort of a crash program, the Guangzhou. I mean, it was sort of a crash program in English, set you up for the graduate studies that you would do and pursue in the United States.

XIONG: Right, it was a complete English and cultural training. There was no science involved.

VAN BENSCHOTEN: Right.

XIONG: There was no biology involved. It was very important for us, if not necessary, because we know nothing about the United States in 1982. We never heard anything about this, and [our] English was very poor. We just barely understood those questions in those tests, but in terms of daily living, we didn't know anything about it. And so we— That helped us a lot. And besides, we needed some time to prepare those applications, and now we were starting to get into the regular applications program just like every other graduate student application in the United States. Except we were not taking any GRE [Graduate Record Exam] or TOEFL [Test of English as a Foreign Language] exam. The graduate program in the United States had to take the word and recommendation by, or written by the group of three or four American faculty [who] went to China to interview us and based on the test questions we had and the score we had. We had no idea how they compared us with our classmates in the United States in the same class. You know, we did not take the GRE exam. But we heard we did pretty well. And they were pretty impressed from Yang. So the schools participating in the exam are all very good schools.

VAN BENSCHOTEN: Right.

XIONG: In that program.

VAN BENSCHOTEN: Now, when you're at this center, I mean, are you just studying English?

XIONG: Yeah.

VAN BENSCHOTEN: Or are you also pursuing your studies under Shen?

XIONG: Once we passed the exam, I only spent a few weeks with Dr. Shen. But then we were sent to the Guangzhou English training.

VAN BENSCHOTEN: Right.

XIONG: You know, it's totally separate from the Chinese Academy of Science. So everyone in the center, called GELC—I think it stands for Guangzhou English Learning Center. That's what it stands for.

VAN BENSCHOTEN: Right.

XIONG: GELC—that's what's we still call it—and everybody would study English. And everyone was disconnected, in terms of education, from their graduate adviser. Although everybody was already accepted by an individual university or academy of science, but once you got to the center, you were not a part of it. Yeah, you did have a formal relationship, but you never saw each other. At GELC, that was a good time, that was good a time, and the only bad thing is that I broke up with my girlfriend.

VAN BENSCHOTEN: Oh, sorry to hear that. [mutual laughter]

XIONG: Other than that, it was a great time. And this four years of hard studies was over, and then we know we're going—about to go to the United States. We're learning English, it was not very hard and we had a lot of fun. And we had a group of teachers from UCLA [University of California at Los Angeles] and for the first time we learned there is something called a party. [mutual laughter] We never had a party before and we didn't know what the party was for.

VAN BENSCHOTEN: Right.

XIONG: We probably read somewhere in English articles about parties. The party means that you go to the apartment of those teachers and they bring some food, and we were just joking and drinking and talking. [mutual laughter]

VAN BENSCHOTEN: So, you eventually, though, get your M.S., right?

XIONG: Yeah.

VAN BENSCHOTEN: From Dr. Shen, from the Chinese Academy.

XIONG: I think— I don't think formally I did.

VAN BENSCHOTEN: No?

XIONG: No, I did not. To get your master's degree, you have to complete three years of classes. I did not. So what happened was I started applying, and then I got a detour of a year. We spend nine months at the Guangzhou English Center, and start applying, and by the spring you receive admission in the fall and go to school. The admission I got from the University of Rochester was not for the fall semester, it was for the next spring semester. I was only one of two people who just stayed behind, whereas all my classmates went out. Instead of going to spring semester, I decided, "Why don't I just stay and [go] to the next year?" So even though I was supposed to come to the United States in— If on schedule, it was supposed to be in 1983 and then instead I couldn't [go until] 1984. So I actually spent one year with Dr. Shen, from 1983 to 1984.

VAN BENSCHOTEN: Oh, I see.

XIONG: Different from other people, because most other classmates, they didn't have any real education with their professors as I did. And that one year made a big difference on me in two aspects. One, I got to know Dr. Shen a lot, and he had a lot of impact on me. Not just he taught me the science part, but also taught me a lot about early molecular biology. And he is a pure scientist up to these days. And I actually talked to him yesterday morning—

VAN BENSCHOTEN: Really?

XIONG: Yeah, I told him I'll be going to China next week and I will stop by to visit him. And he's a classical, traditional scientist by any standard, any sense. He doesn't like doing any administrating job. He doesn't want to be rich; he does want to become famous, though. He just wants to do the research. He just wants to do experiments. He's eighty-some years old right now, eighty-two or eighty-three—

VAN BENSCHOTEN: That's amazing.

XIONG: He still wants to do experiments. He's still running the lab. I told him, "Dr. Shen, look, you are doing too much. Just retire, just have some good life and write some books, don't go to the lab," because his eyesight is very, very, very bad. I said, "It's not good for you." He still wants to go to lab, still reading. I don't know that I will be able to do just like him. So he is a classical, traditional scientist in any standard.

But on top of that, he had one big impact on me, and I don't know [if] I can meet his expectation. He had very high expectations of me. I don't know how he [got] started, but I heard, not from him directly, but from other people, that he had very high expectations of me very early on. He must have his reasons. And [he] taught me not just to become a scientist, but to try to become a great scientist.

VAN BENSCHOTEN: Right.

XIONG: And then he really taught me that scientists are not all the same. A good scientist is different from a great scientist. So he was called a big scientist and was asking big questions and working hard and focusing and sticking to it. So that had a long impact, even nowadays.

VAN BENSCHOTEN: So a very important mentor.

XIONG: [He was] a very big, very important mentor to me. And he didn't [teach] me a lot specifically [about] how to do the experiment by hand—that was by someone else—but this kind of conversation, plus my huge respect to him, in those days had a very big impact. My own ambitions just make me wonder nowadays whether actually I can possibly meet his expectations. No matter how well I'm doing, he says, "You're doing great." And I just don't feel that I can meet his expectations. His standards are very high. It's very high. Even though his whole career was severely impaired by the political movement in China—because he moved to China and he was able do serious research in the early 1950's—but then once this political movement started, he's known— He's no exception, just like my father, and on and off and on and off. He was not able to do much research. So during the whole ten years of the Cultural

Revolution he was at a complete stop. He was begging people to let him back to do the experiment.

VAN BENSCHOTEN: That's amazing.

XIONG: And another person [who] had an impact on me, my early research life, was Dr. Ow, David Ow. He graduated from Harvard. And he's an American-born Chinese who went to Harvard after he graduated from UC [University of California] Berkeley, he went to Harvard for his graduate studies and worked on nitrogen fixation. Because of his Chinese origin, he always wanted to go to China and do some collaborative research and to help China, and he came into contact with Dr. Shen because they work in the same field of research. There's a nitrogen fixation gene regulation part. And he arranged go to China and spend a year in China doing research. It's very much independent, even though it's almost like postdoc research, technically speaking. But having someone just graduate from Harvard at the time and go to China to do research—bench research—was never heard of at the time. And not only he brought a lot of new knowledge, but he was actually on the bench doing experiments himself. Not like Dr. Shen. And he needed somebody to assist him, to help him, to translate for him, and I was the one to do that job, because that was 1983, and I was told that I would not be able to go to the United States in 1983 because my admission was in the spring semester, not regular fall semester. So I went back to Shanghai and Dr. Shen said, "Well, that's good timing. We have a visiting scholar [who] comes from Harvard, and why don't you work with him; he actually needs somebody like that. So you can learn a lot. You can help him." So I worked with him for— Not a whole year, I think it was eight or nine months. So that's my first real experimental experience on the bench with him.

VAN BENSCHOTEN: Wow. So he gave you the technical part.

XIONG: Technical part. And he was the one [who] taught me to use a pipette, taught me the very first bench experiment, my very first molecular biology experiment, yeah.

VAN BENSCHOTEN: It's amazing how all these different influences are coming together.

XIONG: Yeah, and that was very fortunate, and I didn't realize how fortunate I was. And I came to the United States and I thought I was behind my classmates by a whole year.

VAN BENSCHOTEN: Right.

XIONG: And then, once we started the class on the bench, they were so shocked that I can just go to it and do the experiment. They said, "How did you learn all this? We never even heard this in China." Then I realized I was taught probably better than I would have been, because one on one, for nine months by an outstanding graduate from Harvard, that was something not everybody could have. After 1984, I came to the United States, and Dr. Ow, David, went back and took a faculty job at UC Berkeley, and that's where he remains right now, at The Plant Gene Expression Center and a faculty member of UC Berkeley.

VAN BENSCHOTEN: You end up at the University of Rochester. How did you end up there?

XIONG: It's not by my choice. In this CUSBEA program, you're just given five applications. You apply to these five schools here, not by choice. We don't know anything. Only thing we know is Harvard, MIT, that's about it. We don't know what other universities are there in the United States. So I just applied to five schools and I was assigned. Rochester was one of them. I got in there. And I also got into Tennessee [University] and I never heard of Tennessee.

VAN BENSCHOTEN: Not a popular venue for Chinese tourism.

XIONG: Right. And I asked around, "Where's Tennessee?" So Dr. Shen said, "I think Rochester can give you a better education. You should go to Rochester," so I turned down Tennessee and came to Rochester.

VAN BENSCHOTEN: Did you take down a map and say, "Okay, where's Rochester?"

XIONG: No idea. Well, I had absolutely no clue. All I knew was Dr. Shen told me Rochester is cold. [mutual laughter]

VAN BENSCHOTEN: Well, that's true, very cold.

XIONG: He said, "Well, it's cold." I said, "Okay." [mutual laughter]

VAN BENSCHOTEN: All right, so what was your first impression of coming into the United States?

XIONG: Bloody.

VAN BENSCHOTEN: What was that?

XIONG: Bloody.

VAN BENSCHOTEN: Really?

XIONG: Yeah. You know how I got impression? Because on the flight here from China we had an in-flight movie. You know what was the movie? *First Blood.* [mutual laughter] You can't be more distorted by that, because that was the first real American movie I watched. Before that it was something nice, like *The Sound of Music.* You know that's not real life, right?

VAN BENSCHOTEN: Very old, too.

XIONG: Very old. And that's almost like fiction, like movies. I think *First Blood* was the first American movie I watched. Gosh, that was—

VAN BENSCHOTEN: "That's where I'm going!"

XIONG: You don't know what to expect. And so anything you can just— "Okay, that may be it." But you don't have a hundred percent guarantee that that will be what it is. Just take whatever you're exposed to. And so I arrived in New York and spent three days over there. My classmate [Yi-Hao Yu] let me stay in his apartment. That's my college classmate [who] participated in the same CUSBEA program [and came] a year ahead of me. And so I learned from them, through contact, that the graduate student life in the United States is very, very tense and very hard.

VAN BENSCHOTEN: Right.

XIONG: Because you have to combine the language problem, and you have to do TA-ing, you have to take classes, and you have to do your own research. It's very tough, yeah. And so that was not too surprising that that will be the way it is. But the material life, the real life was a shock. The real life was a shock.

VAN BENSCHOTEN: Right, in what way?

XIONG: [The first] sight you could see before we landed at the [John F.] Kennedy [International] Airport— [I] just couldn't believe there were so many cars. Never could understand [why] there's a whole lot of light. So one side is white, the other side is red. Then someone explained to me that white is the cars driving this way, the red is the tail lights driving that way. That was funny for us. The second thing was that we stayed in a room with air conditioning. We knew [there] was air conditioning, but that's the first time I actually—

VAN BENSCHOTEN: Felt it, experienced it.

XIONG: Felt it. Yeah. The first thing I remember is we went shopping with my classmate. He said, "Okay. We've got to go shopping; my refrigerator is empty." We went to shop in the supermarket. We heard the term supermarket, but we didn't exactly know what it meant. Then I realized, "Oh, gosh." The food was so abundant, so plentiful.

VAN BENSCHOTEN: A wonder of the modern world, seriously.

XIONG: Yes! You can just pick anything you want. So that was a shock. There was a lot of shock. I didn't have— I had a lot of shock impressions my first three days in New York, but I cannot say it's really a good one.

VAN BENSCHOTEN: Yeah.

XIONG: It was so crowded and it was not very clean. It's very rich and the building was so tall and so many cars. And so— But it was not very nice, somehow. And I don't know, it's because I started changing my real knowledge and I tried to memorize whether I had any good impression of New York City in that first three days [when I] arrived in the United States. And then after that, I finally waited to fly and go to Rochester. So that was the beginning of my new life. I spent the next five years in Rochester.

VAN BENSCHOTEN: Okay, before you get there, though, how about food, American food? Was that a difficult transition to go from what you were familiar with?

XIONG: There was no need for transition, because [it was] so abundant, just great food. We just could not imagine the food was so abundant, so plentiful. That was 1984, the country was trying to get back to normal and that's already a lot better than the middle seventies or early eighties, but still, there was no comparison. We hadn't even felt it on a high tech part like air conditioning, automobile, television, electronic, those kind of stuff. Just by looking at the food you could realize. The meat, eggs, vegetables and the fruit was unlimited, so that was a shock.

VAN BENSCHOTEN: How about your impression of American people? Because on the one hand you're surrounded by them, especially when you're in New York City, but being surrounded by them and getting to know them are two different things.

XIONG: I didn't get to know any real American people in New York City. I just saw them and crossed them. They seemed to be polite, but I got the impression they were much more polite when I got into Rochester, because on the New York street it's different things. And we were warned a lot that New York City is not safe. So you're subconsciously trying to be safe and it's a little bit scary or nervous. But nothing happened to us.

VAN BENSCHOTEN: Right.

XIONG: But it just— We'd been told by the people from UCLA that taught us English that the city's not safe. You should not carry any big dollar bills with you, not let your wallet be seen, and always watch around, and don't walk around in the dark by yourself and don't go to subways without anyone else, things like that.

VAN BENSCHOTEN: Right.

XIONG: You get the feeling there's crime everywhere. And so that prohibits you from really enjoying it.

VAN BENSCHOTEN: Right.

XIONG: We did look around, but you got this first impression— Not impression, but you got this subconsciously that something could happen to you next minute. Yeah, it was pretty nervous.

VAN BENSCHOTEN: That does cramp your enjoyment, I guess.

XIONG: It's very nervous, that's all. But after a few days, then we started adjusting. And then I only stayed for three days.

Going to Rochester is a whole new world. It's more of a countryside setting. So fresh, so nice. It's September. And that's the best time of the year. Yeah.

VAN BENSCHOTEN: When do you meet Thomas [H.] Eickbush?

XIONG: Probably my second semester. That was late '84.

VAN BENSCHOTEN: Right.

XIONG: Rochester was so fresh. It was so new and I learned so many things, then realized that people are so nice, so polite. And we— There weren't many Chinese students at Rochester at the time. We were the so-called early classes of Chinese students that came to the United States to study. I think I was [in one of] the first classes. And the first class was only one or two people. One was Deng Xiaoping's son [Zhi-Fang Deng]; [he] was my classmate.

VAN BENSCHOTEN: Oh, really?

XIONG: He was studying physics. We lived in the same apartment. Well, not the same apartment, but in the same complex. But in his class, only two people came in the whole year. Only two Chinese people. So I don't know how they lived, and so by the second year there were three. And we were the third one. And I think we had four or five. So altogether we probably had a dozen Chinese students—

VAN BENSCHOTEN: Right.

XIONG: —in the whole greater Rochester area, that's about it. If we wanted to have a group activity and everybody was joining in, all we needed was three cars. The whole Chinese student society could go in three cars. They were not very good cars. [mutual laughter] And we have so many good memories in the early days, and I remember one time we said— That was after first term exam. I don't know who called this one. We went to a party in a state park called the Letchworth. And so we all got together in the parking lot outside the dorm, only three cars, and we all fit in, we go there. And I was riding in a car with my classmates; in front of us was the

car, the big car, driven by Deng's son. The car was so poor, it stopped in the middle of the highway.

I said, "What happened?"

He said, "My car ran out of water." All five people in the car couldn't go. The car was so hot. We were asking the driver in our car if she would drive faster. She said, "I can't drive fast."

I said, "Why not? You just keep pumping more gas."

She said, "I can't, because, in this car, the maximum speed I can drive is fifty-five miles per hour. Beyond that speed the car will shake!" And she bought the car for $250. That tells how good a car we had. [mutual laughter]

VAN BENSCHOTEN: Right.

XIONG: So one third of the people couldn't go to party because Deng's car died in the middle of the highway. That's the best time of the year, the highway was such a clean highway, the leaves were turning colorful, it was just so enjoyable.

VAN BENSCHOTEN: Yeah. It is beautiful in upstate New York in the fall.

XIONG: Yeah. Apart from that, I think that's where I met my wife [Qing Yang]. Yeah, so everything came together. And life was— I felt life was great. It's really great.

VAN BENSCHOTEN: So, how did you meet her? Was she in a class that you were taking?

XIONG: Yep. And she's also a CUSBEA student, but in a different class. She was in the third class with CUSBEA, but she came to the United States on schedule and I came in delayed for one year. So I guess that brought us together. Coming to Rochester, I think it's two weeks apart. That was great.

VAN BENSCHOTEN: Well, great. So tell us a little about the work that you were doing there, the research, when you get to Rochester.

XIONG: The graduate programs at Rochester is very much like many other graduate program

across the country. That first year you do a lot of rotations. So I had to do three rotations. The second one was with Tom Eickbush. My first one, I didn't get anything done. I did it with Dr. Martin Gorovsky, my chairman of the department. For two reasons: a) he didn't talk much with me, he was very busy at administration jobs; and b) I couldn't even find where the sodium chloride was on the shelf.

VAN BENSCHOTEN: Right.

XIONG: Everything was in English and I couldn't find it.

VAN BENSCHOTEN: Yeah.

XIONG: And of course, on top of that I met my wife. We fell in love very hard. So I could hardly concentrate. Right, so my first rotation, I didn't get anything done. I was busy taking care of my classes. And after my first encounter with my adviser for the graduate studies— We had a specific adviser. The department assigned an adviser for [each] individual grad student. So I met with him and he asked me—He's supposed to be supervising me as to what classes I should take. So he asked me what classes I had been taking in China and he recommended, he said, "You're taking this biochemistry and enzymology."

And I said, "No."

And after these days, every time when he introduced me he said, "This the guy, when I met [him] the first time, he [knew] what he wanted. And then he [gave] me the impression what he wanted." The reason I didn't like that was because I don't like to learn this metabolism of biochemistry. To me that's not a whole lot different from the anatomy of a frog. It's just memorization. It's passive. I learned that once already. I just didn't want to memorize one more time.

I said, "Why don't I take some other classes on gene expression and that stuff?" And somehow, I just behaved so bluntly, so determined. And he listened to me. He's a very tough person. He doesn't usually do that. He told me later, he said the way I said it, there was no negotiating, no discussion.

VAN BENSCHOTEN: He's done.

XIONG: "Done! I'm not taking it!"

He said, "Okay," and he just let me take the advanced gene expression class. I didn't

realize how tough it was. It was very, very tough, and so I had to lock myself in the library from morning until night, and both Saturday and Sunday. The class, I just barely passed. I think I got a B+, that's about it.

VAN BENSCHOTEN: How was your English now? I mean, was that still a problem, trying to communicate with fellow humans.

XIONG: In the daily conversation it was not so bad. But we never trained in China to study by reading original research articles and every education was textbook based.

VAN BENSCHOTEN: Right.

XIONG: Right. So that's the first time we had to go to the library, find a journal and—which is another thing new to me—copy the paper and read it. Lots of them, since we didn't understand. The class was really intense.

I am really modeling the same way I learned to the class I'm teaching right now, because that was the first time— It's an entering graduate molecular biology class. It's not taught according to a textbook. Instead it's topic by topic. One topic like oncogene, two lectures; it comes with probably twenty articles. The professor just tells you something basic and you go back and read it yourself.

VAN BENSCHOTEN: Right.

XIONG: So I still want to do that, because it's very tough. But if you want to learn it, that's how you learn it. And you have to make the transition from textbook reading into reading research articles or the original articles. So that was one of the best classes I took, but it was very tough. Fortunately, it didn't kill me, though. [mutual laughter]

VAN BENSCHOTEN: What doesn't kill you only makes you stronger, right?

XIONG: Right, and, well, I could feel it, I could. But I had no idea what to expect. I was just naively thinking I could do anything. [mutual laughter]

VAN BENSCHOTEN: Yeah.

XIONG: Right. Combine all these, and I didn't get anything done in my first rotation.

VAN BENSCHOTEN: Okay, but your second rotation was Thomas Eickbush.

XIONG: My second rotation was Tom Eickbush. And then and ever since, things started back to normal. So my wife and I start calming down somewhat.

VAN BENSCHOTEN: Right. Enough said. [mutual laughter]

XIONG: And I started learning to do some basic experiments, and that tough class was over. So I could focus, do some experiments. And the experiment I was involved [in] in my second rotation involved all the DNA sequencing. And this was very new and very difficult. But that was the one technique I happened to be already doing in Shanghai with Dr. Ow for several months. So that made my life much easier.

VAN BENSCHOTEN: It was all familiar.

XIONG: I was able to get a lot done. And actually I published a first-author paper out of my second rotation, and [that's] something not many people can do. So that got Tom—Tom Eickbush ended up my thesis adviser—extremely impressed. I heard—he [didn't tell] me this; he told other people—he said, "This kid, this guy came in rotation. He did something the regular students take two years to finish, the project. I don't know how he did it." That started the joke in the department, that and I was a magician with my two hands, using pipettes in two hands. And it's getting to be a standard joke. The fact that he'd tell the students, "Go look at Yue. He had pipettes with two hands." And a couple students actually came to look at me, how I would do the experiment. They thought that might be possible.

[END OF TAPE 3, SIDE 2]

VAN BENSCHOTEN: You were talking about your first experiments in Dr. [Thomas H.] Eickbush's lab and you were saying that an article came out of that, a very important article, right?

XIONG: It was just one small article. I don't know, I don't think it's the best article. It's about the molecular evolution of a multi-gene family called chorion. It's a protein for making

eggshells. It's a multi-gene family, [which] means that there are more than a dozen genes closely related, but they are coordinately regulated. The research I was involved in through my rotations was determining the sequence of individual genes by DNA sequencing. That was before automatic DNA sequencing was invented, and we had to do the sequencing manually. That was one thing I did pretty well. And once [we] determine DNA sequence, then by comparing DNA sequencing, we can determine how that whole family of genes were co-evolved during evolution, compare the sequence and variations. And so I made a pretty good paper on this, on the topic of gene conversion. And I don't think I understood very well what the project was in terms of its interpretations, even though I knew pretty well what I was supposed to do on the bench. Just make all those sub-clones and make DNA prep, make a single strand DNA and conduct DNA sequencing. So that part was no problem. I could carry it out all by myself. So at the end, when I finished the project, Tom was pretty surprised at how much I was actually [able to] complete. He said one thing, that this guy could in one shot of rotation finish [what] someone [else] would take a semester to finish. So that was a very productive rotation.

The short part is, just like every junior student in the beginning of first year grad students beginning, I don't think I understood very well. I didn't think a whole lot; it's more of just a student not thinking about much. So luckily, working with somebody, with Tom, made a whole lot of difference, not only just with that project, but also in the next four years, [because] Tom had a relatively small lab—only five or six of us—including one technician, himself, and one undergraduate assistant, and then three graduate students; there was no postdoc. So what that means is I could have a lot of his time. Or among three of us grad students, whoever had more results got more time from him.

And that's the one thing I keep on telling the students nowadays is to try to get as much time as possible to directly contact, discuss, and try to use your faculty and professors. That's the most beneficial thing a student can do. They know a whole lot more and they care a whole lot more than anyone else about your research. And to stick your hand on your own desk, on the bench, is absolutely not the right way to do it. You have to find a way to interact with your professors as much as possible to get the most out of it.

VAN BENSCHOTEN: Right.

XIONG: That's the one thing Tom did a lot, and I think I wrote that in my introduction to my thesis. Someone like Tom really made a difference to me.

My English was not that good at the time in terms of communicating and I was uncertain about my scientific ability, and I needed some encouragement. If I encountered a faculty who was very quiet, not very interactive, I could misinterpret as I was not doing well. So that could be a misinterpretation. And with Tom, it was not like that. He's very outgoing and very interactive and we had lot of conversations in the daytime and sometimes the evening. I remember in the early days, he still came back to lab in the evening to write something. We would talk a lot. The one thing I still remember early on is for some reason he doesn't like to

wear his shoes in the lab. [mutual laughter] He would [take] his shoes off and wear his socks walking between the lab and the office. [mutual laughter] I don't know if he still does or not, but that's what I— One thing I do remember. And we had a board outside the lab, and we used it a lot when we discussed. So that's one of the first things when I set up my own lab is have a board outside, so I can— Like this one outside the lab or anywhere in the lab—outside the lab in the hallway, my office—so that whenever I talk with people, I have something I can draw [on]. That's the place we had a lot of conversations. It was very encouraging to me. Extremely beneficial to me as well.

VAN BENSCHOTEN: Right. And how did you get along with other people in the lab? It's a fairly small lab.

XIONG: Very small lab, but we got along very well. And I think probably Tom played a major role in having a lab like that. For example, and I still hear [it's] his tradition, that every summer he would have a summer party in his backyard—pretty big backyard—where we would play volleyball or badminton or even softball.

VAN BENSCHOTEN: Right.

XIONG: Every summer and every Christmas. We had at least two parties or gatherings in his house every year. We also had a chance to go out together for meetings, only— If we don't include undergraduate helper, we only had, like, five of us. One minivan is enough to carry all of us to go to a meeting together. That was fun. And we went to meetings locally, as well as one time we drove all the way to Boston—the whole lab in one van—for a meeting, that really brought a closeness around a few of us. And [there were] only three of us, plus a technician. Plus Tom, five of us, and we interacted very closely.

VAN BENSCHOTEN: Right. Now, is your soon-to-be wife [Qing Yang] in another lab at this time?

XIONG: Right. And we're in the same class, in the same department, and we're rotating through, and she entered a different lab for her research project. And that's Dr. Bob [Robert] Angerer. And he was the one [who] actually served as my first year adviser. He was the one telling people that I knew exactly what I was doing, even though I didn't. And so my wife and I spent the next five years, actually, in the same building together and eating out sometimes. And that was a great time. That was one of the most productive times of my career, as well as my personal life. We were very simple, single minded, that's the way to characterize [us].

And people always ask nowadays how come the early class of CUSBEA [China United

States Biochemistry Examination and Application] students ended up so successful in terms of their career development. Each class would end up with like fifty of us coming to the United States, entering different grad programs around the country, and— I forgot what's the last number, but at least more than half of us have continued doing basic research and conducted very successful or very productive graduate studies as well as postdoc researches and have moved on to take independent assistant professorships in various good, decent, or prestigious universities around the country. So the ratio is extremely high, and is probably higher than any other classes we have heard of. So people are always wondering why we do so well. And my simple answer is, when we first came here, we didn't know a whole lot, what else can be, and we were very narrow-minded or very focused. I don't know how to say it.

VAN BENSCHOTEN: Right, yeah.

XIONG: And all we wanted was to work hard and study hard and publish good papers and move on to good research and, as a postdoc, then to go back to China to serve the country. We never thought there was an alternative other than doing the lab research. And that's why in the first five years, my wife and I had such a simple and enjoyable life. There's nothing else; it's just doing the research and, on the weekend, have a later sleep, get up, and go to lab again.

VAN BENSCHOTEN: Right.

XIONG: It wasn't very hard—and pretty much seven days a week. Minimum is six nights in the lab. And for five years we didn't have kids. It was just the two of us—

VAN BENSCHOTEN: Right.

XIONG: So we both work.

VAN BENSCHOTEN: When do you marry? Are you married at this point, or—?

XIONG: Yeah, we met when we first got there in 1984; we married in Christmas of 1985, when her mother was visiting the United States. So we took that opportunity to get married. But things— Starting from 1984, we started living together, in and out of the lab, and we were always on the same schedule until we had our first child.

VAN BENSCHOTEN: Oh, that's interesting. How soon after you married did you have your

first child?

XIONG: Not until we graduated.

VAN BENSCHOTEN: Okay.

XIONG: Yeah, that was 1990. So for those five years life was easy. Simple, very focused. Yeah.

VAN BENSCHOTEN: Well, it has to be very convenient, too, to be with someone who understands completely the schedule you have, the goals you're trying to achieve.

XIONG: Very much so. And not just understand, but we both are doing the same thing, so that was not an issue at all, whether the one would have difficulty understanding why the other would need to work so hard. Because we were both working on the same boat toward the same goal.

VAN BENSCHOTEN: Okay. So—how can I put this?—what is your main area of research, then, when in the Eickbush lab. How did that evolve? I guess give me a quick history of that.

XIONG: Yeah, initially, working, once I joined the lab, after my third rotation, I returned to the Eickbush lab. So the first project I was involved in was still on the gene regulation of a chorion gene expression during development. That was a sort of a continuation of the project I was doing during the rotation. So that did not work very well, that project. That gene regulation part. And I was working on this project determining DNase hypersensitivity, a DNase hypersensitivity site in the promoter region. That was the project. And I spent the whole summer of 1985, plus a portion of the fall of 1985 not getting anywhere, and we now know why. It's because the whole locus, the chromatin, was very open. There was no particular site that was more sensitive to the DNase digest than any other areas. We're trying to use DNase as a probe to determine what segment of the promoter region for this multi-gene family is more sensitive. Using that as an indication whether a particular gene is more sensitive or more active in terms of expression, in terms of in the whole locus. We cannot find any particular areas [that are] more sensitive. I think most likely the whole family of genes are regulated in a very coordinated way and not really differentiated, at least not by the way we were probing it. So that didn't go anywhere, we were still working on it, but in the meantime the technician in the lab and I initiated another project. So that was my real thesis.

That was an interesting story behind that. Early on, when the molecular biology just

started, David Hogness, then at Stanford [University], was using this recombinant DNA technology to isolate genes from *Drosophila*, a very well-characterized model organism. The first group of genes they were able to put into the plasmid or put it in recombinant fashion were ribosomal genes. That's a very abundant gene, very important gene family. And the ribosomal gene was the one of the first genes being studied at the level of the recombinant DNA level. One of the side discoveries they made—they couldn't understand what was happening back then—was a fraction of ribosomal gene containing an extra piece of DNA. They were very confused, and they speculated [as to] what it might be, but it didn't make any sense. There were two speculations: a) it is an intron, as we learned back then that intervening sequence insert in the middle of a gene when the gene is expressed, the intervening sequence or intron is being spliced out. But that doesn't seem to fit very well, because there's only a fraction of this, and if it's a multi-gene family, if they were evolved from a common ancestor, you would expect every gene would have it. But only 20 percent of genes have that piece of sequence.

Then they speculated it might be a mobile element or transposable element. That doesn't make sense either, because that piece of sequence only goes to that one specific area. What we learned back then, the classical definition of a transposable element is jumping around more or less randomly in the whole genome instead of going to a specific area or site. So neither hypothesis seemed to make any sense. They didn't pursue that project. When we were working on the chorion gene, we were working on the chorion gene not from *Drosophila* but from another insect species, a silk moth called *Bombyx Mori.* And we have a genomic library made by Tom early on when he was a postdoc, and he also identified the ribosomal gene in his library, the genomic library. And he actually mapped the ribosomal gene, realized that the fraction of the *Bombyx* or silk moth ribosomal gene, similar to *Drosophila* or fruit fly, also contained a bit of extra sequences just left there. And without knowing whether it's related to *Drosophila* or not and, of course, without knowing what it might be.

So that's where we picked up, and the thing we did first is just take those genomic clones and sequence them. What we found was, yes, it is a ribosomal locus. Yes, there's a bit of extra sequence there. So we see where the extra bit of sequences sit— It's about five kilobases or less. But by looking at sequencing, we realized it's like reverse transcriptase containing retroviruses; that was a bit of a surprise. And we now know, we call them retrotransposable elements. But then we had just started learning the retroviruses and that there might be a retrotransposable element. It's a very poorly defined family of transposable elements back to 1985 or 1986. The only thing we can recognize is in the middle of it, it contains a coding region that shares a sequence homologous with a protein called reverse transcriptase, that was first discovered in retroviruses during a study of oncogene transformation. That was providing new insight as well as new questions.

First we learned that that big long sequence is not the intron. By definition, an intron doesn't code any sequences, doesn't make any proteins. The very fact that the intervening sequence is actually coding for a protein says it's not an intron. So that [has] been ruled out. Second, because the homology was to a reverse transcriptase, that would automatically lead you to think of that bit of sequence as a mobile genetic element, because retroviruses show one thing

similar to the transposable element, that once infected into human or rodent cells it is inserted randomly in the genome, like the jumping around of the transposable element. So it could be more like a transposable element than an intervening sequence. But then we have to ask the question, how come this specific transposable element only goes to one place in 123the whole genome? Which [we] never heard of before. So that was a puzzle.

So we had a first paper in 1988 [Xiong, Y. and Eickbush, T. (1988). "The site-specific ribosomal DNA insertion elecment R1Bm belongs to a class of non-long-terminal-repeat retrotransposons." *Molecular Cell Biology.* 8:1 14-123]reporting that this extra sequence in the 20S ribosomal gene encodes a reverse transcriptase-like element. The next question is to determine the mechanism by which that extra piece of sequence—which we called R1, ribosomal insertion one, or R2, ribosomal gene insertion sequence number two, because there are two different types— How are R1 or R2 elements inserted in the specific locus? So that becomes the question.

I had been thinking about this. It was a very funny story. I had been thinking and thinking and thinking. I think I can say this— So one day I went to the bathroom with Tom. We are both standing in the bathroom. I'd been thinking [about] this idea for a while. All of a sudden it just came out of my mouth. I say, "Tom, why don't I do an experiment?" I was in the bathroom, actually. And I said, "If this R1 or R2 element, like every other transposable element, also encodes an enzyme called endonuclease that would cleave the DNA for insertion in the genome, all we need is to add one modification to this hypothesis." That is, unlike other transposable elements, their endonuclease recognizes pretty much random of DNA sequence, depending on where they cut the insert, the endonuclease encoded by R1 or R2 might somehow more behave like a restriction enzyme. They only recognize one specific sequence. They can only cut one area in the whole genome. That's where the element is inserted. Of course, that sequence being cut by this sequence-specific endonuclease ought to be in the ribosomal genes.

That was not very straightforward thinking, and it was not easy thinking that way because, a) the restriction enzyme I was using as an analogy is a restriction enzyme purified from bacteria; it typically recognizes between a 4 to 7 nucleotide sequence. If you calculate randomly, any given combination of 4 to 7 nucleotide sequence can occur a hundred if not a thousand times in a genome. But we're talking about inserting only one area in a whole genome which contains a billion base pairs. So if it is indeed a specific endonuclease, it ought to recognize a much longer sequence in the genome, unlike conventional restriction enzymes we know of. So that was never heard of.

Secondly, conceptually, that was different from the way we learned about transposable elements all these years; that's supposed to be jumping around, although now we are saying this is only jumping to one area. Not only the biochemical mechanism was never heard of before, but also, evolutionarily, how did it happen? Because that was not supposed to be advantageous for the propagation of transposable elements, because you just got one area, you end up being eliminated.

VAN BENSCHOTEN: Right.

XIONG: So that's not a very good way to survive, as far as a mobile element, which is a piece of such DNA, is concerned. But the idea is good, because it's testable. If it's a specific sequence endonuclease, then we can test it easily biochemically by making recombinant protein and just test whether it can behave like other restriction enzymes and specifically cleave the ribosomal genes. It's very testable.

And I actually [came up] with a very simple strategy. Say, make a plasmid DNA which would drive the expression of this elusive or hypothetical endonuclease, and in the same plasmid DNA I would put this ribosomal gene into it that contains an insertion site but without an element yet. And hopefully, when this enzyme is expressed in *E. coli*, it would be functional and cleave the DNA. Because we know the plasmid DNA in the cell is circular; if this enzyme is indeed, as we postulated, encoding a sequence-specific endonuclease and cleaves the ribosomal gene, then it would linealize this plasmid DNA and separate the circular and the linear DNA's quite easily. If that indeed occurs.

VAN BENSCHOTEN: Right.

XIONG: So that was whole idea behind this. And I remember Tom didn't say anything when we walked out of bathroom; a few minutes later, he said, "Let's do it." I said, "It's a good idea." [mutual laughter] So he was really thinking about this one, he actually agreed.

I just devoted my whole energy into working on that idea. I probably, if not a whole year, I did spend a good eight or nine months on the idea. And nowadays I probably can do it in a week, because at that time a lot of PCR [polymerase chain reaction] technique, or cloning technique, was not available.

VAN BENSCHOTEN: Right.

XIONG: Even if you just make a construct, you design one way, but to make it— There's no easy way to make it if there's no available restriction enzyme site in the area you want to subclone. You would do this tediously. And then we have to go through a lot of things that we didn't realize, and it's not as simple as we thought. Because I thought it's very simple; if the plasmid is linealized then it will be degraded, the *E. coli* cannot grow. So I can do a genetic screen for a plasmid that doesn't grow. But it turns out, now we realize that was not the right way of thinking about this, because the *E. coli* replicated DNA so fast then, then it's faster than the way it is degraded. So even the linealized— Only a small portion at any given time is linealized, but the majority of plasmid DNA are still circular, and the *E. coli* bacteria still have no problem continuing to grow. Even a small portion of DNA or plasmid DNA is being

linealized. But that was a not problem for the *E. coli* growth, which was the way I was initially screening. So that didn't work. So instead of looking for the *E. coli* growth genetic screen, I was starting to do a biochemical screen, looking for the evidence of DNA linealization. And I spent several months; still couldn't get it.

One day we were talking to a faculty in the department. He said, "The way you extract DNA is not right." Because the conventional way of extracting plasmid DNA involves a denaturing agent called SDS. So that would denature everything. So you will not be able to separate circular DNA from linealized one. If there is DNA linealized in the *E. coli* cells, you could not detect it. So you've got to find a way to do this. Then I said, "Oh boy, that must be the reason." So if there was DNA being cleaved by this putative endonuclease, the method I was using would not allow me to detect this. And then I modified the method. I used the so-called mild extracting method allowing, presumably, the isolation of both the linealized DNA as well as the supercoiled DNA. And boy, that was lucky. And I thought this—

I actually remember how the discovery was made. It was a Friday, and I looked at my gel and I saw a nice, very nice linear band. And that's exactly what we had been predicting and we'd been dreaming of. And that's the first time. That's the first time I really tasted the feeling of making a discovery. The whole weekend, I couldn't sleep and I was so excited and so exhausted, both myself and my wife. We got— And she had probably been just dragged by me to look at this endonuclease, endonuclease, endonuclease for about eight or nine months. [mutual laughter] And finally we got it. The whole weekend actually was pretty cool; I didn't tell anybody except my wife. So by Sunday, I think I pretty much convinced myself.

Then what I did, Sunday night, pretty late, before I left the lab, I just [took] a piece of paper towel, and I wrote a note on my desk to Tom, and I wrote, "Tom, I got it." [mutual laughter] I would come to the lab pretty late, after eleven. So Tom came pretty early, like seven-thirty in the morning. So he was yelling at me later. He said, "You just got me crazy for the whole morning without knowing what you got!" Of course he knew what I was doing, but he couldn't believe I actually got that, because there was no sign before that weekend that anything was working. It was just working all of sudden. Everything's just sitting there. There was no other interpretation. It's pretty simple.

VAN BENSCHOTEN: Right.

XIONG: And you got it, you got it. So he was walking in the back, out and in and out of the lab. Pacing. [mutual laughter] So when I came in, he said, "What did you get?" I said, "I got the endonuclease." [mutual laughter]

VAN BENSCHOTEN: Did he fall over?

XIONG: Yeah, then he kept on telling that story to a lot of students. Subsequently yes, he said, "That's how he just got it. He was just cool."

I said, "I was cool, but you don't know how exhausted I was the whole weekend."

VAN BENSCHOTEN: Exactly.

XIONG: Because I wanted to make sure I was not making things up and I was not just misinterpreting my result, that it was a real discovery. That was really exciting, that part, yeah. And so at that point, then things became much easier. Once [you've] got activity, then the assay was very easy. We were looking at a few months of follow up, and then we submitted a paper. So that was published in *Cell* [Xiong and Eickbush (1988) *Cell* 55:235-246] a few months later without much revision at all. And it just went in pretty straightforwardly and it carried a number of implications, a) we established a system to study other transposable elements; and b) that was a time when people started realizing that the reverse transcriptase containing mobile element is much bigger family than previously realized. Because previously, when Barbara McClintock discovered the transposable element fifty years ago, it was the so-called DNA based mobile element, which goes from DNA to DNA to DNA. So this is a different class, like retroviruses. And for a while people were thinking this was probably a deviant group, a sub-branch; now it turns out that all the way from mammalian cells to yeast, the retrotransposable element, as we call it now, which stands for reverse transcriptase containing transposable element, represents a much bigger family of genes than we realized. For example, in mammalian cells, it represents more than ten percent of the whole genome. It is the biggest group of transposable elements. The mechanism by which they propagated was unknown. So we were the first one to provide a system to study how they integrate. And second, that changed the concept of transposable elements. That it goes through randomly. We found that a mobile element can actually insert specifically into one area. And probably the most important aspect is providing an assay for the subsequent study of not only the integrating step, but also the reverse transcriptase step. And for the first time, we are actually able to express a functional enzyme encoded by the element in *E. coli.* So once you have a function enzyme, then you don't have to deal with DNA anymore. You have the enzyme. You can study the enzyme biochemically. So that led to the later findings and the further characterization of the reverse transcriptase encoded by the R2 element. And from then on Thomas and I never went back to studying chorion genes. The whole lab shifted—

VAN BENSCHOTEN: Yeah.

XIONG: Yeah, studying this. Now the Tom Eickbush lab is a leading expert in the field of transposable elements.

VAN BENSCHOTEN: Right. That made up, by the way, the bulk of your dissertation, right,

your Ph.D.?

XIONG: That's only one chapter, actually.

VAN BENSCHOTEN: Oh, really? What was the rest?

XIONG: I was pretty productive when I was a graduate student. I probably had ten papers.

VAN BENSCHOTEN: Productive is an understatement.

XIONG: Tom was trying to set a record to see if anyone in the department can break my record. Not so far. [mutual laughter] So that was one project. And then I was involved in a number of other related projects and determining how many other elements like R1 or R2 there are in other organisms and studying how they evolved. And a major separate project was studying the molecular evolution of reverse transcriptase element containing transposable elements. Because we started realizing more and more that R1 and R2 were not as special as we thought in the first place. We thought this must be some weird transposable element that happened to be containing reverse transcriptase for some unknown reason, that's not necessarily representing a mainstream transposable element as we want to call it. When more papers come out and the more sequences we conducted, [we] realized it's a whole lot broader than we thought.

Then I was involved in conducting a sequence comparison and the molecular evolutionary analysis of reverse transcriptase containing genes. At the beginning it was very easy. And I remember the first version of the paper I came up with. It only contained sixteen sequences, and I was able to align them with my eye and hand, instead of a computer program. It was not even available back then. And so [I] aligned the sixteen sequences together, and I calculated the sequence similarity, pairwise, first with the second and second with the third, etc. It's doable with a calculator. Now it doesn't seem possible, right? And so that was the time when the computer program was not available.

So actually, after comparing the sequence, aligning them, we realized one thing. There's a very good correlation between the protein sequence similarity in the reverse transcriptase region and the overall structure of the reverse transcriptase containing region. It sounds a little vague. So what that means is that by looking to see if we can tell that— When the element, when the transposable elements evolve, they evolve from very simple forms and they become more and more complicated, more and more sophisticated, the most sophisticated one being HIV [human immunodeficiency] virus. The most primitive one is the one discovered in bacteria. And people were confused. And it was not clear how they were related, and we were among the first— I think we were the only ones doing that at the time. And we compared a sequence homology of reverse transcriptases, which we determined is the only thing common for this

totally different element, from very divergent element. But by analyzing the reverse transcriptase, we could conclude they were evolved evolutionarily from the same common ancestor. So we can trace them back, how they evolved. And we can also conclude that as they start to change and become more and more sophisticated, the protein sequence also changes along the way. We were able to draw an evolutionary tree and conclude that reverse transcriptase containing retroviruses, which were much more commonly studied, much more extensively studied than retrotransposable elements, only represent a small branch of the whole reverse transcriptase containing element. The bigger group is the one that actually doesn't contain a structure called LTR [long terminal repeat] that's common to all retroviruses. LTR is a very important element necessary for a retrovirus or HIV to replicate and integrate and infect. So we were able to conclude from our analysis that there's a bigger and more primitive group of transposable elements. They're like retroviruses in containing the reverse transcriptase, but they don't contain this LTR. So that would argue that there must be a new mechanism out there. So eventually it was illustrated out right now. So we now know that so called non-LTR elements, as we initially named them, actually are a much bigger group than we realized ten years ago.

VAN BENSCHOTEN: Right.

XIONG: Yeah. So that actually had some other additional impact on me, that part of [my] research in addition to molecular biology study on the endonuclease, because that gave me a training on the molecular evolution. Gave me the ability and perspective to be able to [be] more appreciative of genome studies. Because the genome studies is a lot of information. It is raw information if without analyzing, just dumping the gene bank in the database. And if you don't know how to analyze, if you don't appreciate sequence alignment, sequence comparison, you're not able to take full advantage of the information available to you. Because of that early training, I have been following that, even though I was not really studying the genomic or genome project, but I was able to follow it and appreciate it. And that's one of the reasons nowadays why we should move into studies of the completion of the genome project.

VAN BENSCHOTEN: Right.

XIONG: I think it traces back to my early training on that subject, because Tom Eickbush himself has very solid training in molecular evolution. He's very interested, and his lab continues working on that project. And if not for that, I would not be supervised in that area of research. And that actually has some very good influence on me, in terms of being able to appreciate from a large scale, from a different perspective. Because in molecular biology, in the end, the more the you do, you become more narrowly focused.

VAN BENSCHOTEN: A by-product.

XIONG: Not being able to appreciate it from a whole genome-wise, from an evolutionary standard— Instead, you focus on one protein, one type of cell in one organism. But evolutionary studies emphasize a comparison between organisms during distance and during evolution. So that puts you in a different perspective. That is not something that everybody had similar training in during graduate study, have two different aspects. They're pretty separate. Not many people I know of are doing both evolutionary study as well as molecular studies at the same time.

VAN BENSCHOTEN: Right. So by 1989, then, you received your Ph.D.

XIONG: Right.

VAN BENSCHOTEN: And at that time, what were your thoughts about where you would pursue a postdoc? Was it obvious that you would continue on in the Eickbush laboratory?

XIONG: No, that was very confused for several months. And a lot of things happened in 1989, politically, that affected my career. Because we didn't know where we could go. We came to the United States on a so-called J1 visa, and there's a requirement that if you come to study on a J1 visa, the American government is responsible to limit your postgraduate study to no more than eighteen months. After that, you have to return to your home country to serve for a minimum of two years before you can return to the United States to work. So that's called a J1 requirement. And the only exception is if your home country waives the requirement. When we came here, we all hope one day we can return to China to serve the country. And that's what the government wanted us to do. They helped us to apply and to train, they set up English training and helped us to fly here. And so that was the goal early on. But in 1989, a lot of things were happening.

And one of the major dramatic events was the Tiananmen [Square] massacre. That changed my view a lot. Until 1988, I was still determined that if I can get a chance to do postdoc research, after that, I still want to go back to China to do the research in China, to serve my country. But the Tiananmen massacre changed things quite a bit. I just can't believe they can kill people like that. And so we were very, very angry, very mad. And I remember, June 4, we attended a rally in Washington D.C. We drove all the way through and then came back to Rochester; for thirty-six hours nonstop. I couldn't sleep. Pretty upset. So after that, things were calming down somewhat and then we started thinking about what we want to do. And then I was thinking about going to Canada for research, thinking about staying in the United States. And then one thing that happened, late 1989, was that President [George H. W.] Bush issued an executive order to waive the requirement for all the J1 Chinese students returning to China. There was a specific reason behind that decision, because we were so angry and a lot of us openly protested and we actually yelled in front of the Chinese embassy for the whole day. We

saw and heard the tape machines, video. They took a picture of that. But we could care less at the time. We were so angry. And so there was a real possibility that if we were to return, we could face prosecution.

VAN BENSCHOTEN: Yes.

XIONG: That was a real possibility. That's the first time actually I protested. Just unbelievable, I don't see how can they kill people like that. I mean, the government could have turned the whole thing around in a much better way. Yes, and I agree, the country needs to be stabilized, and we cannot afford to go back to another chaotic Cultural Revolution-like period. But there must be another way to deal with the situation. You don't have to use tanks and crush the students.

VAN BENSCHOTEN: Right.

XIONG: You can just negotiate with the students, because early on, at least, they were not asking a whole lot. They were not asking a whole lot. I don't think the students wanted to throw out Communist control or government; I don't think that's what they wanted.

VAN BENSCHOTEN: No, they just wanted recognition, I think, of certain basic needs.

XIONG: It's what the government accused them of and got them angry. I don't think that was their intention. I think now the leadership of the Communist Party has started admitting that.

VAN BENSCHOTEN: They made a few bad mistakes, it escalated, and by the time of the massacre, the government had backed itself into a corner. Then the only option was to save face and they did it with tanks, bullets, blood.

XIONG: Yeah, it escalated, and then became almost out of control.

VAN BENSCHOTEN: Right.

XIONG: The students were real angry, understandably; they were young. And so it is, I think, largely the responsibility of the leadership and you've got to recognize that and don't take hardship, and not move, like, ten thousand soldiers into the city, It's just never been heard of.

VAN BENSCHOTEN: Yeah.

XIONG: It's still pretty recent. Otherwise, I have a lot of respect for Deng Xiaoping and all he did to reform the country. But that part, I don't think I could agree with him. I think he could [have done it in] a different way. I think he should have [taken] a different way. So after '89 and the Bush executive order, we all of a sudden had the opportunity to stay in the United States to continue our research. And then I got into thinking about this, what I wanted to do. So one of the first things I wanted to do was go to Dr. Harold Varmus' lab to do a postdoc.

VAN BENSCHOTEN: Right.

XIONG: And he was doing retrovirus for years. And so that's very logical. And once I realized I could do my postdoc research in United States, I wrote a letter of application to him right away. And a few days later he called back to Tom Eickbush and asked how I was doing. And he actually read my paper and he knew what I had been doing as a graduate student, even though we'd never met in person. So he invited me for an interview right away at UCSF [University of California, San Francisco]. The interview did not turn out very well, though. Yeah. I didn't do very well on the interview part, because somehow I put two interviews together, and that was an interview with another faculty at UCSF, Cynthia Kenyon working on the *C. elegans* development. I was more into the *C. elegans* stuff, but also interested in the history study, the history part of the Varmus lab. So I wanted to know what he was doing currently and I came away with the impression the research in the Varmus lab was not as active as early on. Those oncogene days were over and the field of cancer research was getting more and more into the tumor suppressor, but he's continuing working on the retrovirus part. I was just not very excited by his current research at the time. And I had a lot of respect for him. And we went to lunch together. That was after— That was only two months after he just received the Nobel Prize. Yeah, so I remember asking, I said, "Dr. Varmus, how do you feel about the Nobel Prize?"

He said, "Surprised." [mutual laughter]

So he wanted to buy me lunch, and then I made a joke, I said, "You are now a rich man, you can buy me lunch." We had a very good beginning, but at the end, somehow, I just was not very excited.

VAN BENSCHOTEN: Right.

XIONG: And I was not very good at behavior either at the time. And so when I was not very excited, I must have somehow just shut off. [I did] not even go to dinner with his lab; instead I

went to dinner with Cynthia Kenyon's lab.

VAN BENSCHOTEN: That can do it.

XIONG: And that created a very bad impression. He was the one [who] invited me to go there and then I didn't really show much enthusiasm. So when I came back, he wrote a letter to me. He said, "Although you're on the top of my list, I decided on someone else." So I think that's a pretty accurate assessment of my behavior at the interview. So in the meantime, I also interviewed at a number of other places. I think I applied for ten different labs as postdoc research. I was accepted by at least seven or eight of them.

So my final decision was narrowed down between David [H.] Beach at Cold Spring Harbor Laboratory, working on cell-cycle control, and Matt [Matthew P.] Scott at Stanford [University], working on *Drosophila* development, and that was a hard choice between those two. And I went to [University of Colorado] Boulder to interview with Matt Scott. And he was at the time just about to move to Stanford, join the faculty of Stanford. I really wanted to go to California. I read the history of Stanford, I was somewhat into this. And also, Matt was such a nice person; he really wanted me to join his group. I had a terrific interview with him at Boulder. And he has a very positive interaction with a lot people in his lab. He actually invited me to stay in his house. So the day I was leaving, they actually left earlier to go on vacation. So they said, "Okay, the limo is going to pick you up a few hours later, why don't you stay. This is your house and you just drop the key back when you're leaving." We're pretty close, I like him lot. The only difficulty I had was, I didn't know the *Drosophila* genetics.

VAN BENSCHOTEN: Yeah.

XIONG: And I felt— I feared it would take a long time to learn *Drosophila* genetics. And it's not something I could learn so quickly. And I was really reluctant. I just didn't know what I was getting into.

VAN BENSCHOTEN: Right.

XIONG: Whereas when I was at the interview with David Beach, [it was] very straightforward. That was a good time and the cell cycle was just emerging as a major breakthrough was about to happen. And that was the year they discovered the cyclin proteins as a major regulator of the cell cycle. And I think at the time I was interviewing with David, his lab made a discovery, that cyclin functions by physically complexing with CDC2 proteins. That was before cyclin dependent kinase [CDK] concept was developed. But the realization that there are two proteins—a kinase and cyclin need to be complexed—was the seed of the idea of CDK later.

VAN BENSCHOTEN: Right.

XIONG: So a lot of excitement going on. And he was just awarded the Howard Hughes [Medical Institute] investigator position. The lab was expanding, so the interview went very well, and before I left, he offered me a position and he promised he could help my immigration if that was needed. And I would be appointed as a Howard Hughes research associate, which means a regular postdoc, but better than a regular postdoc in terms of benefits.

VAN BENSCHOTEN: Right.

XIONG: And he liked me a lot, and [we] clicked almost right away.

[END OF TAPE 4, SIDE 1]

VAN BENSCHOTEN: Okay, you were talking about the Beach lab and how things started to click.

XIONG: Right. And after I came back from the interview with David Beach, I also got a phone call from Tony [Anthony] Hunter at the Salk Institute [for Biological Sciences], also inviting me for an interview. And I want to go his lab, too. He was also doing cell cycle. And then Tony was great. From that point on, actually, to my career, [he's] still pretty supportive nowadays. But he just called about a few days too late. He was in Europe for a meeting, didn't get to see my application until he returned from Europe. I think it was two or three days, I had just said yes, accepted the offer from the Beach lab. So I didn't return to California to interview with Tony.

VAN BENSCHOTEN: Right. So it sounds like you had a lot of different routes you could have taken. It was very nice.

XIONG: I could. And I had help from two people, in terms of making a choice, two extra people, actually. Before I decided where to go for interviews, I had a long conversation with several faculty in my department in [the University of] Rochester. I went to talk to my chairman [Martin Gorovsky] I did the first rotation [with]. At that time, he realized that he made the mistake of not keeping me in his lab.

VAN BENSCHOTEN: Right.

XIONG: He realized he didn't spend enough time with me, so we didn't know each other on the first rotation. But anyway, he was so helpful, so supportive of me on this. So he closed his office, "Okay, let's talk, what do you want to do?"

And then I said, "I don't know what I want to do. I really want to just be here." That was something not everybody's doing enough when they graduate. They're not taking a step back. Now they just want to graduate and just make a decision pretty quickly. They don't have enough thought. Now I think I did something not everybody was doing, and I really thought, I really [went] around and talked to [as many] people as I could and get as much advice as I could and try to have a more broad view. Somehow I realized, subconsciously, that I didn't have an overview about today's biomedical research. And I did know one thing, I would not continue in Tom's [Thomas Eickbush] lab as a postdoc. I wanted to go out, I wanted to get more training.

VAN BENSCHOTEN: Right.

XIONG: That was pretty clear. I didn't know what I wanted to do. So I took the initiative, contacted those faculties in the department, asked them to give me advice, and they were so happy to see that, because not everyone does that. Plus the fact that I did pretty well as a grad student— So they were pretty happy to see and to sit down with me, to go through with me what they're thinking. So I talked to my chairman and he closed his office door and listed five or six areas that he [thought were] really emerging as very hot areas, that a lot of breakthroughs likely will be made in in the next few years, that as a postdoc I should join in. And one of them was cell cycle, the other was tumor suppression. That's what I've been doing up to now.

And I also talked to Bob [Robert] Angerer, my wife's adviser. We were both looking for postdocs. We graduated at the same time. So he was even more serious. And he thought about it a few seconds and said, "Okay, why don't you come to our house tomorrow for dinner?" And I don't know how many students can have that; I don't even know how many faculty are doing that nowadays. He invited just two of us and sent the kids out. Just the four of us. Him, his wife [Lynne M. Angerer]—she's also a scientist, they both trained at Caltech [California Institute of Technology]. Just the four of us. And [we had] dinner and after dinner, we had coffee and were sitting in front of the fire and talked the whole night about what he thinks and what fields are good and what I might be good at and what I may not be enjoying that much. So that helped me a lot.

At the end of that, Bruce Alberts and Keith Yamamato, two very prominent scientists in the biomedical field, went to Rochester for the funeral of their friend. So my chairman told me that's a good opportunity to grab them. They both [come] from different angles, they are both working on different fields. They know more than we do, because they are involved in not only their own research, they are involved in more broad areas, because Bruce Alberts became the

president of the National Academy of Science later, and Keith Yamamato was a chairman of the study section for years. I never met them. My adviser said, "Don't worry about it, just go to them and tell them that you are looking for a postdoc, and I bet you they'll be happy to talk to you if they have time. Don't be shy." So I talked to the wife and we just drove to the airport and I talked to them before they boarded the flight, for a half hour, so they gave me specific suggestions [about] where I should go if I pick this area and where I should not go, actually. That's a very frank discussion for some people I just met. I was really grateful for that part. So that actually gave me a lot of help for what I was going [into] and made me feel confident about going to the cell-cycle field, even though I didn't know anything about it. And it was the right choice.

VAN BENSCHOTEN: So you researched all this, sounds like. Some great advice came of it.

XIONG: I did, I did, yeah. And that's one thing— I don't know how I got started, but that's one thing I totally initiated myself. The first thing I did was looking for the publications in the last few years on the major journals like *Nature, Science,* and *Cell* to see what areas are very hot and who is making a lot of contributions. And I came up with a list. So when I put together all this research I did myself [with] the conversation I had, that decision to go to the Cold Spring Harbor Lab was not too difficult.

VAN BENSCHOTEN: Okay, so this brings us up to what, May of 1990, then?

XIONG: Right.

VAN BENSCHOTEN: When you enter Cold Spring Harbor in the Beach lab, what was it like entering that laboratory? Describe that. First of all, I guess, what was David Beach like? What was your relationship with him?

XIONG: It was not as close as I had with Tom [Thomas H.] Eickbush. Yeah, so David was young. He's only four years older than I am. [He] was very famous already. And to be that young and famous, it's incredible. Not very personal. Very intense. Incredibly smart. That's how he can be described. And even up to now, I don't have a close relationship with him. Which I could and I should, but I didn't.

VAN BENSCHOTEN: Right.

XIONG: Yeah. And I tried. Well, I didn't try very hard. It's just not easy. And he was very

busy. At the peak, when I was there, he had twenty-five postdocs.

VAN BENSCHOTEN: Times Square.

XIONG: He occupied an entire floor with thirty-plus people—

VAN BENSCHOTEN: Stadium science.

XIONG: —including himself and the secretary and the supporting technicians, and was running very innovative research in the cell-cycle field, was incredibly productive, and made all these important discoveries. Then his schedule is so tight, it's difficult to get time to really get to know him personally. I don't think he was personal with any particular person—

VAN BENSCHOTEN: Yeah.

XIONG: —for a real long time. And that's just his personality.

VAN BENSCHOTEN: Right.

XIONG: Yeah. So when I first got into the David Beach lab, the first feeling I have is "Boy, this is a great place. How well can I do here?" And you feel— It's unlike the experience I had [when] I went to Tom's lab; it's small, you get to know everybody in one week pretty well. It's only four of us—

VAN BENSCHOTEN: Right.

XIONG: —including the technician, besides Tom. But the time when I arrived in the Beach lab, they had a dozen people already. Most were postdocs. There was only one or two grad students. It's a very competitive environment, it's not easy to get along with everybody so quickly. You just feel you are pretty junior.

VAN BENSCHOTEN: Yeah.

XIONG: So it takes some time to adjust. My first six months were not very relaxed or not very happy. It's a completely different environment from Rochester, where I had such an intimate relationship with everybody in the lab. That was not the case at the Cold Spring Harbor lab.

VAN BENSCHOTEN: No.

XIONG: Beach lab. For the first four, five months, everybody just worked on their own. On top of that, the lab was expanding at an incredible pace. Every month, or two months at the most, we'd have a new person join the lab. And once in a while we'd see a new person; we don't know who this is. [mutual laughter] Whether someone has come to visit or if someone is your postdoc mate, we were never formally introduced. We can't remember who has come to give us a seminar, who is joining the lab. They just kept on coming, just all these new people came in.

VAN BENSCHOTEN: Right.

XIONG: That was a period that was pretty crazy at the time. David just got Hughes money. The lab was expanding. The lab was so crowded, because the completion of the new building was behind schedule. So they crunched, like, ten people in very small rooms, and you can hardly just physically walk around in the lab. It was very stressed in the beginning.

VAN BENSCHOTEN: Right.

XIONG: So that's the beginning of the lab.

VAN BENSCHOTEN: It took about maybe six, seven months, then, to adjust to these new conditions?

XIONG: Right. It took probably that long for me to adjust to that environment. I also did not have very high confidence at the beginning, because I didn't know who else is doing what. It was completely blank. I was [one of a] few people not having training in genetics. Because [in] his lab at the time, the main project was on the genetics of the cell-cycle using a model organism called yeast. And I didn't know anything about it. And I got a feeling a lot of people had yeast training as a grad student. Because that was one [reason] I was afraid of going to a fly lab was that I [would] go in like an idiot and I don't know anything or know so much less.

VAN BENSCHOTEN: Right.

XIONG: I was just in a very foreign environment. Even though I knew that learning yeast genetics is much less complicated than learning *Drosophila* genetics, I still felt that I know much less than everyone else. You just have to work harder to know those. And the first project in David's lab didn't work out, actually. So my first project completely failed. We now know why. I was assigned a project to isolate, or screen for the tyrosine kinase gene in *S. pombe* yeast. At the time, the tyrosine kinase gene–tyrosine kinase was very hot–was identified as a major oncogenic pathway in mammalian cells, and it is a multi-gene family; the PCR technology was just coming out that we could use in the sequence alignment of human tyrosine kinase to design so called the degenerate oligo to screen a possible candidate of yeast tyrosine kinase. So that's my project. That's my first project. And I was working and working and tried and tried to just— There was nothing I could pull out of it; it was a failure. We now know there was no tyrosine kinase in *pombe* at all. [mutual laughter]

VAN BENSCHOTEN: Right, by the way, it doesn't exist, what you're looking for.

XIONG: Yes. And so that's one of the things about researching; you never know, and you just keep on thinking that the condition was not good, and keep on modifying, modifying. And finally you give up.

VAN BENSCHOTEN: Now, when you finally gave up, though, was it your decision? Or was it Beach walking over and saying, "Yue, do you have a minute?"

XIONG: I think it was his decision. I don't know, I don't remember specifically that we had a discussion, and he said, "Okay, let's stop it." That was an evolving process; I just couldn't get it. It was overlapping with another project, and so sometimes the decision to drop something is made by the good progress of another project. It's, "Okay, that's going very well, why don't you focus on that?" Which means, stop on this one. Right. So that's the project that got me into the cell-cycle field.

So the project was to isolate new cyclin genes. Or more specifically, using a genetic approach to isolate G1 cyclin of mammalian cells. So the background's pretty simple. That was the year that Steven Reed's lab at Scripps [Research Institute] and Bruce Futcher's lab at the Cold Spring Harbor Lab reported three genes from yeast they called CLN1, CLN2, and CLN3. These are cyclin proteins. If you knock out—which means you remove the function of any one of those three genes or any two of those genes—there's no problem for yeast to grow. But if you simultaneously knock out all three, the yeast won't grow. Won't grow means they stopped. They stop in the cell cycle, which we call cell-cycle rest. And they stop at specific point of the cell cycle, called the G1 point of the cell cycle. These genes got a name called a

G1 cyclin. And that's important. That's very important, because if we are thinking that cancer is a disease of the cell cycle, one can see that cancer is pretty much a disease of a deregulated cell cycle. Because in a sense, the cancer is a group of cells that just keep on growing, growing, they're dividing, they don't stop their cycle. Because 95 percent of cells in our body right now, they don't grow; they stay there as a live cell doing their job, but they are not supposed to keep on dividing. Only two types of cells keep on dividing all the time. One is the germ cell, and one is cancer cells. So the hallmark of the cancer cell is that [it is] so-called immortalized. They keep on dividing, dividing.

VAN BENSCHOTEN: Right, they're deathless, until their host dies.

XIONG: Yeah, indefinitely. So the concept is pretty simple, that if we can understand how the normal cell cycle is controlled, we might understand how the tumor is— Tumor cells develop. So the idea has been there for a long time. The focus has been early on—even before I got into Cold Spring Harbor Lab—focusing on understanding the G1 part, because the cell cycle can be divided into four phases. One phase is the actual dividing from one cell to two. There's another period that replicates all the DNA, called the S phase, during which all the genetic material, DNA, is copied or duplicated from one to two. But then, before the mitosis, the cell takes a break after finishing DNA synthesis. We now know why. It's because they want to make sure all the DNA have been replicated. They check one time.

VAN BENSCHOTEN: Oh, I see.

XIONG: And if everything's fine, they commit mitosis. Divide. After mitosis, they don't initiate DNA synthesis right away; they also take a break—or we call it a gap phase—called G1. So that's a time we now know is incredibly important, because that's the period of time the cell is measuring the environmental conditions—and that includes cell differentiation, DNA damage, cell senescence so on and so forth—to make a decision whether to go on to replicate DNA and divide or to rest. Because all cells in our body, if they rest, they rest in G1. They don't rest in G2. Cells cannot stop in the middle of DNA replication or the middle of mitosis; they will die if they do that. Right, so for example, neuronal cells are all G1 cells, which means when they finish mitosis they receive a signal, "Now you are supposed to become a neuron. Right, so you will stop forever to divide. Just stay as G1 cells." And if neuronal cells divide, we are not going to have any memories. Muscle cells differentiate, and the G1 phase becomes fused. And each cell has a multiple nucleus. Of course, they cannot divide anymore, so they do that during the G1 phase of the cell cycle.

Okay, more importantly, back to 1989—late 1980s or early 1990s—the studies from the oncogene transformation have come to the realization that a lot of oncogene function is during the G1 phase of the cell cycle. So if you look when they express, when they have activity, they all function [during] G1, because those are the signaling molecules, determining whether the

cell is to divide or to rest. So it is in that context that everybody realized if we can identify G1 cyclin— Cyclin was already known to be necessary for the cell to move on to the next phase, to divide, but there are a lot of different cyclins, some responsible for mitosis, some for DNA replication, but G1 cyclin was not identified. If we can identify G1 cyclins, they might carry a direct connection to oncogenesis. So that's the stage. And Steven Reed's lab and Bruce Futcher's lab at the time identified G1 cyclin in yeast. Of course, yeast don't get cancer, but the implication's pretty clear, that we might take the genetic system to looking for genes from mammalian cells, [which] would functionally complement the yeast G1 cyclin deficiency.

VAN BENSCHOTEN: Right.

XIONG: So in other words, we could ask whether we can transform this yeast cell that is deficient for all three cyclins with mammalian cells, thereby isolating the gene that can complement the G1 cyclin deficiency. By definition, that's a mammalian G1 cyclin. So we could have a mammalian G1 cyclin, and we could have a new insight into cancer development, how that is being connected to the cell cycle.

So that was the unspoken implication to many people involved in the field. And then I don't know if it was so clear or not, but I think that was the impression in a lot of peoples' minds, that if somebody can identify G1 cyclin that could allow us to have the first insight into how the cell-cycle control is being deregulated during cancer development.

VAN BENSCHOTEN: Right.

XIONG: Because at that time there were a lot of cell-cycle genes already identified, such as CDC2 and cyclin B, but quickly it was realized that those genes are very unlikely to be targeted during oncogenesis, because tumor cells need those genes; so does a normal cell. So to change activity of those genes is not any benefit to the tumor cells. When the tumor cells become a tumor or cancer cells become cancerous, it's not because they are dividing any faster, it's not because they are proliferating faster than normal cells. That's not the case. The reason they become cancerous is because they are capable of dividing at a time when normal cells will not or are not supposed to. They are capable of proliferating while they're entering the cell cycle at a place when the normal cells would stop. So, in other words, it's not much faster. Just like if you're driving too fast you can kill somebody, but instead you are not stopping at the red light or you're not watching around, so you bump into somebody's car.

And so that was more or less the idea in a lot of people's minds back in 1990, that if we can understand the G1 control, we might identify the decision-making cell-cycle genes, which conceptually are always on, the cells keep on dividing, dividing, they don't want to rest. The consequence is cancer.

VAN BENSCHOTEN: So you, starting from those assumptions—

XIONG: I was joining the project; I didn't initiate the project. I was joining the ongoing project begun by another postdoc using that approach to identify the G1 cyclin in the *S. pombe*, which is a separate yeast from the baker's yeast. That was the organism studied by David Beach for years. So what I was joining there was a similar approach, looking for a similar type of gene but from mammalian cells.

VAN BENSCHOTEN: Right.

XIONG: One postdoc was focusing on identifying the yeast or the *Pombe* G1 cyclin. I was working on isolating the mammalian cyclins, G1 cyclins, using a similar approach. We took this system of genetic rescue and did a lot of yeast transformation and then identified several new genes, and I was starting to sequence those genes.

And I remember one day when David came back from a meeting, he said, "What have you got?" I said, "I'm sequencing new cyclin genes." So we looked at that and we couldn't make much of it, because that gene itself is clearly cyclin, but doesn't look like the G1 cyclin we were expecting. The only G1 cyclin we knew of was CLN1, CLN2, and CLN3 from yeast, but the gene I put out called a cyclin, which— It's the gene we now call cyclin D, it doesn't look like a real G 1 cyclin more than any other cyclin we know of.

VAN BENSCHOTEN: Right.

XIONG: So just by the sequence comparison we can't tell whether it's G1 cyclin or not. We were just focusing on the G1 cyclin. Although this one, this gene, is capable of complementing G1 cyclin deficiency, so can other mitotic cyclins. That was one surprise, that even though those three genes, CLN1, 2, 3, clearly only function in G1, and without that function the yeast cannot go through G1, would stop. If you ectopically provide a cyclin which normally doesn't function in G1, functions instead in G2, it can do the same job instead of supporting G1 growth.

VAN BENSCHOTEN: Right.

XIONG: We didn't realize that just by virtue of its ability of rescuing the G1 cyclin deficiency doesn't prove that cyclin D is a G1 cyclin. And by looking at the sequence, it doesn't look particularly closer to the G1 cyclin of yeast than other mitotic cyclins we know of. We're not so sure what we got. So we put it in the refrigerator to keep on looking, hoping that we could pull

out a gene that really looks like the G1 cyclins. So we continued working on and working on and couldn't get any new cyclins. Couldn't, so then we just— One day we decided I go back to working on the cyclin genes that we had. Things started moving very fast from that point. So one day David came back from a meeting at Howard Hughes and he sat next to an investigator named Chuck [Charles] Sherr, from Memphis, and they were working on a totally different angle, working on a receptor gene called CSF; it is a gene that is necessary for a mouse cell line called a macrophage to progress through the G1 phase. If you don't provide that growth factor, cells will stop in the G1; if you do, if you add in a growth factor, it will now go to S phase. So they wanted to know what that growth factor is doing by looking for the target. So they did a pretty straightforward experiment and made two cDNA libraries, one with and one without growth factor stimulation. Asking what's different in terms of gene expression and identified three genes. And when that is sequenced, it looks like cyclin. They don't know what cyclin is, they simply call it cyclin-like molecules, one, two, and three.

VAN BENSCHOTEN: Right.

XIONG: And so those two met on the bus, that's [what] David told me, and they were talking about [this]. And [Chuck Sherr] said, "Oh, David, you're from Cold Spring Harbor Lab, you're working on the cell cycle."

David said, "Yeah."

And so Chuck started asking David some questions about the cell cycle and cyclin. In the end they said, "Well, we cloned a new cyclin recently, and it has this characteristic," looked like a G1 cyclin, but by sequence it doesn't look like the G1 cyclin of yeast we knew of at the time, at that point. So [after] David's return, they had more conversation; they decided, "Let's compare the sequence side by side," which means my sequence, the one I put out, and Chuck's sequence. So they decided to fax each other, at the same time, the first few amino acids. And immediately we realize we got the same gene.

VAN BENSCHOTEN: Right.

XIONG: So they knew from our finding that that is a G1 cyclin by functional definition, because we cloned the gene by function "rescue." And we knew from their experiment the gene is being induced in the G1 phase. So put together, it smells very good as a G1 cyclin.

VAN BENSCHOTEN: Right.

XIONG: And so then we started cooking a paper together and agreed we were going to submit

our papers side by side, back to back, to the same journal. They had a gene before we did, so they graciously agreed that if their paper was accepted, they would be willing to wait a few more weeks—

VAN BENSCHOTEN: Oh, wow.

XIONG: —delay publication so that the two papers could [be] published back to back, have more impact and [be] easier for people to read. And that was great, because we sat on the gene for several months not working on it. From sequence comparison, we couldn't tell [if it] is G1 cyclin or not. We continued to work on other cyclins; we couldn't find it. So now we returned to work on the cyclins and do some basic characterizations. And we submitted a paper back to back to *Cell* and both papers [were] accepted. And at the same time, at the very same month, I believe, there was another group at Harvard Medical School, working on a totally different area of research— There is specific cancer called parathyroid cancer. And working on a subset of cancer, they realize they have a specific translocation between chromosome 11 and chromosome 13. They know what is on chromosome 13, where the gene moved to, because on the chromosome 13 there is a specific promoter that becomes very actively expressed in this tissue. So the idea behind that is whatever gene from chromosome 11 somehow jumps into chromosome 13, into the promoter of the thyroid hormone becoming now active. And that activation could contribute to development of this particular cancer if they can find out what that gene is, right? So they published a few papers early on, but they couldn't narrow down where the gene on the chromosome 11 is now fused, during the cancer development, to this parathyroid hormone promoter on the chromosome 13. Eventually, they narrowed it down and cloned the gene, it is a cyclin. So they realize that they might have a first connection with cancer directly. And so they heard, somehow, our finding as well. So they rushed their paper to *Nature*, and they actually ended up with it published a couple of weeks earlier than our paper, and it turns out to be the identical gene. So that was a very exciting area and time period, and for the first time we had direct evidence that expression of a cyclin gene that is known to function during the cell cycle is activated during the G1 phase by a growth factor and is translocated during the development of a specific cancer. That really provided the first evidence of a cell-cycle gene being altered during cancer development.

VAN BENSCHOTEN: Right.

XIONG: And it fulfilled the prediction that the cell cycle is a direct target. It only took a couple of months to realize that we just touched the tip of the iceberg, because it laid out— Immediately after the *Nature* paper, people realized the cyclin D genes— We all landed on what was located on this chromosome 11, q13; it's a site a lot of people have been working on, because that's the area— That area of the chromosome has been known for years and amplified in about 40 percent of head and neck cancer, 25 percent of breast cancer, right? So when the gene is amplified, it is indicating the presence of oncogenes and the isolation of cyclin genes,

and knowing the function in promoting cell cycle and the localization of the gene on the chromosome 11, q13, it lets those people quickly just narrow down, asking whether cyclin D is amplified in the breast cancer or not, is amplified in the head and neck cancer or not. The answer is yes. Yeah. So the cyclin D gene is representing now a major marker for breast cancer development, as well as head and neck cancer.

VAN BENSCHOTEN: So when did you publish this paper [Y. Xiong et al., 1991. "Human D-type cyclin." *Cell* 65:691-99]? So it was very early on in the postdoc, then?

XIONG: Yeah, so that was very quick and the work was incredibly fast paced and we could hardly get those figures together. Yeah. So the whole process of cooking out the paper at the end, it only [took] a couple of months, once we realized what we got.

VAN BENSCHOTEN: Right. Okay. Now could you fairly quickly go through the research you did after that, after 1991, but before establishing your own lab.

XIONG: Yeah. Well, after cloning the whole cyclin D, I had a down time for about five or six months, couldn't go anywhere. Because once you got a cyclin, what you really [need to find] is the kinase. Because cyclin doesn't work by itself; it has to find its kinase. We couldn't find the kinase and it was just really going—

VAN BENSCHOTEN: In circles.

XIONG: Circles. It was going nowhere. The whole research was a pretty down time. So the breakthrough came in 1992, when I finally got new antibodies and found that cyclin D associates with CDK2 and CDK4 and CDC2, but that was not a major finding. The major finding was during that study, searching for the protein associated with cyclin D, I found that in addition to CDK that we were looking for, cyclin D was also forming a complex with two other proteins, one called PCNA, one called p21. I'm not going to say much about PCNA. We still don't know a whole lot of what PCNA is doing in p21 /cyclin D Complex. There are a lot of studies on this. But let me say a few words about p21, because that has a lot of impact on myself and subsequent research.

It's a protein that we had no idea what it's doing. But we were really surprised already that cyclin was forming a complex not just with CDK, but also with some other proteins. That finding in itself carries a lot of implications, because at that point it was widely accepted that cyclin forms a complex with CDK and this is the enzyme and that's it, and this is the key enzyme controlling the cell cycle. By virtue of physical association, it was a pretty tight one, proteins like p21 and PCNA could play a key role in regulating this activity of CDK. So this

was published in 1992 [Xiong et al. *Cell* 71:505-514], and we reported that cyclin D forms a complex with several CDKs as well as p21. Okay. So that was the first report that cyclin and CDK proteins can form a complex with additional proteins. And immediately following that finding, I published another paper in 1993 [Y. Xiong et al., 1993. *Genes and Development.* 7:2572-1583], documenting that the p21 molecule was not associated with cyclin and a CDK if the cell is transformed. So that really had quite a bit of impact on the field. And the way I made that discovery—I can take some credit here—is that I was really thinking a lot about genetics, thinking about control, because we were looking at the kinase complex and we found this association in specific cell lines that people called normal cells. I didn't understand at the time why they were called normal cells, not wild-type cells, later on people told me the human cells— You can't study *the* human in the body. You can take a cell culture and study it in a plastic dish. They're not a wild-type anymore, a lot of things change, but the cell line I was using is as normal as one can get, so they call it normal cells. That's almost like a wild-type, as opposed to the cell line, [which] is taken from tumor cell lines. I was really into it and talking to a lot of people, how could I have a control? Just like people doing genetics. When they're doing the genetics, they're comparing the wild-type with a mutant. I want to do the same thing in mammalian cells. People tell me there are no wild-type cells. These normal cells are all you can get. I said, "Well, how can you compare this?" They said, "You cannot compare this, because whenever you're talking about two human cell lines, they always come from two different people, and they've been cultured totally differently. You always compare oranges and apples. That's incomparable."

I said, "I don't like that idea. It's got to be compared somehow."

They said, "Well, do this one, so you can take these so-called normal-human cells, compare them with the one derived from it after [it is] transformed by a DNA tumor virus." So that's how I [got] into this. So I compared the normal cells and its transformed derivative. So that actually is just digging a golden pond.

So as soon as we compared these, set them side by side, [we] realized a lot of things happening to the cyclin CDK complex, among them is a p21 molecule is lost. And another thing is we discover another protein called p16, which represents a major tumor suppressor right now. That had lot of impact for subsequent research. And one-third of my lab up to now is still working on those small genes.

VAN BENSCHOTEN: Oh, really?

XIONG: And later on, the gene was cloned. We call them CDK inhibitors. And that conceptually tells us in biochemistry there is a group of genes that bind CDK and then actively regulate activity of CDK, just the opposite of cyclin, which binds the CDK and activates it. There's a good analogy. You think of the CDK as an engine for the car, so the cyclin functions like gas. Just pump the gas and the car goes. But if you just run the engine, it's very dangerous to drive if the brake is not working, and the CDK inhibitor is like a brake.

VAN BENSCHOTEN: Oh, I see.

XIONG: And we also realize that for cancer development, the brake is much more likely to be hit during cancer development than the gas genes, because cancer cells need gas as well.

VAN BENSCHOTEN: Right.

XIONG: And you probably need more gas driving fast. But that is not how most accidents occur. Most accidents occur not because you're driving too fast, it's because you forgot to stop or you cannot stop or you [do] not pay attention while you're driving. The problem is the brake was not hit, so the brake is more likely the one being hit during the cancer development. So that could more likely be a direct target of cancer development. So that idea turned out to be the case. And the CDK inhibitors, particularly p16, are much more frequently mutated during cancer development than cyclin genes.

I made several findings as a postdoc, the discovery of CDK inhibitor p21 and p16. And before I left the lab, I almost actually cloned the gene for p21. So that was published in 1993 in *Nature.* And I did not clone the p16. After I discovered it and I left the lab, another postdoc continued, and he was using a yeast two hybrid method and cloned the gene for p16; that was late 1993. So by the time I started here, in 1993 in the fall, the CDK inhibitor field started exploding. I joined the Beach lab in 1990, when the cyclin idea started coming out. So I left the lab, and we pretty much know what cyclin is doing. We discovered new G1 cyclins. And that led to the discovery of CDK inhibitors. And so my research from here has been focusing on CDK inhibitors.

VAN BENSCHOTEN: Right, okay, great. When you come here— Tell us a little about that transition. What other places did you look at, and what were the main reasons you came to University of North Carolina [at Chapel Hill]?

XIONG: I looked at a few places. I applied at a number of places. I got a lot of interviews. And the research was very hot and very potential, but it was a little bit too potential. And the job seminar I was giving was in early 1993— The p21 and the p16 were not even isolated yet, and I could only describe those as a polypeptide, as a protein, without being able to tell the audience what they are. I could tell them [that] conceptually they could be important by virtue of their association, but we never had luck with understanding them and so we could not predict that they actually would be CDK inhibitors. There was no indication they could. The CDK inhibitor word did not even come out during my interview, and people realized there's a lot of potential, but it was just not very clear. That's one thing. Second, I was not preparing at all for my

interviews. So my interviews went pretty lousy.

VAN BENSCHOTEN: Right.

XIONG: And my job seminar— I did not know how to present a seminar. I never gave people an introduction. I always thought people knew exactly what I was doing and I just needed to jump into my result. I got a lot of people confused. But there were some places that appreciated me and I got several offers, from Indiana [University], Yale [University], here, and M.D. Anderson [Cancer Center, University of Texas].

I picked this area, I picked this school, for a number of reasons. One, my wife also got a job here as a research faculty. And the people here are very positive, very positive. And this area is very good. Both my wife and I really like this area, because during my job interview, I said to my wife, "If I go out looking for a job first and you come with me, then I'll try to look in an area we both like," because we both don't like living in New York. I did not apply to any place other than New York or Los Angeles.

VAN BENSCHOTEN: Right.

XIONG: Yeah. So that was not a good time for American cities. The city was pretty down and crime was high. It was not a very nice time. Things— Then after we left, New York City become much better. Yeah, so we don't like big-city life much. Didn't take me long to decide to come here. When I finished the interview and as soon as I got back to Cold Spring Harbor Lab, they made an offer from here, said, "We would like you to join our faculty." And it only took, like, two or three weeks for me to decide to come and join the faculty.

VAN BENSCHOTEN: Oh yeah, so that's fairly quick.

XIONG: Yeah, it was very quick.

VAN BENSCHOTEN: Now, your wife got the job before or after you got your job?

XIONG: Before. And they offered her a research faculty job at the Gene Therapy Center. She doesn't want to start her own lab like me, to pursue an independent career. At that time, we had Jessie [Xiong], my daughter, already, and she would like to spend more time with the kid. Now, she, at the time of the completing of her postdoc—she also did her postdoc at Cold Spring Harbor Lab with another faculty, Nick Tonks—she realized that she was not really enjoying that

kind of intensive research and always worrying about your grant, your publications, competitions. She didn't think she would enjoy that. She decided not to pursue that kind of direction. Instead, a less independent job would be more fit from her perspective. So research faculty at the Gene Therapy Center is under the supervision of another faculty, and she's responsible for creating vectors, but doesn't have too much responsibility.

VAN BENSCHOTEN: Right.

XIONG: Yeah.

VAN BENSCHOTEN: Okay, and you might have told me this already, but when was your daughter born?

XIONG: It was '90. Just before we left Rochester. When we moved to Cold Spring Harbor Lab, Jessie was three months old.

VAN BENSCHOTEN: Okay, what was the startup package like when you came here? What did they offer you?

XIONG: It was decent, was not incredibly, outrageously big. And I think it was a quarter of a million dollars in cash I could use any way I wanted, plus a lab space. And my salary was paid by the State of North Carolina, which means I don't need to come up [with it] from the startup package. On top of that, the department of biochemistry, where I got my tenure track appointment, will support up to two graduate students in my lab. And the [Lineberger Comprehensive] Cancer Center, [with] which I had a joint appointment, will support a postdoc fellow I can recruit until I got my major grant. Which means if I could recruit all these people, I could start my lab right away, even before I received my RO1 grant from NIH [National Institutes of Health]. So that was pretty decent at the time. It's not the very best, but it's better than many other places. They told me they really tried hard to get me here. And that was my last interview, and though I came very close to making decisions, very close.

VAN BENSCHOTEN: Right.

XIONG: They actually recognized this—this is a very significant part—because that was late in 1993, the cell-cycle stuff; people start smelling that something's coming out.

VAN BENSCHOTEN: Right.

XIONG: Whether they really actually realized that some molecules identified, like p21, p16, are important ones, I'm not sure. Because we didn't— We couldn't appreciate very well ourselves. But they could tell what was happening in the cell-cycle field in the previous year involving the cyclin D1 discovery, the G1 cyclin discovery and the— They realize that something is about to happen.

VAN BENSCHOTEN: Right, okay. This is an interesting transition, because you're a student, you're a postdoc, and then you have to now set up your own lab and be a principal investigator, and you have a whole new slew of responsibilities and commitments. How was that transition for you?

XIONG: Not very good.

VAN BENSCHOTEN: No?

XIONG: No. I had no training, like everyone else. So my first few years, I was pretty much on the bench all by myself.

VAN BENSCHOTEN: Right.

XIONG: I really did not know how to train students. No one taught me, so I made a lot of mistakes. I drove them crazy and I expected them to work just like me. The first three students I recruited, they were working just like me; they were very ambitious and they working incredibly hard. That's two words to describe them, ambitious and hardworking.

VAN BENSCHOTEN: Right.

XIONG: Just like me. And I think I got them burned [out]. I did not train them in the right way. For the student— They come in, they couldn't really appreciate as much as I could, and so if one doesn't really understand the implication of the study, it's difficult asking them to appreciate working like that. And besides, the pace was too intense for them.

VAN BENSCHOTEN: Yeah.

XIONG: Yeah. And I came out of Cold Spring Harbor Lab, and here's a different setting. I came out of the postdoc incredibly competitive. That's not what they had been expecting, but they were working with me like that through the first couple of years and helped me to set up a lab and we published a few good papers. With their help, I got my first two research grants. They both are very good ones, very big ones, and that was faster than any other people at the time, that a junior faculty submitted two— First two grants and got them right away—

VAN BENSCHOTEN: Yeah.

XIONG: —so that allowed me to really focus on the research for the next few years, including additional funds from the Pew [Scholars Program in the Biomedical Sciences] program. So that takes off real well. But as soon as I started recruiting a lot more people in the lab and losing my hand on these three, the first batch of students, they almost got lost, because I trained them too closely and I never really intentionally let them think for themselves and develop themselves. There was too much on-hand training. That was not entirely good for them.

VAN BENSCHOTEN: Right.

XIONG: They lost their initiative. As soon as I [loosened] my hands, they got lost somehow, just simply confused [about] where they're going from that point. They just felt all of sudden I didn't care [about] them anymore or they didn't have enough attention anymore. I take a lot responsibility for that. They did pretty well, though. So my first student [Yan Li], a graduate of those times—published a few papers—got a very good job and moved on, and is now working in Bioinfomatic Industrial. They did very well and are still doing very well. But I think, looking back, even though she never told me, but I would say that she must have some distaste about science research because [of the] intensity.

VAN BENSCHOTEN: Right.

XIONG: My second student [Mike Nichols] went on and right now is in medical school. He said he wants to do M.D./Ph.D. type, clinically-related research, but I think included in that thinking, part is because the lab research probably got him burned [out] somewhat.

[END OF TAPE 4, SIDE 2]

[END OF INTERVIEW]

INTERVIEWEE: **Yue Xiong**

INTERVIEWER: **William Van Benschoten**

LOCATION: **University of North Carolina**
Chapel Hill, North Carolina

DATE: **11 October 2000**

VAN BENSCHOTEN: Last time you spoke about the evolution of your research and coming to UNC [University of North Carolina] at Chapel Hill. That brings us roughly to the last couple of years, the recent past, starting in 1993. We talked a little about the startup of your lab and your present focus on cell-cycle control and tumor suppression. Could you give us a brief overview, then, of your current research projects that you're doing?

XIONG: Yeah. Okay. The current project, the current research was a continuation or further development from what I started seven years ago, since I arrived at UNC Chapel Hill. We are currently involved in three different areas of research. All of them are aimed at understanding the mechanism controlling the cell-division cycle and how a tumor develops; in short, cell-cycle control and tumor suppression. The first area is a continuation on the understanding of in vivo function of CDK inhibitor genes. So more specifically, we now know that there are seven distinct genes encoding CDK inhibitors that function by inhibiting cell-cycle progression. So in other words, there are seven different breaks in the cell that could stop the cell cycle. At any one point, if a cell activates one of the CDK inhibitor genes, it's generally believed it's sufficient to cause cell-cycle rest. Then the question becomes, why would a cell evolve to have seven different breaks or seven different inhibitor genes? So that's the question we want to understand and on that front we are at a stage— I would say we understand very well by now the biochemical properties and in vitro function of those genes. But what we do not know, or we know very little still, is what they're doing in vivo under physiological conditions.
So what we're doing today is to take a genetic approach by knocking [out] the function of individual CDK inhibitor genes, asking what's the phenotype developed in mice lacking individual CDK inhibitor genes.

The second area we're working on is a so-called ARF-Mdm2-p53 pathway and that was closely related to the first one— Actually was directly evolved from the first one. One of the seven CDK inhibitor genes I mentioned was the one called p16. It is the most frequently mutated in human cancer; in 40 percent or more of human tumors, the p16 gene locus is mutated or just gone. It's the second most frequently mutated gene in human cancer, second only to the p53 as the most frequently mutated genes, about half. So if you randomly take ten different cancer patients and half of them have a mutation of p53 genes, the other half probably have a mutated p16 locus. That tells you how important those two genes really are in terms of suppressing tumors from developing. So during the study of p16 genes, which is the one I

mentioned yesterday and was first recognized in my early studies, while I was still at Cold Spring Harbor Laboratory, it was discovered that the reason the p16 [has] got such a frequent mutation rate in human tumors is because of its unique structure, that the two genes sleeping together is very, very unique in the mammalian genome. It happens in very primitive organisms like bacteria, but not in mammalian cells. They're two genes and they really sit on top of each other. They're using the same piece of DNA, but they translate slightly differently in the so-called alternative reading frame. The protein is very different, therefore the function is very different. So it's very unique. And the question becomes, if you've got two genes together and this whole locus is gone, then the loss of which gene's function is the one responsible for cancer development? So that [led] to the study of the second gene overlapping with the first one called p1 6; the second one is called ARF.

And we made a big discovery and it's a very important one, I think that was back to 1997. There was a surgeon coming to work in my lab on his fellowship, so he wanted to do some basic research in addition to his hospital job. His name is Wendell [G.] Yarbrough, and he brought his ARF project in the lab, really wanted to understand what it's doing. Between him and another person in the lab, Dr. YanPing Zhang, we made a discovery that ARF binds to another protein called MDM2. So that made a lot of impact on the field, because MDM2 was already identified previously as a principal negative regulator of p53. So now everything tied together. It goes like this, that during normal cell growth, [if] the cell wants to divide, they do not want the p53 to function, because the p53 functions kill the cell or stop the cell from growing. So that's exactly the mechanism by which p53 suppresses tumor growth. When something's wrong, like say DNA's damaged or got too much oncogene, the p53 will be called up to do its job, to cause cell-cycle rest, to stop them growing, or cause the cell to die, by suicide, or we call it apoptosis. That's why when the p53 is mutated, the cell [has] got a much higher chance of developing a tumor. But normally, you don't want the p53 to do its job, because if everything's fine, the cell wants to grow; otherwise we wouldn't be sitting here. That job is taken care of by MDM2, which will bind with p53 to kill p53 when everything's normal. But if it's not normal, then ARF comes to do [its] job. So that finding of ARF binding MDM2, stabilizing p53 was a major finding in the study of the cell cycle, in the tumor suppression field in the last couple of years. And we're happy to be part of it.

The third area, related to both the first and second one, that's called the mechanism of protein degradation. The reason we got into this is because we know a lot of proteins we've been studying involved in cell-cycle control and tumor suppression are being degraded at a very rapid rate, and that's essential, because when the cell cycle progresses, it's an irreversible process; it can go forward but not backwards. And it's very important that it keeps on going forwards, keeps on cycling, but not backwards. And partly that is being determined by this mechanism of protein degradation. Once a job is finished, say a DNA completes replication or a cell completes mitosis, a cell will destroy completely the enzyme that initiated that process for DNA replication, precisely to prevent the cell going backwards, precisely to prevent the DNA from replicating again until it's finished the next step, that is, mitosis, or to complete mitosis before they re-replicate DNA again. So that's very important, because we all know the cell can only divide once, once only per each DNA replication or vice versa. What that means is during each cell division they replicate every genetic material once, but only once, no more, no less.

They then must commit division and they replicate again, then division, they replicate again, then division. So this is a very precise process, and if there are any deviations the cell's in trouble. One of the main mechanisms to insure this is through the destruction of key proteins for each step. Once a protein's destroyed, very rapidly, the cell cannot initiate this process again, unless or until they finish the next step.

But understanding the mechanism of protein destruction, although known for some time, has been quite evasive all these years. We know that happens by a process called ubiquitin tagging. If a cell wants to degrade a protein, it would put a ubiquitin tag on that protein and then put a second one on the first one, third on the second, fourth on the third, and so on and so forth. We see [within] a few seconds the protein is being tagged with this long tail that we call a poly-ubiquitin chain. So once a protein's been tagged, then it will be picked up by a machinery called a proteasome and chopped into pieces, recycled into amino acid. So that second part is understood very well, but the first part was not for a long time. How [does] a cell know at what time and what place a protein is being degraded? Because it must degrade the protein at the right place and the right time, otherwise the cell [will] be in trouble. So that's the question that had been bugging us for a long time, because a lot of proteins in the cell cycle are regulated by this pathway, but we don't know how. And specifically, what they're missing is this key enzyme called ubiquitin ligase.

So we made a contribution by discovering a specific protein, a RING finger protein which we call *ROC1*, so that's just doing that job. Specifically, it activates a ubiquitin conjugating enzyme to put a tag on the protein. Those are the three areas we are engaged in right now. The function, or in vivo function of CDK inhibitor genes, the molecular mechanism of the ARF-Mdmz-p53 tumor suppression pathway and the molecular mechanism of ubiquitin mediated protein degradations.

VAN BENSCHOTEN: Right. Okay, good. It seems clear then, that one application of your research or one possible application, would be the treatment of cancer and understanding it better, avoiding it. Are there other applications?

XIONG: Yes, especially the third application. Because I used the cell cycle in cancer as an example to illustrate how important ubiquitin mediated protein degradation really is in that process, but ubiquitin mediated protein degradation is also involved in virtually degradation of any protein to which ubiquitin is being tagged. So you can imagine that process can be and actually is used by many other cellular processes. For that reason, people studying, like, signal transduction eptosis, inflammation disease and the immune response, so on and so forth, have a lot of long standing interest in understanding this process. The same enzyme of ubiquitin ligase can be used for the degradation of any other proteins, in principle. The question is, "What is the nature of this enzyme?" The understanding of this very enzyme called ubiquitin ligase has implications far beyond the cell cycle and tumor suppression control. For example, we've been initiating collaboration with a pharmaceutical company, or biotech company, in San Francisco to work specifically on how could we screen the drug compound to inhibit this enzyme, along

with the development in understanding how each specific ubiquitin ligase is being utilized by what disease process. In the long run we are hoping that by having this compound in hand we might specifically target the protein degradation machinery in selective ways. So the point is, can we selectively inhibit the degradation of one protein, thereby affecting another process or the disease development?

VAN BENSCHOTEN: Okay. Any other applications?

XIONG: Gene therapy is another target. For example, I mentioned early on the gene that I was working on called cyclin D. Cyclin D is the gene involved in cell-cycle control. When a cell [has] got too much D-type cyclins, these specific proteins, the cell will proliferate almost in a deregulated manner or uncontrolled manner. So the cell, the environment cannot control it. I mean, that's the reason behind the amplification of this gene in about 40 to 50 percent of head and neck cancer and a quarter of breast cancer. So if one can imagine or develop a method to degrade this amplified D-type cyclin protein, you might stop the disease from continuing to grow. So if one can deliver a method to destroy cyclin D in those tumors, that could have profound implications. That actually is indeed one of the things a lot of people, including a couple of people in my lab, are working on, to see whether we can specifically engineer an attack that can bind on one hand with cyclin D, let's say, and on the other hand it brings the ubiquitin ligase. So we can selectively target specific proteins for ubiquitination if we want. As I said, once a protein becomes ubiquitinated, being tagged by those ubiquitins, it then will be degraded. So if we can develop a method and introduce that method into like tumors, then that could help us to prevent further development of those diseases.

VAN BENSCHOTEN: Right.

XIONG: So that's the one thing, and I've got several people working with me. They're all—There are several people in the lab that have long interest in the clinical setting. One is Dr. Yarbrough I mentioned; he himself is a surgeon and working on head and neck cancer. The other is Tom Luedde, a visiting doctor from Germany. He also has a long interest in cancer treatment, especially liver cancer treatment. So they both are working on those kinds of related methods.

VAN BENSCHOTEN: Right. Okay, where do you see your research going in the next five years?

XIONG: Oh, boy. Somehow this year, I got a lot into thinking about this. I feel the cell-cycle field, compared with, like, seven or ten years ago, or five years ago, [has] become much more mature by now. So the translation is less exciting—

VAN BENSCHOTEN: Right.

XIONG: And there are fewer new discoveries or fundamental discoveries [than] we have been witnessing over the past five or ten years.

VAN BENSCHOTEN: Right.

XIONG: I've been thinking a lot about where we're going from now. On one hand, I would say we will be continuing working on cell-cycle control and the tumor suppression as I just described. On the other hand, we are thinking and we actually initiated an effort to get into the so-called proteomic studies, which means we're going to study specific biological questions by studying at the genome scale. And the reason for that is obvious, that the genome project of a human is near completion, because the whole genome sequence has been determined and soon will be finished annotation and analysis. So we'll know all the genes in the genome pretty soon. After that, in a year or so, we're going to know the whole map and sequence of the mouse genome. So knowing the sequence in itself now is not that difficult for anybody. Traditionally, biological science has been carried out by individual labs on an individual gene basis. Each investigator was studying a gene or a few genes that are related in functions. It has not been performed on the scale of the whole genome, asking, in the network sense, the function of your genes, because we know in the cells it's not— No gene is working just by itself. They're all working in the networking sense; they must communicate [with] each other.

So we don't have an overview of how an individual gene works from the point of view of the whole cell by the limitations of what we know, but that is changing right now. So that's the one thing we are thinking of developing into, proteomic studies. Just by first asking what the protein we'll be working on is interacting with who else in the cell. Just taking a systematic approach to purify those protein complexes one by one. And to get an idea of what other proteins are in association individually with the proteins we're working on.

VAN BENSCHOTEN: Right.

XIONG: And then we're asking, why are the proteins associated with these proteins? And doing what? For what functional purposes?

VAN BENSCHOTEN: Right. Good, so more sort of global, systemic views.

XIONG: Precisely.

VAN BENSCHOTEN: Right. Okay, to what extent have you achieved your research goals you set out in 1993 when you began your lab?

XIONG: I guess you can say that the bottle is half full or half filled. [laughs]

VAN BENSCHOTEN: Right. [mutual laughter]

XIONG: Yeah. In the horizontal sense, compared with the junior faculty— We start up at the same time, working at a relatively comparable field. If you use that as a judgment, with the development of my career and accomplishments made in my lab, I guess I have to say I'm really happy. But I also realize on the other hand I have this personality [that's] just not easily satisfied.

VAN BENSCHOTEN: Right.

XIONG: Just not very easy. I start off setting up relatively high standards for myself, as well as for my lab. That's the one thing my colleagues and my wife [Qing Yang] remind me of all the time. They say, "That may not necessarily [be] good for you; just because you have high standards, [it's] not necessarily always driving you to higher productivity and accomplishment." So having said that, and I do say we can do better and we should be able to.

VAN BENSCHOTEN: Right.

XIONG: It's a learning process. The first few years I didn't know how to do it and I spent the most time myself on the bench, and have not learned early enough how to be a good teacher to train the students. I only learned later, the last three or four years. And it's become increasingly more and more clear to me that recruiting good people into the lab is probably more important than anything else, maybe combined. Without enough grant support or funds, research is difficult. Picking the right project is important, so on and so forth. But none is more important than recruiting good people.

VAN BENSCHOTEN: Right

XIONG: And to train them well. Yeah, and to really try to inspire them, not burn them out.

VAN BENSCHOTEN: Right. [laughs]

XIONG: So that's one thing I've started learning now, and I think I'm doing on that front much better than I did six or seven years ago

VAN BENSCHOTEN: Right. This is a side issue, but I think it's important. Do you spend much time at the bench anymore?

XIONG: Unfortunately not. I have not been on the bench for a year by now, more than a year, not at all.

VAN BENSCHOTEN: Do you miss it?

XIONG: I miss it a lot. It's just become impossible now. Because when on the bench, what you really need is to be focused; [you] cannot be disrupted. There's no sense at all to doing an experiment and then stopping and then somebody else will pick it up while you go pick up a phone call, to a meeting, and come back and pick it [up] again.

VAN BENSCHOTEN: Yeah.

XIONG: That's just not the right way, as I see it, to do the experiment. After not being able to do a real experiment myself on the bench for more than a year now— I have a relatively big group right now, and it is fluctuating between a peak of eighteen people to, right now, twelve people. In terms of productivity, as well as for training purposes, it's probably more efficient for me not [to be] sitting on the bench. I've been asking people a lot. There are examples where the senior faculty are sitting on the bench doing experiments; I ask them how they do that. The common answer is, you just ignore the people in the lab, if you really want to do an experiment on the bench, enjoying yourself. There are successful examples, people like Fred [Frederick] Sanger in the United Kingdom. He was still doing DNA sequencing just before he was retiring, after he received twice the Nobel Prize. That's incredible. But then when he wrote his memoirs, the first thing he said is that he felt somewhat guilty and selfish for not serving on any editorial duties, any administration jobs, not writing many reviews. So you have to take that kind of approach to be able to keep on the bench. Generally speaking, that's probably not very good for the people in the lab. So yes, you can do an experiment, that is a good part of it and you still have the direct feeling about result, but on the other hand, the people in the lab don't get enough

time to discuss with you. I still think of the adviser in the lab or the PI [principal investigator] in the lab [as] being the most important person to interact from the angle of grad student or postdocs. But if you spend too much time traveling or on the bench, they're not receiving enough training from you.

VAN BENSCHOTEN: Okay, your lab has been up and running for about seven years. What has been the impact, or what was the impact of the Pew Scholars Program in the Biomedical Sciences award on your research?

XIONG: There are three measurable impacts, as I can see it, of being a Pew Scholar. One is giving me a sense of confidence as to how well I'm doing on a national scale, because as a junior faculty, you did pretty well, you must have done pretty well from your postdoc training, but you never know how much of that success is because of you, because of the institution you are associated with, and more importantly is it because of your supervisor, your postdoc mentor? You never know. And writing a grant and getting an award after becoming independent is the first indication or measurement of your own. So for all that, receiving the Pew award tells me that yes, compared with my peers and colleagues nationwide I am doing pretty well, because the winners were selected from comparable level junior faculty within less than five years of their starting faculty positions. They're all more or less on the same line of their career. So they're pretty comparable, not to mention that the Pew Scholar nomination was only to, like— I heard it was, like, limited to eighty of the most prestigious medical schools around the country. So you're really compared with the best group of young junior faculty around the country.

Second, of course, is the money issue. That's come very early on, the two hundred thousand dollars, [to be] used at your discretion, any way you want, no restrictions. They supplement, encourage very well for you to take some kind of relatively risky approach. Something that there's no guarantee [on], because science is exploring; by its nature of exploration, it is looking for something that may or may not be there. Otherwise it wouldn't be scientific research. When the funding tight, people take a safe approach to convince the reviewers that, yes, if you give me money, I definitely will get something done based on this proposal, but that [does] not necessarily mean the best science. For the best science you have to take a risk, do something that may not give you anything. But without financial support, you cannot afford that, especially the junior faculty. So in that sense, the Pew money does encourage junior faculty like me to take an approach—

For example, specifically this knockout project, I probably would have hesitated to initiate. It costs money, it may or may not give anything. If there's no phenotype after knocking this gene out, we may not learn a whole lot. It's costly and it takes a long time. You know that, minimum, for two years you're not going to publish anything. So the Pew money helps that. The third sense is the impact on the campus. When I first came here, the UNC [University of North Carolina at] Chapel Hill medical school or the university was really pushing up the biomedical research on this campus. It has a critical mass, and they built up very rapidly before I arrived here. So one thing they're missing is high-quality of junior faculties. They've been recruiting

some people and the quality varies from year to year. But they really want to recruit some high-quality junior faculty. I was the first Pew Scholar nominated and awarded from this campus. So that made everybody happy. They were actually very encouraged and for that reason they actually supported me further. They realized they have a pretty good junior faculty on this campus. They felt very happy about it.

VAN BENSCHOTEN: All right, have you gone to the general meetings that the Pew has given?

XIONG: Yeah, I've been attending every single annual Pew meeting.

VAN BENSCHOTEN: And are they useful, those meetings?

XIONG: Oh, yeah. I mean, not to mention it's in this exotic place. [laughs]

VAN BENSCHOTEN: Right. [laughs] That's also a benefit.

XIONG: Right. Yes, because we normally don't go to meetings like that. The Pew Scholars were selected from a wide range of fields ranging from cell biology, immunology, developmental biology, structural biology. When we attend meetings, we only attend the meetings specialized in the field that's related to what we're working on. We don't usually listen to people outside the field. So that actually narrows your vision. So at the Pew Scholar gathering, the discussion is pretty wide ranged. It's difficult to understand, sometimes, if you're not in that field. But they really force you to sit there, to listen to something that you don't normally read or listen to. It gives a chance for people to get to know each other, to interact with each other in a such an intimate setting, you feel that you belong to a class—I like that term—called the class of '94, class of '95. Because one of the most close relationships you can have is with your classmates. You can't have any closer than that. Knowing each other in personal ways is different than from knowing each other from just reading each other's papers. From that sense we do feel—I'm not exceptional—that among Pew Scholars, we somehow feel that we have a closer relationship to each other. So when we call each other, requesting material, asking for information and discussion, it instantly creates a much more friendly and open communication if we can relate to each other by associating with Pew.

VAN BENSCHOTEN: Right. The next couple of questions are general and they're about biomedical research. The first one would be if you could talk a little bit about the impact of technological innovation on research.

XIONG: It's almost impossible to overdescribe that.

VAN BENSCHOTEN: Right.

XIONG: The biomedical research, as one discipline of science, has one distinction from other sciences we know of, such as chemistry or physics. People probably remember, early on, the golden age, at the turning of the last century, for quantum physics development. It's purely theoretical. In the early days, all you need is a calculator and a piece of paper and a pen to calculate. And more or less, that's the case. It was not until late, once the theory ground was laid, and then people needed to build up accelerators and those big machines to test those theories, [that it] became more and more experimental. And a very similar situation happened to molecular biology, early on the 1940s and '50s before the double helix structure was resolved. People do a lot of postulation. If you read those early papers, including seminal work by people like Jim [James D.] Watson or [Francis] Crick, it's one speculation based on another. It's more speculation and postulation, theorization, than actual fact. But that stage is over; we still need theoretical guidance for our work, but there's more and more emphasis on the experimental approach. When you come to the experimental approach, the method and the technique become limiting factors. Again and again, it's constantly that a breakthrough in the technology field has such a direct impact on the whole field of biomedical research.

There's just so many examples like that. So I don't think I need to just list one for you, for example PCR [polymerase chain reaction] technology. It's purely just technical. For that—They awarded the Nobel Prize for that method. I think nobody would argue with that.

VAN BENSCHOTEN: Right.

XIONG: That's just impacted almost every field of molecular biology today.

VAN BENSCHOTEN: Okay. I would imagine too, that that makes it a little bit harder to do bench work, with the idea that because there's so much change technically, it's hard to keep up. Or do you find that to be the case?

XIONG: Yes. We had a lot of discussion in the lab, and I myself have been thinking [about] that issue quite a bit. My view right now on that issue is that if your question is being blocked by technological development, you cannot really go further, and then you must adopt the technology, then learn the technology. So keep up with technology development. You can't beat technology, just keep up. It's so important, just don't run away, no matter how new the technology is. It is a challenge to many people, because people have this tendency that if you

know something pretty well, if you're good at something, you have this tendency to keep on doing the same thing over and over and over again. Very soon you'll be outdated. So I emphasize so much to the people in the lab that if we know there is a technology out there and it is pretty well established, but we don't know anything about it, and there's obvious implication to our research—don't bypass it, learn it.

VAN BENSCHOTEN: Right.

XIONG: Set it up, establish it. I put so much emphasis on this. I think the whole lab is now starting to benefit from it. One of the major strengths in the proposal I wrote in the last cycle of my funding application is the technological strengths. We are at the cutting edge of utilizing all those techniques.

VAN BENSCHOTEN: Right.

XIONG: So I emphasize so much on this. You've got to be able to do the best and use the best technology available to address the questions. Otherwise you are just simply handicapped.

VAN BENSCHOTEN: Okay, in looking through your CV [curriculum vitae] and reading through some of your papers; you've collaborated with a few people. Could you give us sort of an overview of those collaborations?

XIONG: Yeah. That's precisely related to the question of technological development, because now those things develop so fast. It's really a required ability of individual principal investigators to horizontally collaborate with other investigators while they continue to develop their own research in the vertical way. We are each studying specific questions, specific fields. As this develops, it's ultimately connected with many other fields, especially [when] what we're doing is a fundamental question—how the cell cycle or cell proliferation is being regulated. But the cell proliferation itself has intrinsic connections to many other cellular processes, ranging from developmental biology, tumor suppression, cell senescence, so on and so forth, which I don't know anything about, back to several years ago. There are two choices: either you're stuck to this very narrowly defined field of your own, [you] keep on doing the same thing to see whether you can go down, or you make horizontal connections by interacting and collaborating with other investigators from different fields. It's become increasingly clear now that there's an interdisciplinary connection. Interdisciplinary, interactive collaboration is the way that discovery is being made.

VAN BENSCHOTEN: And that trend is probably going to only increase over time.

XIONG: It's going to only increase, more and more. Because knowledge, information accumulates at such a fast pace, no one can possibly know everything, unlike earlier days, in 1940s, 1950s. Then one could say, "Well, I read every single paper in the field of molecular biology." That's not exaggerating. There were only so [many] papers you could read. Nowadays nobody can even say, "I read all the papers in my field." I can't say I read every paper in the cell-cycle field; that's impossible. So you can't possibly know everything, and the only way to do that is keep on doing what you're good at and keep your eye open, and once you know there's an important connection there, go out and read it and find the best people you can to collaborate with.

VAN BENSCHOTEN: Right.

XIONG: Learn from an expert.

VAN BENSCHOTEN: Okay.

XIONG: I must say that I've been so fortunate to have been in this campus; one of the things is [there is] a big biomedical-research community here. There's so many experts, and you can't just possibly predict where you're going to develop in the next few years. But if you go to a good campus that has quality researchers, has a critical mass like this, you know there's a good chance that once you get to that point, expertise will be available there. Again and again, that's been the case.

VAN BENSCHOTEN: On the flip side of collaboration is competition, and you were talking about how crowded this particular field is, the cell-cycle field. What are the pros and cons of competition?

XIONG: Yeah, there's clear pros and cons on competition. Overall, it's probably good for the public, because the competition is really driving the discovery and we all have our own egos. If there's no competition, we can do science like Mendel a hundred years ago and sit in the church and in his backyard, studying bean development.

VAN BENSCHOTEN: Right. [laughs]

XIONG: And yes, that can make a discovery, but it would be very slow paced. If the discovery

is made slowly, then the biomedical translation or the benefit of the patient will be slower, too. Okay, so overall, it's good. But there's the other side as well. The other side is when the competition becomes too much, it generates stress on the young investigators, myself included. And that may or may not be the best thing. And I know it's definitely not the best thing for the young students. They feel that they might get burned out. So I've got to be careful on that part.

VAN BENSCHOTEN: Right.

XIONG: Secondly, you lose some of the tradition of scientific research. The traditional scientific research, especially in the early days, like early 1900's when the quantum physics was developed, people gathered around the board and— Such open collaborations, discussions, and in the early days of molecular biology and development, people were getting together and they're openly discussing unpublished results. That's our tradition. But that's becoming more and more clearly decreasing nowadays, for a number of factors. One of them is the publication speed [has] really speeded up. Second, people are afraid of competition or screwing up, so they don't— They are pretty reluctant to discuss something they have not published or that has not been accepted for publication. So that kind of situation actually impacts somewhat collaboration, which would otherwise accelerate discovery. But overall, completion is a good thing for biomedical research.

VAN BENSCHOTEN: Right. Now, because publications have sped up, people are rushing to try get their results so they're not scooped. Has the quality of the research, do you believe, gone down in the last couple of years?

XIONG: Individually, maybe, but not necessarily the quality has gone down [so much] as that a lot of experiments were a little bit rushed, incomplete, and if given more time, it could [have been] more thoroughly conducted. But I'm not really concerned too much on that, because science research is a more or less self-policing discipline. I will tell people that if it is something very trivial and not important and if it is incomplete or not correctly interpreted or even falsely interpreted, I don't think it's a big deal. I personally don't think it's a big deal, because what's the impact if nobody cares? But on the other hand, if some important discovery is being reported that was not appropriately controlled or missing some controls or was not correctly interpreted or was using the wrong material, in any of those cases, if it's an important discovery—which means a lot of people will pay attention to it, and right away, they're going to develop on your discovery the first thing one must do is repeat the experiment. So right away, you discover if it is not right. I'm not concerned too much; people can discover it right away. If it's not important, who cares? So overall, as a whole, for the biomedical research— So that has not been a huge issue, and of course the ethics have to be very high and so that one thing— And as a whole community, I think we, as scientists and as a whole, are holding very high standards. Extremely high standards. I have not seen any other community—in business or law or politics or anything like that—have nearly as high criteria as we do, and self-imposed in

many cases.

So a few years ago, if you remember, there was this interference from the Congress, politics got into this, and it was just ridiculous. Totally unnecessary. We've been doing science for hundreds of years, and just look at how things were developed— Once in awhile there might be fabrications that come out from somewhere, but if it's not being detected, that means it's not going to have any impact, it's not important. I'm not saying that's good, but if it is important, then it will be discovered very quickly. It's not easy to escape.

VAN BENSCHOTEN: Now, in the rush to publish, one possible effect is that people get scooped. Has that happened to you?

XIONG: Oh, yeah.

VAN BENSCHOTEN: Unfortunately.

XIONG: Nowadays, it's pretty easy to get scooped. So we're doing things fast, but we also, in some kinds of ways, are not doing things fast enough. I have a lot of examples like that. For example, when I first came here, one postdoc in my lab was purifying this gene that turned out to be CDC37, and we had difficulty getting the protein sequenced, we had difficulty in cloning the gene quickly enough. So finally, by the time we cloned the gene, I got a phone call from my friend saying that a paper from another lab is already in press. Now what do we do? Stop doing it. [mutual laughter] Yeah, we just got a gene and we haven't even started yet to characterize it, while the other lab already has a paper in the press. Actually two papers; this other paper came out even earlier than that one, I was told. So we just stopped.

VAN BENSCHOTEN: Being a principal investigator, you have several responsibilities, quite a few, in fact, as you probably know all too well. Do you teach? Are you teaching?

XIONG: Yeah, I do some teaching as a professor, but it's not much. Being at a medical school, we don't have a formal teaching duty to the undergraduate college, unlike the people in the department of biology or other science schools. I'm teaching graduate courses, and for myself, my teaching load is about ten to twelve lectures a year. That's concentrated within the frame of four weeks— Actually three weeks— Four weeks, and then it's done, so that's not too bad. It's a pretty light load.

VAN BENSCHOTEN: And do you enjoy teaching?

XIONG: I love it. I love it. It probably can traced back to my early teaching days, when I was in the countryside during the days of the Cultural Revolution and I taught middle school for a few years, and I had a very good relationship with those kids I was teaching. And I myself had a very close relationship with my teachers as well, and I was inspired by them and I respected them. I just feel, still up until these days, the benefit of having good teachers. One thing I have is a close relationship—direct interaction— instead of formal teaching [where] you dress up and you feel distant from the students. So that's not the way I like it. I was also encouraged a lot by the teaching and the evaluations I've been receiving from the class I've been teaching here, and every year I've been ranked number one by the class I was teaching. There are four of us, and I was joking, and I said to the other three faculty that the one way you guys [can] catch me up is by changing from speaking English to speaking Chinese. [mutual laughter]

VAN BENSCHOTEN: So why do you think you've gotten such high evaluations? What is it that you do?

XIONG: I think it's probably because of my enthusiasm. When I go up to the podium and I'm teaching the class, I feel excited. That intrinsically affects the students, and I speak loudly and I speak in a very exciting sense, and also I bring them up and the feeling that what we are learning today is directly connected to the public health. The topic I was teaching, such as retrovirus, which carries oncogenes, and one retrovirus is HIV [human immunodeficiency virus]— So they all know what an impact that is. We also cover oncogenes and tumor supression, and we all know that cancer is a pretty terrible disease, and so by teaching those topics and by making connections to students that what we do in the laboratory, on the bench, has a direct impact—and not in the distant future, but in the near future—to the public health. And that can excite students; they feel that what they're doing, what they're learning, and what they want to do in the future is a noble cause. So that makes them feel very positive about it.

VAN BENSCHOTEN: How do you run your class?

XIONG: I spend a lot of time to prepare it and to compensate for my language shortage, that part I suppose is not the best part I am. And also, I speak very fast, and so I'm concerned students may not be able to catch up to what I say. So I prepare very well my handouts, and so what I tell them at the beginning of my class is that if you just listen to me carefully, you don't have to take [many] notes, because all the complicated figures or formulas or tables I have already printed out so you can have it. You don't have to write out those numbers. My handouts are very clear and the lecture is very organized and I make sure that it flows from one lecture to the next, and is well connected. Instead of teaching point by point, I try to teach along a line, so that they can connect and interpret that what they learned today using what they learned a few weeks ago. Those kinds of connections are very important. And third, to keep them updated and contemporary, [which] makes the students feel excited— They might have heard this discovery

a few weeks ago on CNN [Cable News Network] or reading *Time* magazine, then they realize, "Oh, boy! This is what's wrong in that disease!" And a few years ago, there was a cover story that p53 gene was being named as the molecule of the year and made the cover of *Time.* There's a big story once or twice a year on HIV and cancer; if you read the contents, a lot of the discoveries [were] on the molecules I was teaching, like p53, p16, ARF—

[END OF TAPE 5, SIDE 1]

VAN BENSCHOTEN: I'm sorry, you were talking about your teaching method, and you were talking about relevance and how important that was, that the student can see the connection. Did you want to add anything to that?

XIONG: There's one more factor to it, [which] is that I emphasize that this teaching is aimed at making a transition for learning. Students are now shifting from the textbook reading and learning into reading the original research articles. That's a big transition, because up until that point—starting probably from elementary school—what they've been learning is what is in the textbook. So I emphasize repeatedly to them that those days are over. No one can write a textbook for you anymore on what you're learning, because we do not even understand it yet. We have not written textbooks on it yet. A textbook is typically five to seven years behind the discovery, but you're a graduate student now, you're at the forefront. I have to teach the method of how to read the research articles. What [you're] really saying behind that kind of teaching is that now you are entering a period of learning something that is really ongoing and you have to use your own judgment, you have to be critical, because we all have this tendency, when we read a textbook, to trust everything that's said in the textbooks, because otherwise it wouldn't be in the textbook. But a research article is a different story, because that is ongoing research and it could be incomplete, it could be misinterpreted, it could be missing the proper controls, and it's not a textbook anymore, it's not a bible anymore, and it may not be even right. So you have to develop your ability to read it, to judge it critically, to criticize it, otherwise you will not be able to develop as an independent scientist.

VAN BENSCHOTEN: Right.

XIONG: So that's one thing I emphasize a lot, and I realize this is a different class, and so I emphasize a lot on that, as well as the big picture, because everything I say in the first lecture I teach each year is tell them that whenever you start reading something and doing something, always ask, "What I am doing? Why am I doing this?" And very soon, within a few hours, or once you get into the lab, you just stick your head into the sand and the specific project, and you very easily forget the picture of what you're doing in the big field. So that eventually can make you feel dry, and you don't feel excited and you just forget what you're doing and why this is important. People often forget to ask those questions before making those big connections,

because science is not— The whole field is not developed by one individual or one experiment. Instead it is composed of multiple small projects developed simultaneously. But you ought to be able to understand what you're doing and how it's contributing to the whole field of development. We don't ask that question a lot, so without thinking about that, you eventually get lost.

VAN BENSCHOTEN: What you say about critical thought, I think, is very important, because I know from teaching history at the community college level, I attempt to do the same thing. I try to get the students to think, "Why should we believe this? Why are we learning this? What is the big picture?" There is an immense resistance to that, though.

XIONG: Yeah, resistance is automatic, otherwise you just listen to it, memorize it, and trust it. But trying to be critical is very difficult, especially for the first and second year graduate student. To make the transition, they say, "If you find the critical point and try to say that this is not right, then a very few minutes later people will say, 'This is already documented and this is right.' Then I can hardly make a discovery based on my reading that I am right and the author was not right."

And I say, "But if you don't do it, you don't get to that point."

VAN BENSCHOTEN: How would you describe your lab management style?

XIONG: That is the one thing I have been learning from the beginning and, in general, I feel that I am more organized than most other people that I know of, and that is also from the fact that when new people come into the lab, their first impression is the lab is very organized and that's for efficiency. We generate a lot of reagents and we develop a lot of lines, but if we're not organized well, people waste a lot of time to repeat the same thing that has already been done before, and the only way to avoid that is to organize the lab very efficiently so that people can get to the last development that someone else made before and go on from that point instead of going back and repeating and making the same construct again, to generate the same antibody again, to do the same experiment again. That's kind of a waste. I emphasize that the lab needs to be organized very efficiently, and that's why I spend a lot of time myself, still now, on organizing the lab. I need to keep up the lab stock for plasmid, for antibody, because I am the only one that has stayed in the lab for the entire period of seven years. People come and go, so I figure that no one else can keep up that kind of job and that I'm the only one that can do it. So actually, I'm doing that myself and it actually helps a lot for the people in the lab, and when new people come into the lab, as soon as I introduce the system, they can think out things by themselves. But if we're not organized well like that, that would not be possible.

VAN BENSCHOTEN: Earlier you talked about how [Thomas H.] Eickbush was someone that

you had a very close relationship to. You could go to him—that's partly because it was a small lab—and then later when you went to the [David H.] Beach lab, it was more difficult, partly again because of size, but I'm sure because of other factors as well. Where do you see yourself in that sort of continuum?

XIONG: I really want to combine— Combine both is not the right way to say it, because you can't combine those two different pictures; I'm more toward like an Eickbush method, and I try— And I think I have a close relationship with everybody in the lab, and to say that I view the lab as sort of like a family is probably not really overstated, because I do see that people spend five years or four years with each other in such a close environment and it's a very important period of time, and not only important for these four or five years in the lab, but also for the future. So I myself set up an example to have a close relationship with the people in the lab by having constant conversations with them, very informal ones on a daily basis whenever possible. I also encourage people in the lab to develop relationships among themselves somehow by just setting up collaboration among the people, by forcing them to communicate with each other, and by having joined the lab meetings and the journal club, every mechanism I can imagine. I think that by the time they finish and leave here, they will develop a collaboration and working relationship among themselves much [more] easily than they would with people outside the lab, because they know each other so well. So that one, so far, so good; we're doing pretty well on that part. A lot of people in the lab have become close friends among themselves.

VAN BENSCHOTEN: We should put on the record, too, that yesterday we had sort of an informal birthday party for two or three people in the lab. So we had great cake, by the way. Anyway, describe the makeup of your lab.

XIONG: The lab is made up typically of half postdocs and half graduate students, plus one or two supporting technicians right now. The number of personnel in the lab fluctuates between a high point of eighteen people in the lab and right now about ten or twelve people. So people come and go, but it's typically half senior postdocs and half graduate students in the lab. I always have one or two technicians supporting the lab and who are responsible for medium preparations, dishwashing and ordering, and some kind of routine plasmid preparations like that. It's a very technical support.

VAN BENSCHOTEN: Do you see the lab growing? Would you want it to grow?

XIONG: I'd like the lab to grow and I think that I'm capable of managing a big lab, and so I'm not afraid to have a big lab, and I still can run it efficiently; and more importantly, we have to have a critical mass [so] that people in the lab are really interacting with each other more efficiently than they would with people outside of the lab. If you have a small lab, just four or five people, they don't have much communication. They feel a little isolated, less excited, and

also they lose the potential to take advantage of unpublished new discoveries. If you make a discovery in the lab, often it will lead to further questions and further research, so that can be an advantage before anybody else even knows it, and so that's why I think that to maintain a critical mass of ten or twelve [people] is necessary.

VAN BENSCHOTEN: All right. The next couple of questions are about administrative responsibilities and also your professional duties. First, what are some of your administrative responsibilities?

XIONG: Almost none.

VAN BENSCHOTEN: Really?

XIONG: Almost none, a) I purposely wouldn't; and b) I don't know if I'd be good at it or not.

VAN BENSCHOTEN: Right.

XIONG: I may be too straightforward and so to run an administrative job, like running a department or some kind of program or center, if it is not purely scientific, I don't know if I'd be good or not. I've never tested myself on [whether] I'd be good at it or not. I might be too blunt and people might not like it, but on the other hand, I could be very efficient in just running my lab and that being very efficient, so I don't know. But the main reason is I've been trying to purposely avoid administrative jobs. For professional jobs, I've been involved pretty actively in attending meetings and traveling around to give lectures and serving as a consultant for different companies and serving as a reviewer for NIH [National Institutes of Health] grant review, as well as a number of different journals. So that has been constant, and that is very professional, so I don't think that— That actually only enhanced my own research to a certain extent, even though it takes some time away from it.

VAN BENSCHOTEN: How much time, roughly, percentage-wise?

XIONG: Not too much right now, because I'm getting more and more efficient. If you ask me for a rough estimate, I would not put more than 10 percent of my time, at most no more than 15 percent. It's fluctuating, and sometimes you get a flux in the number of manuscripts coming in the same week, but sometimes it gets quiet and sometimes that drops quite a bit, and like a whole two weeks [I] will be outside the lab and traveling around. But in general, I probably spend more time in the lab than most of my colleagues.

VAN BENSCHOTEN: Okay, very important to your profession, too, is getting papers out, getting them published. Could you describe the journal-writing process that you have, that you've developed?

XIONG: That's one thing I don't think I've done a [very good] job on. I write pretty fast. I'm good at that. I'm a fast writer, even though it's writing English, I'm still pretty fast and reasonably good, but not as good as I would like to [be], because I'm very good at Chinese writing. I have very solid training in Chinese writing, and not just using the words and terms, but also structurewise and the flow, and so that's probably more important than anything else, clarity. And although scientific writing is less demanding or less fancy than literary writing, still, it requires clarity. That is one thing that the young students, the postdocs, are not doing very well, and I'm not patient enough. So very often, once we've got a result, I just [write] the paper quickly myself, in a couple of days. So to me, it's pretty quick, and I'm just not patient enough and it's not very good for them. But looking back, I didn't get a whole lot of training in writing those papers when I was a graduate student or postdoc, either. The paper published during my postdoc was mostly written by my mentor, and I wrote the first drafts and not very good ones, so he'd just hang around. Then when I started myself, I could still do it, so I don't think that is so terribly important, practically. What's important is getting the paper out and once they get the paper, they can move on with their career and get a job and they can get this training later. It's important, of course, but I don't think it's as crucial as published papers for them. Instead of letting them spend, like, a month to write a paper, I just figure that you spend two days to finish a paper, send it out, and move on; it's much more efficient. It also depends on— Some people have come in with very good writing skills and I let them do it. I've got a few people that are very good at writing and so in that case I let them do the writing. But in the majority of cases, I wrote the most part, if not the whole paper, myself.

VAN BENSCHOTEN: Now, those who write their own papers, do you go over it several times or how do you work that?

XIONG: A couple of times. Not very often. I enjoy a lot [working] with good writers. I have to say myself [that I am an] above average writer, so I can tell the good writing from the lousy writing. So if people in the lab have good writing skills, I actually enjoy writing with them. Then we can really start digging into styles and how to make things clear, because sometimes the writing isn't clear, not only because of style, but also it tells your readers how clear you are, conceptually, about what you're doing scientifically, so that's important. I've had several people in the lab, all Americans, that have very solid training from their high school and college years and they write very well, very clear. So they helped me a lot, actually, and so that's the one thing I learned from them more than from anyone else. But unfortunately, more than half the people in the lab [do] not have English as a mother language, and a lot of American students and postdocs, they're not even writing as [well] as I am. So that's a shame for them. They must not

have studied hard enough in high school and college on their English training.

VAN BENSCHOTEN: I know from interviewing someone at Caltech [California Institute of Technology], they, I think, had instituted a program where they actually had a class that biomedical students could attend to learn how to write a paper. It seems maybe, too, that they could devise a program where you can learn how to run a lab. That also seems like a valuable skill that you don't usually get.

XIONG: Our department has a course for that, called grant writing.

VAN BENSCHOTEN: Oh, okay.

XIONG: I haven't asked directly what kind of an impact it [has had] on students, but I was not involved in the teaching and without being able to compare how bad they were before they started and how much they improved at the end of class, I can't tell what kind of benefit they have. I myself was not influenced enough, myself. So if they are good, I will work with them. If they are not very good, I will just say, "Give it to me and I'll write it."

VAN BENSCHOTEN: How often do you attend scientific meetings or symposia?

XIONG: I think, generally speaking, often enough, two or three times a year. It depends. Most times, nowadays, I don't really go to meetings unless I was invited and so that actually limits it somewhat. I don't like to take money out of research grants to go to meetings myself if I was not invited. Instead, I'll send people in the lab to go. But still, I'm going at least once a year to a national or international meeting myself, not including small and local meetings.

VAN BENSCHOTEN: You're also on— You've said you've been on NIH study sections?

XIONG: Yeah, I've been on study sections and so far I was able to convince the people at NIH not to ask me to serve as one of their regular members, which is a very heavy duty. You're talking about— if you go every time—three times a year and two weeks each time— Four times; that's a lot.

VAN BENSCHOTEN: That is.

XIONG: So this is one grant I'm reading, it's this much [indicates a thickish volume]. That's one. So this much plus that much; that's a whole deck.

VAN BENSCHOTEN: Right.

XIONG: That's just one.

VAN BENSCHOTEN: Right, you're pointing to a couple piles of paper here.

XIONG: Yeah, so I'm going next Monday to a study section for this one. It's a lot of work. So the first reason I use is that I haven't gotten my tenure yet and you've got to give some leverage or room for the junior faculty before asking to serve. They say, "Okay, we think that is a good reason, so we will let you off for a few years and you're going to come back, right?" and I said, "Okay, I will come back." So I will be back and serve in another study section on an ad hoc basis, but not as a regular member, and I don't know how long I can keep doing that.

VAN BENSCHOTEN: Yeah, that's a lot of work.

XIONG: It's a lot of work. It's a learning process too, but it's too much time. But on the other hand, it's a duty and we all have to do it at some point, and if we fail, find a reason not to do it, then who's going to do it? This is one of the best systems in terms of determining funding, is by peer-review system. It's not perfect, but no one else can come up with any better system than that.

VAN BENSCHOTEN: Okay, another professional responsibility is grant writing. Describe that process. Does it take a lot of time?

XIONG: Oh boy, that's a lifeline supply for everybody, and that's the one thing I really learned an awful lot [about], and [I'm] still involved in the process of learning, but I'm getting better and better. And I didn't realize it was difficult, because when I first got here and submitted my first RO1 application, [I] got it right away. I got a very good review, it was outstanding, and I wrote a second one and it was outstanding again. I said, "Whoa! This is easy."

VAN BENSCHOTEN: "What are people talking about," right?

XIONG: Yeah, I said, "This is easy. Why does everyone say it's so difficult?" And people said, "I don't know if you're writing [well] or your field is pretty hot right now or not, but it's not supposed to be that easy for everybody." And then yes, when I had to completely renew last year, I realized that it was not so easy, because then once you're established, people use different criteria to judge you, and you're still in the learning process. But I have to say that is the single most useful experience I have had since I became an independent faculty, because that really forced me to stay out of the lab and rate systematically, to have an overview of what we have done in the last four years and what the field has moved on in the last four years; therefore I can propose what we are going to do in the next five years.

VAN BENSCHOTEN: Right.

XIONG: Otherwise there is no other mechanism that can force me to do that.

VAN BENSCHOTEN: So it forces you to see the bigger picture again.

XIONG: To see the picture and to really sit down and read and think about this one.

VAN BENSCHOTEN: Any lessons you could pass on to new PIs about how to write grants?

XIONG: Oh, yeah. A lot. First and foremost is to find a good person to talk to, and a good person means that they have enough experience serving on a study section, success in doing the research, and success in getting grants, because not just what you propose is important, but also how you propose it is important. You've got to keep in mind that what you are writing is not a sum of your research. What you are writing is you try to communicate what you accomplished and what you want to do with somebody who is not necessarily in your field. If they don't understand, it is not their fault, it is your fault.

VAN BENSCHOTEN: Right.

XIONG: We don't understand this very well. We always assume that everybody knows what we are doing; [they do] not, because the field is moving so fast. We all become specialists. If you ask someone outside of your field to judge your stuff and if you can't communicate very well, then you can't blame them. If they don't understand it well, how can you ask them to just blindly give you money? When the money is really loose, it's abundant, it's another issue. That may not be so terribly important, because as long as you keep on publishing, doing well, then they will say, "Okay, this guy has a pretty good track record; even though I am not entirely clear

on what he or she will be doing in the next four or five years, I trust them." But when money is tight, that is a different issue, because then we can say not only your track record is important, but also how clearly you're writing, how important [what] you're going to do in the next four years is, is also important. So really talk to people and don't just close the door and write it yourself. Also ask some people to read it, especially the people that are not necessarily in your field, to make sure it's clear. Because at that point, you're not going to change a whole lot about your science. You can't just in that one month period time of writing a grant decide, "Okay, I'm going to start a new field, I'm going to develop a whole new approach, a whole new technology." That's not going to happen, so more or less, you're going to write based on what you've already done, but the important thing is to write clearly.

VAN BENSCHOTEN: Does it take about a month, then, to write a grant, too, for you? Say a pretty good medium to large sized grant.

XIONG: I set a month for myself, because one's going to last a month, and then I set up my mentality into the writing, but I don't think I've ever spent a whole month for a single grant. I usually have— I really put them together in two weeks, but I start a month earlier to finish some paperwork and to make sure that everything is behind me except the body part of the proposal. Then in that final two weeks I can just focus on the proposal without worrying about whether I've got a figure ready or an appendix ready or whether those document forms are ready or anything like that.

VAN BENSCHOTEN: Right. Now, if I read your CV correctly, you received tenure in 1999. So congratulations. That was fairly soon.

XIONG: That was pretty normal, slightly a year ahead of schedule; normally at this institution, they review tenure around year seven, which means you've got it by year seven— Between year seven and year eight, so I was a year ahead. So they call it early promotion, but I have to say I was not too surprised. I was not too surprised because this is a public university and we are not setting up competition among each other. You are competing with yourself for that tenure slot. So the slot is there and if you're doing well, you can have it.

VAN BENSCHOTEN: Right.

XIONG: And it's not like some places [where] no matter how well you're doing, you have, like, five junior faculty up for tenure review this year and you only have two or three slots, so somebody has to go. That's not the situation here. That's one distinction between the public schools and the private schools. And also from judging by what we've been publishing and what we've been getting in terms of funding and awards and what I've been hearing from my

colleagues, I know that I'm doing okay and I'm actually doing pretty well. So I know that I should not have too much difficulty.

VAN BENSCHOTEN: Yeah, but what is the tenure process? Is it long?

XIONG: It's a long process and they took a whole nine months, and they started by the chairman appointing a senior faculty in the department as the chair of the tenure review committee, which is composed of three additional— Four tenured professors along with the chair. Then they came and sat down with me and said, "Well, we are going to initiate the tenure process, we want you to summarize what you're doing, and that you're writing, and your CV, including everything ranging from your teaching, funding, publications, and invited seminars, national and international review duties, and so on and so forth. Everything. And we're asking for every copy— Or a reprint of every paper you've been publishing. We look at all the material from you, then the department will go to—" The department has a mechanism to accumulate the teaching evaluations, so that's one of three components of the tenure-review process, being teaching, research, and administration. The third one doesn't apply to me, so it would be just teaching and research. So when all the materials were gotten together and they thought that it was good enough, they started a formal process and one of the first things they did was send out ten or twelve letters outside the campus to the leaders in the field we are working on and solicited their opinion on how we were doing, or how I was doing. Who wrote the review, we don't know. You could make some suggestions, but they didn't really necessarily follow what you're asked for. But it has to be someone recognized in the field. They're usually in the rank of department chairmen, institution leaders, or a director of the National Academy of Sciences, or the senior faculty in the field. So they have a fair comparison of you with similar junior faculty in other institutions. Otherwise, we know we're not competing with anybody in the department, so the people we see on campus will say, "Oh, yeah, you are good," and everybody says everybody is good, and that's not critical enough.

So when all the letters come back, then the committee will get together to review all those materials to determine what is the deficiency and whether this is good enough to write a recommendation to forward to the medical school, and the medical school has a committee that will review it and then the whole medical school submits [it] to the university. The university will review it all together with the applications from various departments before they submit it to the board for approval. But the last stage is pretty much a rubber stamp; if the university recommends, the president or chancellor or the board of governors always accepts.

VAN BENSCHOTEN: It's pretty rare.

XIONG: Yeah, it's pretty rare that they turn you down at the last step.

VAN BENSCHOTEN: Okay. What does tenure mean here, specifically?

XIONG: Tenure means nobody can kick me out unless I do something crazy, unethical, or criminal. It's just to give one indication that you are moving ahead in the current scheme of things. You are not junior anymore, so you cannot have those perks anymore. That's one thing. And also it means, to me, that I have to take more responsibilities outside the lab. I can't just say that I am still at the early stages of my career development and I have to set up my lab first, and I have to get more involved with the administration jobs outside the lab. Tenure also means you feel a little more confident, and mentally or psychologically, you are more secure in terms of your position. As long as you keep on doing good work, your institution is behind you, because now you are tenured faculty in this institution. So you can afford more competitiveness; if the research doesn't produce as much in the next couple of years, it is not as huge a deal as early on, when you're really focusing on publications and getting grants and almost on a yearly basis to accumulate enough before year six or seven. So that becomes less demanding or less obvious, so that lets you afford to think about— Instead of talking about the quantity of your research and your publications, there should be more focus on the quality of your research. That has always been a struggle for junior faculty, not only for their own sake, but also for the sake of people in the lab, whether you can be patient enough to do long-term research, do high-quality research, which means to take risks and be patient.

VAN BENSCHOTEN: Right. Just to finish up this particular section, I just wanted to ask you a few questions about your family. We had already gone over that. You got married, for instance, in 1985.

XIONG: Yeah.

VAN BENSCHOTEN: How did being married affect you, your life, and your work?

XIONG: Tremendously. I was a wild boy before getting married. I was very outgoing and I had all kinds of interests, and one of the first direct impacts of marriage on me is making me able to focus, so I don't have to go around and do every crazy thing anymore. I don't need to or I don't want to, and I'm not enjoying it anymore. So I'm really focusing, so that's one thing. The first five years of our marriage was very, very peaceful, very, very simple, because there was just two of us, and the only thing we had was just research and research and research in terms of my professional life. Overall, we've had a very happy marriage, fifteen years by now. Yes, we had ups and downs and tough times and stressful times and difficult times, but overall it's a very happy marriage. The tough times came when we were doing the postdoc at Cold Spring Harbor Lab. We both were doing postdoc research full time, and our daughter [Jessie Xiong] was very young, and that was tough for both of us.

VAN BENSCHOTEN: Yeah, it must have been.

XIONG: Partly because I am more self centered and I did not know— This, after all, is a learning process, just like many other things as well, how you view your family versus your own research. I am not very good on that part, so even my daughter knows sometimes I work too hard.

VAN BENSCHOTEN: So you're still trying to find that balance between professional duties and family.

XIONG: Yeah, I am still learning that and it's not easy. It's not linear in that you have actual hours outside of the home and in the lab you can be more productive or vice versa. It's not always like that. It's more of a quality issue here. So I don't think I'm doing very good on that part and I'm still learning this and somehow we have to struggle through together. My wife always tells me repeatedly that sooner or later [I'm] going to feel regret that [I'm] not spending enough time with Jessie and that [I'm] missing a lot of stages. The early development of childhood, when it's gone, it's gone, and you can never get it back. You're not going to see that anymore. You can see pictures, but it's different. She tells me that repeatedly that she has been enjoying a whole lot more than I do. So she tells me that I have already missed a lot and I'm still missing it. I think I agree with her on that part, but on the other hand, the research is demanding. The job is pretty demanding, not to mention that I have a lot of interest in it myself. I don't know who actually is the best example on those issues. I have not found one yet.

VAN BENSCHOTEN: So it sounds, then, as if your wife has done most of the child-rearing responsibilities.

XIONG: Yes. So that's one of the reasons early on, before completion of her postdoc training, she decided not to pursue an independent research position like what I'm doing right now, because that would be too demanding for both of us and she would not enjoy that too much, and it would definitely not [be] very good for the family.

VAN BENSCHOTEN: Okay. So in running a household, in running your household, how do you break up the responsibilities and duties? How does that fall?

XIONG: Not in a good way.

VAN BENSCHOTEN: In what way is it not a good way?

XIONG: Because my wife is pretty much the one taking care of the family and I'm doing very minimal— I have to say, not much. Not much. Not a whole lot. We are trying to learn this right now, but not much at all.

VAN BENSCHOTEN: Now your daughter is born in 1990, right?

XIONG: Yeah.

VAN BENSCHOTEN: What was the impact of her birth on you, and your wife for that matter? How did it change your life?

XIONG: That had a big impact on both of us, especially on my wife. Motherhood really got her into thinking [about] what she wanted to do in the long run.

VAN BENSCHOTEN: Right.

XIONG: And that also, for the first time, made me feel that there is something more important than my career, and that comes— I think it was the second year when we were at the Cold Spring Harbor Lab, when Jessie was a little more than a year old. One day we got a phone call from the doctor, from a— Well, it was in the lab, and we had to take Jessie and go to emergency right away. That morning we had Jessie checked up because she developed a bruise on her chin and we didn't know what it was and she didn't feel much pain and we thought she just bumped it somewhere. So the doctor took some blood tests and just sent us home. A few hours later, they gave us a call and said, "Go to the hospital emergency room, I already made an appointment for you," without telling us what was going on. That scared the shit out of us, and I think I was running and speeding up and running through red lights or something to get to the hospital. We didn't know what was happening. We didn't know the answer for several days, and they kept on doing more tests and more tests and even, at the end, an oncologist, and of course we knew what that meant. When the oncologist was brought up, [that meant] she might have the chance of developing leukemia.

VAN BENSCHOTEN: Right.

XIONG: They did all these kinds of blood tests and even did bone marrow testing, and it ended

up that she had this autoimmune deficiency disease and her immune system was eating up her own platelets and making her unable to stop bleeding efficiently. So whenever she bumps something, she will have this bruise on her skin.

So that, if it is very severe, could be pretty dangerous, because kids don't know this stuff and they could just bump their head somewhere, get internal bleeding, and be unable to stop it. So that could be dangerous. Having accomplished a *Cell* paper and a *Nature* paper, a grant, that doesn't mean anything. That was pretty devastating until a couple of weeks later, when they figured out what was going on and they determined that there was no chance that it's anything [like] leukemia or lymphoma or anything like that. It's just an autoimmune disease and it's treatable and all we need to do is regularly go back to the hospital and treat her and administer an IV injection of immunoglobulin to suppress her immune response, and eventually she will correct herself. It's common, actually. It's pretty common, and we didn't know that at the time. By the time they get to around ten or twelve years old, they will have corrected themselves. Only 5 percent of the cases will not be able to do it still, and then the doctor will remove the spleen, and even that is not going to have a big impact for the overall health. They might have a decreased immune defense system, but it's not a huge amount. So she's over it now and for some time already. After we left Long Island, we never needed to go back to the hospital again.

So that tells you that there is something more important than your career and you know it. You feel pretty happy when you play with her, but you feel it from a different angle that you actually could have lost your kid. It's a completely different feeling. Enjoying playing with her is one thing, and after dinner [we] put her to bed and then we go back to the lab again. It's like a routine. It's just like, "Oh, yeah, this is how kids are raised," until that part.

VAN BENSCHOTEN: Do you bring her into the lab?

XIONG: Sometimes. She brought another different perspective into my life, because my wife is also a scientist, so I could communicate with her about my research, even though she [has] become less interested now compared to the graduate students or postdocs. But Jessie is different, because she doesn't know anything about science, so she doesn't care anything about it. And it makes you think science is not everything. So really it brought you outside the world, and I remember one time last year I went to Philadelphia to receive a Gertrude [B.] Elion [Cancer Research] Award for the American Association for Cancer Research, or AACR.

VAN BENSCHOTEN: Right.

XIONG: And that's a big award. It's national. So I was the only one on this campus to receive it and I was pretty happy. And the department of Biochemistry was also very happy and they actually had a ceremony for me. Everyone was happy because it was a big deal. So I brought this plaque home and told my daughter, I said, "Jessie, look at what I brought back." And she

looked at it and—I don't think she did it on purpose, it was pretty spontaneous—she said, "Oh! That's kind of small." Then she went back into her playroom and brought her trophy she won during her karate tournament. It's much taller than my plaque.

VAN BENSCHOTEN: "My trophy is much bigger than yours, dad."

XIONG: Yeah, she was so serious, "Oh, that's small."

VAN BENSCHOTEN: That's funny.

XIONG: What can you say? It was a very genuine response from her. It really makes you realize that there is another life outside the lab.

VAN BENSCHOTEN: In a way, bringing up kids is a long, humbling experience. Enriching, but humbling.

XIONG: Yeah, you think that science is everything to you, it's your career and you've been so concentrated and so focused over the last fifteen years. It's almost like everything to you after your marriage and now all of a sudden the kid tells you, "Wait a minute! There is a whole big world out there, like my karate tournament; it's bigger than your plaque."

VAN BENSCHOTEN: Right. So it has opened up this other perspective, then, or just broadened the perspective, I guess, in which you see your life and your work.

XIONG: Yeah, and it's not that I don't know it, it's just you have to feel it. You have to see it, you have to feel it.

VAN BENSCHOTEN: Now, does she have any idea about what you do? Does she ask questions about your work?

XIONG: She does, and she knows we are scientists and we are doing research and that in the long run we are trying to kill cancer; in quite a superficial way though. I don't know how much she really respects what I'm doing, because it has generated a lot of conflict for her. On the one hand, she knows that what we're doing is a noble cause and it's good. [We] treat patients and might contribute to the cancer patient treatment, and so in that part she knows it's a good

profession, and it's a very good one. On the other hand, it's taking too much time [away from] her. She doesn't like that, especially when I have to come back to the lab and to the office in the evening. That's her playtime and she doesn't like it. So she's struggling between that, and I hope that when she grows up she can have more— How do I say this? Can put her view into more perspective. Nowadays that's the professional life. It's demanding. It's not like an eight-hour life anymore if you want to be a professional. It's not just an eight-hour job anymore.

VAN BENSCHOTEN: Do you plan on having any more children?

XIONG: My wife and I were never on the same schedule on that issue. The time that she wanted, I was not very enthusiastic, because I was so busy. And by the time I think I was more calmed down and established, she said that she's out of the mood. [mutual laughter]

VAN BENSCHOTEN: Not any more interested in that.

XIONG: Right. And she said that Jessie is already ten years old and it's already past the stage of raising young kids. It's very difficult to go back again.

VAN BENSCHOTEN: All right. Tiananmen Square. When it occurred, you remained in the United States. Do you miss China? Do you plan on going back?

XIONG: Not permanently. I'm already settled in the United States now.

VAN BENSCHOTEN: So you're here.

XIONG: Yeah, but I am continually increasing my trips to China. My first trip back to China was after three years in the United States, almost three years. The second one was three years later, and lately I've been going back every year. I have a mixed view on that part myself. On the one hand, I know it's my inherited heritage and I do have a responsibility, and I am very interested and I really want to help my colleagues and collaborate with my colleagues back in China. On the other hand, it's a very different situation. What I'm doing is very basic research and it costs so much money, and I don't personally think that's what China needs right now at so early state of development. Not every country can afford the basic research like in the United States, and China is still in early economic development and they emphasize basic research, but it has to be in a realistic perspective, whether that's what's the best for China right now. So if I do too much on that part, I don't know what kind of impact I could have had and not to mention that I'm still at the early stages of my own career development. Before I really establish myself,

traveling too much to China, I don't know if it is good or not. What I believe is by the time, a few years down the road, when I get more established and I can have more impact, I probably could help them more efficiently.

VAN BENSCHOTEN: Right. And how about your wife, also? She's a U.S. citizen.

XIONG: Right.

VAN BENSCHOTEN: Does she miss China?

XIONG: Not much at all. Much less than I do.

VAN BENSCHOTEN: Right. One of the bad side effects, probably, is that you are separated from your parents.

XIONG: Right.

VAN BENSCHOTEN: But you had told me the other day that they've come over three or four times since—

XIONG: That's even more so in the sense of the tradition of the Chinese culture. There was this old saying of the Chinese, that if your parents are still around, you don't go out. For a thousand years, that has been the case, but obviously that has just become unrealistic nowadays. If you go to college, you can't stay home, and if you go to your job, you can just come back home to where your parents [Shenggao Xiong, Zhiyeng Peng] live. Still a lot of people do that, [but] I myself don't feel that anymore. I think that really limits the development of the child. So my parents, fortunately for me, both are very well educated on that sense, even though my mother never even got a chance to go to high school.

VAN BENSCHOTEN: Right.

XIONG: But very early on, when she was young and just getting married, she was able to get a job herself. So she appreciates and realizes how important [it is] to be independent, to get an education, and that kind of philosophy is the one that she [has] been teaching us, all three of us.

VAN BENSCHOTEN: Well, it has had pretty amazing results, hasn't it?

XIONG: It has, and that is the one thing that they feel proud of, is they actually set an example for the people around them. The three kids raised by them, they all became independent professionals doing pretty well.

Yes, I do miss them, especially my mom. I had a very close relationship with my mother, and not just because she raised me all the way, but also in terms of characteristics. I admire her a lot, I like her a lot, I am really appreciative. She has a big heart, even though she had much less education compared with other people, especially my father. But she has a big heart and is so tolerant and she is really forgiving and she really teaches you to ask yourself, but don't ask other people. So all those kinds of characteristics I really appreciate and they help me a lot, and I just wish I had inherited more of her character than my father's part. My father's character was distorted because of years of a political movement that tried to make him into a more self-content and sometimes self-pitying, and on the other hand, a critical person.

VAN BENSCHOTEN: Right.

XIONG: To a certain extent, because of [his] own detour of career development—Well, he never actually got his career developed at all and then he actually transferred all of the hope onto me, and had very high expectations on the three of us and particularly on me. It had a good impact early on, but later I don't think I liked it too much. It's a pressure on you. And also, now I have a different perspective from him, that family is important, and without the family, you don't have a base. I don't think he would agree with that part too much.

[END OF TAPE 5, SIDE 2]

VAN BENSCHOTEN: The next couple of questions will deal with the scientific community overall. Where does most of your funding come from? Where does the bulk of it come from?

XIONG: From NIH, the National Institutes of Health, and I constantly have two so-called RO1-type grants running. This RO1 stands for the principle investigator initiative, so basically it just comes to the lab. In addition, I am also being supported by the American Cancer Society, as well as the [United States] Department of Defense for breast cancer research, and of course the Pew [Scholars Program in the Biomedical Sciences] and some other sources on a smaller scale.

VAN BENSCHOTEN: To the average person on the street, the connection with breast cancer

and the Department of Defense isn't natural, doesn't seem intuitive.

XIONG: It's not. It was not natural, anyway, in the beginning.

VAN BENSCHOTEN: Right.

XIONG: It's dictated by the Congress, and I don't think that was initiated by the Department of Defense. But actually, it's good, though, and it doesn't cost them a whole lot of money at all, but it gives them a very good public image that they are involved in civil research on something called breast cancer. It can't be more positive for their public image if they do things like that. Actually, despite a little bit of a confusing start, they're doing pretty well. They have started to see some impact on it.

VAN BENSCHOTEN: Good. I think just last night I saw a story about— We all know about the rise in breast cancer and then also the connection between it and contraceptives that were made pre-1975.

XIONG: Yeah, it is constant. It is a terrible disease overall, and not just breast cancer itself. This is probably one of the worst cancers among all the types of cancers. For one thing, the disease itself is terrible and the mortality is pretty high. Second, we know very little about it compared with some other types of cancers. For example, the diagnosis of early childhood cancer is pretty good and the treatment rate is pretty high. The rate of testicular cancer treatment is also pretty good, but [with] several major ones, in particular breast cancer, we're not doing very well. This is probably because the basis or mechanism of development is still very, very poorly understood at the moment.

VAN BENSCHOTEN: How does the source of your funds affect your research?

XIONG: Not much, because most funding is pretty flexible. In particular, the funding from NIH is very flexible. Oh, I should say that the Pew money is probably the most flexible; they just give you money to do whatever you want. But NIH is big money, and they don't have many restrictions— They have some restrictions, because you have to think about when you renew your grant and you have to tell the review what you have accomplished, but they don't check you. As long as you have not deviated too much, it's all up to the principal investigator, which I think should be the way it is, because science is a developing field. It's not like a contract, [where] you sign the contract with somebody and say, "I am going to build your house," and you try to do it as close as possible, if not identical, to the way you contracted. But science is not [like that]. Science is developing. We hypothesize that something is going to happen down the

road, but nobody can predict exactly what is going to happen. Things change, not only by your own research, but also by the research conducted and published by your colleagues elsewhere, and so you have to be adjusting constantly to keep up and to make the best out of it. So that is also the interest of the funding institutions, as well as the public as a whole, that the money is being best utilized. I mean, it's stupid to stick to exactly what you proposed; a lot will become outdated or already have done by somebody else or become obviously impossible.

VAN BENSCHOTEN: So to your mind, it sounds as if you believe that the person who knows best how that money should be spent is the PI [principal investigator].

XIONG: Absolutely. I don't think there is any question about that. It has to be the people in the lab [who] determine what they are doing. Of course, at the time they make a proposal, they have to make the best [one], to their knowledge, at the time, but once the money arrives, you just have to emphasize and encourage them to adjust constantly and keep up. That is not implying that you're just jumping around and doing everything randomly. In that field, the principal investigator has to make adjustments constantly, otherwise the science will not be developed as fast as we would like it to.

VAN BENSCHOTEN: Right. Now, one of the criticisms I have heard about the NIH is that very often, in order to get the funds, you have to do half of the research or have more than half of the research done, and that, in a sense, it doesn't encourage people to do sort of cutting-edge science.

XIONG: Right.

VAN BENSCHOTEN: Is that your own view?

XIONG: I don't think it's my view, but my situation is somewhat different from the people that might have those views. I started my career in 1993, when the worst time was just over in terms of funding. There is a number measuring that, called the funding percentile, where it's cut off; the worst time I've heard of was like ten or eleven percentile, which means that almost 90 percent of grants cannot get funded. So that's extremely competitive. Now it [has gotten] back to more or less normal: twenty-five percentile. When the funding is very, very tight, I mean, how are you going to discriminate [between] the different proposals? That has become almost impossible, because they're all good. So then you have to say, "Well, this one has a higher chance of success, everything else being equal." But what do you mean by, "a higher chance of success"? That means more obvious, and more obvious, by definition, is less risk, and less risk means less potential of making discoveries. So that is anti-intellectual, I think. I think that is anti-novelty, anti-intellectual, anti-science at bottom. It doesn't mean that it's always bad, but in

general that is not how science should be conducted.

Science, by nature, is making discoveries [about] something you don't know. If you know exactly what you'll discover, it means there is nothing to be discovered. If you know what you're looking for, you will, of course, discover it; by that nature we are doing something that we don't know exactly what we expect. We are exploring. So science should take risks and it has to be on that part. You just have to heavily rely on the track record. If somebody is doing well and making discoveries and has a reasonable chance—not a guaranteed chance—that they will be doing fine in the next five years, then give them money.

VAN BENSCHOTEN: Okay, part of a trend that has begun maybe eight to ten years ago and I think has increased is the privatization of biomedical research, and I know from doing a couple of these interviews that I think it is more likely now or maybe more common for postdocs and also graduate students to go into private firms rather than, say, a university. At least, that option is much more available, maybe, than it was before. Do you think that is a good trend or a bad trend?

XIONG: A good trend, and for two reasons, pretty obvious ones. [First], that gives another alternative for career development and practical life for those people. Otherwise, everybody tries to jump in and squeeze into the same bus and the bus is not big enough to hold everybody. Second, science traditionally is considered pure science and is not so closely related to the public, so the public has this image of the scientist as nice people, but they're on their own. One reason is that they don't see much connection between the scientists and real life. The bridge between real life and science is in the pharmaceutical companies. A pharmaceutical company can take our discovery to make a drug and treat a disease, and the public knows what we are doing. I mean, who can do the— [Those] who would be good for the pharmaceutical companies and do kind of translational production research, of course, have to be the people trained by us. So I think that is one thing that the public is becoming more and more appreciative of, increasingly lately, the biomedical research and the preventative support. One of the reasons is that now they are starting to see the product coming out of the pharmaceutical end and a lot of pharmaceutical products nowadays are based on the research discoveries made years ago, and so if the public can see that, then that is good.

VAN BENSCHOTEN: So two things then. Sort of, again, pharmaceutical— What would be a better way of putting this? There is actually a product produced at the end after all of these years of research, that would be one. So the application is clear to the person. Also, it allows another avenue of advancement, I guess, for up and coming scientists. Any other benefits that you see?

XIONG: Yes. Science education. Also, science and the law. That is another issue. That also touches on the science and patent issue. You need knowledge in the field of science, as well as the law field. I'd have a course in scientific-based management, because to manage a

pharmaceutical company, a biotech company, or a scientific administrative job, if you have managing skills, it will be much enhanced if you also have some knowledge in the science field.

VAN BENSCHOTEN: Right.

XIONG: So along those lines, we now have this genome project complete, this bioinformatics. It's still science, but it's not the traditional sense of science or bench science anymore. It is more and more computer analysis. So people don't sit at the bench anymore. Those people sit at the computer or at a desk. You can still call them scientists, but it is in a different sense. They are not hands-on scientists. They use their heads and the computer a lot. So in that sense, science training is becoming more and more broad.

VAN BENSCHOTEN: Now, you mentioned patents, and that has definitely been sort of a burning issue in the last couple of years. One of the benefits of being at a university is that there is this idea that there is this free flow of information. I think one of the fears that people have, not simply among the general public, is that when you have patents, all of a sudden that free flow is dammed up. Do you see that? What is your own view of patents in biomedical research?

XIONG: For the research part, I don't see much, and I only have one experience or one area, and [my] view is that now it's become more difficult to receive research material from other institutions. Every time you request something— Which early on was completely free, and the definition of publication meant that you are willing to make available to the community whatever is described in your article. But now when you request something, you have to go through all this paperwork and sometimes it becomes an almost ridiculous requirement, and just by providing a simple reagent, they almost own you. I think that is really going to obscure scientific development; that's not good overall.

But in general, we are still enjoying a lot of free exchange of reagents, and I myself emphasize a lot on that. We actually have a written protocol in the lab specifically indicating how we handle the requests, and so the line is pretty simple. If it's published, we send it out. Whether we patented it or not, we send it out to our colleagues. If it is a company, I don't see much point in restricting them either, because if they are going to develop [something], it is good for them, it's also good for the public as well. I mean, overall, ultimately it is good for us. So we send out any published reagent without any hesitations and very quickly and in a very detailed manner. So I do have some expectations of my colleagues, as well, to other people. In general, since I still think that is good and we are doing all right and I don't have much difficulty in getting what I requested from my colleagues in the large sense— There are only a few cases and I hope that is not going to continue to develop like a trend, because that definitely will hurt science in the long run. Of course, behind that is just patent issues. I mean, they feel that if it is patentable material, they want to hold on to it, to keep the possibility that it might have the potential to be developed for commercial purposes.

VAN BENSCHOTEN: Do you feel that those protocols that you have in your own lab are fairly common among the community at large?

XIONG: I don't think so. I just feel that science ought to be open research, and if you are hiding yourself and close the door, you are dead. I, personally, am really against that philosophy. One of the practices that I take is that whenever people request something, don't hide it. Just because it is important to you, doesn't mean that you should not send it out to other people. Yes, sending it out might provide a little bit of a competitive advantage to other people, and that may be your competitor and you can imagine it that way. But I think that in a lot of cases, people exaggerate that. It is definitely not the right practice, because we are not using our own money, in a sense. We are using public money.

VAN BENSCHOTEN: Right.

XIONG: The public doesn't care much who actually published it first, as long as it is published and the discoveries are made. So we've got to balance what we are doing here, in the sense that we're using other people's money, we're paid by the taxpayers. Why should you slow down other people? You have to think about those kinds of issues. Ultimately, it is not going to help your science, because if you close the door to other people, other people are going to close the door to you as well, and so ultimately you are not going to benefit, either. So you just nowadays cannot do everything by yourself. It doesn't work that way anymore.

VAN BENSCHOTEN: Right. Do you have any patents?

XIONG: Yeah, we have several.

VAN BENSCHOTEN: Okay. We talked a little bit about the makeup of your lab. How many women do you have in your lab?

XIONG: It fluctuates. I don't know if I have had more men or more women overall. It is slightly— Probably 60 percent men and 40 percent women.

VAN BENSCHOTEN: One of the common things that we see—I think it is common in the scientific community at large—is that, whereas the breakdown of women and men is fairly— I wouldn't say equal, but you see many women graduate students, let's say. When it gets to the

postdoc stage, unfortunately, the number of women PIs is extremely low compared to that of men. Do you have any—?

XIONG: I don't like that. I have two views on that. It has to be scientifically based, and I don't like this racial bias or gender bias promoted purposely by the government. For example, I don't think I agree with NIH's policy that whenever we organize meetings, they purposely ask you, "Is there going to be a woman involved?" I don't think that is a very smart way to do this. It just makes people backfire. Just because she is a woman, why should her science be viewed any differently from others'? Because ultimately you're going to generate that view among people.

But on the other hand, women are competing with men on a disadvantaged stage for one obvious reason, which is childbearing. I mean, that is in the physical sense and just cannot change, and when people are entering the postdoc period, that is the time they are getting to the late twenties and early thirties, that is the time they have to think about family. Men cannot do it, only women can do it, and that can hurt a lot. We now manage the career development in a very fast pace. Not many people realize that, that you have to graduate in five years. If you stay for seven years, people think you failed. You have to complete your postdoc in three years, because that is [when] all the fellowships stop. They cover [you] for three years; after that the fellowship runs out, you have to move on. Moving on can be moving down or moving up. Moving up means becoming independent faculty; moving down means looking at a second postdoc. That is a big detour. Usually it is not good. You conduct your first postdoc and after three years, if you're pretty good, but not good enough to become independent faculty, [if] you do a second postdoc, you start over again; it doesn't help you at all. It doesn't. So that is a practical issue. That is a stage [when] a lot of women are thinking about having a family, having a child, and that definitely is going to slow them down and for quite a long time. I don't know what the solution for that is. Not being slowed down myself, I see what happened to my wife [Qing Yang], and I still encourage my students— But when it comes to reality and practical issues, I don't think I would have a good solution or advice for them.

I've had two women student graduates, and the first one is now doing pretty well in a pharmaceutical company. She is actually doing very well, and she probably can continue doing this for a while, until she has a child. That is why she is doing pretty well now, because she can still work just like a man. The second one is just starting her postdoc. So they both are moving pretty well right now. How long can they move on down the road? I don't know. I had a woman postdoc [who] left the lab and she had a lot of chances, a very good chance, actually, to develop into an independent faculty. I am more than willing to support and help her all the way down, but after three years, [when she] finished her fellowship, she wanted to get married and moved in with her boyfriend—husband now—and started a family. [She moved] to Atlanta and started a second postdoc and has not been very productive, which means she probably will not have any chance to develop into an independent investigator or faculty, because people will say, "Wait, you did okay in the first three years; not good enough, but what happened in the next three years? Nothing happening." You have to start from scratch, so I don't think that is good for her. But she wants a family.

VAN BENSCHOTEN: What do you think can be done, though, to change that? Or at least, how do we keep these promising— These women have obviously proven themselves to be scientifically capable.

XIONG: I don't know. I am confused on that part. I have mixed feelings, because on one hand, you want them to be truly equal, but they are not, because women are women and men are men. Only a woman can bear a child. I mean, I don't think that anybody can change that fact; but on the other hand, how can you do that without sacrificing the scientific merit? Because they are behind. I mean, how do you judge this, if one person ends up publishing three good papers during the three year period of postdoc training and the other one publishes one paper in five years? When we review the grant applications, we don't know who is a man and who is a woman, so you can only judge by the scientific accomplishments.

That is the reality, but there is a big issue behind that. As a society, I don't know if it is a good idea or not to emphasize that, because by overemphasizing that you are encouraging women to continue working and working and receiving education, and now education [has] become longer and longer and training [has] become longer and longer. The postdoc was invented only in the last twenty years; it used to be that after you got your Ph.D., you moved on to become an independent research investigator or faculty. Nowadays, after the Ph.D. [it is] almost an unspoken, unwritten rule that you have to conduct postdoc research for a minimum of three years, and usually four or five years. By that time, you've already finished twelve years of education in the institute and you are in your early thirties. If you are lucky and you got your independent position, there will be even more challenges coming to you and this is the worst time to have a child. There is no good time. What does that mean? You sacrifice your family. So the society has to consider whether it is good or not for society as a whole, as a family, to continually and constantly, sometimes I call it blindly, encourage women to just move along with men, side by side. How many papers you published as a grad student, how many papers you published as a postdoc, so on and so forth. I don't know if it is good for them or not. I don't know if it is good for men or not. I don't know if it is good for families or not. I would have to say probably not necessarily.

VAN BENSCHOTEN: Right. We know, too, that even when a woman becomes a PI, there are again the same issues. In other words, they have maybe five to seven years to get tenure. If they have children, that will extend that.

XIONG: Yeah. Now, at our university, we have this policy that if during the first five or six years, before your tenure is reviewed, if a female faculty [member] has a child, they can delay their review process by one or two years, I forgot. I don't see how that can help you, because things don't work in that linear, mathematical way. If I have a child, you extend my review process by one year, but unfortunately it doesn't work that way, because the institution can delay your tenure review by one year, but your grant review session and your Pew funding and

your publications don't work that way. For example, you can't say, "All my papers, publications, [will be] delayed by one year; I can still publish." Unfortunately, no, because they can say, "Oh, this story [has] been published by another journal last year. You can't publish it anymore, just because you had a child, and we can't view this paper or review this grant as it was a year ago." It doesn't happen that way, so you can't change that. [These] are facts and irreversible or not accomplishable— But think, lost for what? They lost it to have a child and a family. Is it that publication and tenure more important than that? I don't know.

VAN BENSCHOTEN: It's a difficult problem. A related issue would be ethnicity. What is the ethnic makeup of your lab?

XIONG: Oh, everywhere. On average, half are American and the other half are from foreign countries, and now it is becoming increasingly from foreign countries, from Japan, from India, from China, different countries, and one from Germany. That has become a trend lately, that less and less American young people want to go into science.

VAN BENSCHOTEN: Right.

XIONG: The first choice probably— I don't know what the first choice is right now. It used to be, like, medical school, and [being] a doctor is not far away from research, because you can get a Ph.D. first and then [become] a doctor, or vice versa. But nowadays, I don't know what is the trend or the first choice if they have the choice. I don't know whether it [would be] the financial sector or the management or not. But I think that biomedical graduate school is not the first choice for most people. So we increasingly are recruiting more and more foreign postdocs into the lab.

VAN BENSCHOTEN: Do you know what the reason is for that trend?

XIONG: Oh, the reason is very simple. It is because of the financial burden. It takes so long for biomedical researchers to become independent, to establish [themselves]. Postdocs are paid so little and by the time you become a postdoc, you are already a doctor, and after a long way, you still have to go through another three or four years and at a low pay scale. You still cannot start a real family life, meaning have a child, buy a house, because how can you do it with a less than $30,000 a year salary? You can't do it. So when students graduate from college and think about what they want to do, they talk to people and they realize, "If I go to graduate school, I will spend six years there, and there is another four years as a postdoc, which means I can't buy my first house or start my family for another ten years after graduating from college." Whereas, if they were to just go to the financial sector, they can probably get a job easily, with another degree, in three years. That is the comparison.

VAN BENSCHOTEN: What do you like most about being a principal investigator?

XIONG: Freedom, independence. I can really think about [things] and I can do whatever I'm thinking about. I don't know what else can be more enjoyable than that. I love this job. If you've got an idea, you test it, and you make discoveries. "Aha! This is what is going on here." I mean, it is very independent and I don't have to listen to anybody. We all want to be king of ourselves, and so I am sort of like a king in the sense of controlling my own life and my own career. Of course, you have to be reviewed by your peers and by grant funding agencies, but most of the time you are pretty much running your own career.

VAN BENSCHOTEN: Right. Okay, what do you like least about—?

XIONG: Not to mention that you really feel good about what you are doing and you go out and— You don't go out that often at all to get to know the public, but occasionally you talk to people on the street, on a vacation, on the beach, or on an air flight, and they ask, "What [do] you do?"

And you say, "I'm a scientist."

"What are you doing as a scientist?"

And you say, "I am doing cancer-cell biology."

Instantly and always, it is, "Wow! That's good." They don't understand what you are doing, of course, but they respect what you are doing. That's a good thing to do. I don't know, when people say, "I'm a politician" or "I'm a lawyer," whether they get the same response or not. I doubt it.

VAN BENSCHOTEN: Right. Okay, what do you like least about being a principal investigator?

XIONG: Sometimes it can get too stressful and I don't get enough time with my family. This is not an eight-hour a day job. This is very demanding. Yeah, that's a trade-off. An unlimited amount of work can be done and you can see very clearly the correlation between how much time you invest into it versus how much you can get out of this.

VAN BENSCHOTEN: Right. Could you describe for us a typical day for you? I mean, from

the moment you get up in the morning to the moment you go to bed.

XIONG: I get up late, usually. I rarely get up before eight o'clock. I am a late person, so I usually get up around eight-thirty, nine sometimes, depending on how late I stayed up the day [before]. I get up and early mornings in our house is like running a battle, because everybody is pretty fast. Very, very efficient. So when my parents [Zhiying Peng and Shenggao Xiong] come in, they are just amazed. We can hardly talk. We just get up, take a shower, dress, drink milk, and run to the car.

VAN BENSCHOTEN: It's like clockwork.

XIONG: Right. So they are amazed, because it is totally different from the way they have the— They get up earlier, cook breakfast, sit down and eat breakfast, and talk, and dress, and walk around and then walk out. It is very different. It is very efficient. We take no more than thirty minutes from the time the clock rings to the time we jump in the car. It's pretty quick. Even Jessie [Xiong] has been trained that way now.

I get into the lab and check my E-mail and messages. That is the first thing I do, and after that, then just start working. And I usually now— Nowadays it's different from before. Before, I would jump into the bench, starting or continuing experiments I left yesterday, but now I don't have anything on the bench going. So the first thing I do is just sit at the desk. I still come earlier than most people in the lab, so I will just do all the paperwork while nobody else is in the lab, and read something or write something for an hour or two. So around eleven o'clock I go to the lab, have a cup of coffee, and then start talking to people in the lab one-on-one. I try to talk to them as much as I [can], and then I have lunch, and then continue talking to people in the lab or doing paperwork or reviewing grants or reviewing papers and writing papers. Around five-thirty in the afternoon I go home and have dinner and play with Jessie.

Around eight-thirty I come back again, and the evening, actually, is a very good time, because it is quiet and there won't be any phones ringing and not much E-mailing going on back and forth. So I can either really do some writing, or I can talk to people in the lab in a quality way, really go through their results and analyze with them or design a new experiment with them, because a lot of them actually come back in the evening as well. Typically, I stay here— It varies, actually, from sometimes eleven, which is more typical, or until midnight. But if I've really got something piled up and I have to write a paper or a grant and I have to get it done, the best time actually is from eleven to three or four in the morning. So that is actually the best time I can do something, and there are no phones and no anybody, I can really concentrate. So if I do that, then I come back to the lab the next morning probably, after ten or eleven. So that is a typical day. Saturday I get up a bit late, and then I stop by the grocery store to pick up donuts or croissants or bagels—

VAN BENSCHOTEN: Sounds good.

XIONG: —to bring to the lab, because the cafeteria is closed on Saturday, and still a lot of people in the lab come in to work on the weekend and they can't always find lunch somewhere. So they don't need a big lunch, but they need something. So we have coffee constantly and then some donuts or something like that.

VAN BENSCHOTEN: Very good coffee, I might add, too. I'm drinking some right now.

XIONG: I love that myself, and I always get people spoiled. So Saturday's a good time, too; then we can really sit down with people and go through something in a very detailed way.

VAN BENSCHOTEN: The next couple of questions are kind of disjointed. They are just a few questions that I'm going to throw at you. Where do your ideas come from to do your research?

XIONG: Half from the discoveries we made, results we made in the lab, and the other half come from reading people's papers.

VAN BENSCHOTEN: Right. Okay. Do you feel that creativity in science is similar to the creativity you find in art? Do you think scientists are comparable in that sense?

XIONG: They are comparable in the sense that they both have to be creative. If you don't have enough creativity, you cannot be a good scientist. You can only be a good technician. In art, in the sense that you have to think and you have to imagine it. But there is a constraint for scientific creativity, because your creativity can only be so wild; you make a hypothesis, but you have to test it right away, experimentally, at least in our discipline. If it is not testable, it is not science. I mean, that is a foundation of science. You can make all kinds of hypotheses, all kinds of theories, and no matter how fancy it might be or whether it is right or not, if it is not testable experimentally, scientifically, then it is not science and we don't consider it science. We never test how old a god is, for example. We don't think that can be testable. I mean, whether there is a god— We don't even bother to ask those kinds of issues. That's just not science. We're not saying it's wrong or right, it's just not science. I would imagine—I don't know this—[that that is] not necessarily true for art. They can imagine something and keep on imagining. There is no boundary in the sense of where the imagination can extend to, but there is a boundary as to what we can imagine and that something has to be testable scientifically, experimentally, and then you have to develop on that basis. So step-wise, it is limited, and it has to be scientific.

VAN BENSCHOTEN: Well, I remember when you talked about Doctor Shen, you were saying that there were at least two different types of scientists, and you talked about a big scientist. Big scientist, big ideas. What distinguishes the two?

XIONG: The distinction is actually pretty clear. Most scientists—and I myself might be included as one—are just doing routine science. You're making discoveries, and you just— You don't jump. You're doing things at a solid pace and step-by-step, keep on doing things like that. That's a pretty natural way to do things, and most people do it this way.

There's another way. You have this idea, very creative, very imaginative, and you're jumping ahead of other people, and you are patient, you are persistent and you pursue it, if you have the conviction for it. You are setting a higher standard for yourself by asking bigger questions and not small ones, the question that, if solved, could have a big impact not only on you, your group, or your own field, but also have clear implications to people that are not in your field. There are people in other fields that think, "Aha! That is the way to go." So that is the difference.

VAN BENSCHOTEN: Okay. Where do you put yourself in that framework?

XIONG: Oh, I would still put myself as conventional scientist. I have high standards, but it's not— I mean, subconsciously—like many other young investigators like me—I have this dream or standard or expectation set by myself or my peers to do good science, to do big science, to make a big impact, have this ego behind this. I am still trying to work on that, but whether I can get to that point, I don't know. We all have limits, and if we are not realistic enough, we might just get very frustrated and depressed, feel that you actually failed. Just because you are not reaching the high goal [does] not necessarily mean you fail, [but] I am not very satisfied with what I have accomplished so far. I am not. That is one thing I keep debating with my wife. She would say that you have to be realistic and you are doing well, you are doing great, but I don't feel that way.

VAN BENSCHOTEN: All right. Another question from left field, What do you do for fun? What do you do when you want to relax?

XIONG: Outside of the lab?

VAN BENSCHOTEN: Right.

XIONG: Traveling.

VAN BENSCHOTEN: Oh, traveling.

XIONG: Right. So that is one thing that both my wife and I love. I love traveling and just going outside, and that is the one thing I am still doing pretty well in terms of separating the real life from the lab life, as I call it. I think I am doing better than most other people at my level in the sense that if I go out for vacation, I rarely bring anything with me for the real vacation. I don't think about it. I can do that and not just on purpose. If I go out, I just really go out. I can just put the lab behind me.

But I enjoy it. It is fun to travel around and see many things. Early on, when we both were graduate students and were still relatively poor, we couldn't afford to go anywhere, flying around the world or anything like that, but still, whenever we got the chance, we would rent a car and drive around and it was really fun. But whenever we have time— Now financial [problems are] not an issue, we could afford to do it; the question is whether we can get the time. But looking back, we were able to, at least once, if not twice a year, make some long trip. We have traveled a lot of places. A whole lot more than the people I know of, on average. We love it.

VAN BENSCHOTEN: Right. So where do you go? Where do you travel?

XIONG: That is [another] thing that my wife and I also share in common, we don't like big cities much. We have been to many cities, but we [don't] really enjoy the busy cities. So we travel a lot to parks and outside things. We have been in probably two-thirds of the national parks of the United States already. We have been to a lot of small countries in Central America, starting with my Pew meetings, and then we have been to Europe and, of course, China and Mexico, Canada. All these places. So we're still traveling whenever we get the chance.

VAN BENSCHOTEN: Right.

XIONG: That's fun.

VAN BENSCHOTEN: Well, if you ever get out to California, I know we have some pretty nice parks as well. I would definitely suggest that.

XIONG: Oh, I have been to California many times.

VAN BENSCHOTEN: Yeah.

XIONG: The Kings [Canyon National] Park and Yosemite [National Park] and all those parks.

VAN BENSCHOTEN: All right. What has been the impact of the Internet on you, doing your work, but also privately?

XIONG: A lot. Mostly on the scientific life, because nowadays, whether you like it or not, you have to live on it. I probably appreciate it more than other people at my level, because my early training as a grad student in molecular evolution required a lot of work on computer analysis, sequence comparisons, the calculation of sequence similarities, [things] like that. So when the genome project, when the database develops along the way, I pay a lot of attention to it and I benefit a lot from it. That is why I have a close association, my creative development with the development of the Internet. I read pretty fast and so I can search databases pretty fast, and that is one thing I am doing a lot and that is one thing I still enjoy a lot. Once I get on the Internet, working on the database and looking for other people's publications, [it's] difficult to get off.

VAN BENSCHOTEN: Right. And how about TV? Do you spend much time in front of the tube?

XIONG: Yeah, we love it a lot, and other than traveling, both my wife and I, whenever we get the time, we watch TV, and especially on the weekend. That is one thing we love a lot. One thing that she doesn't share much is that I like to watch politics. I pay a lot of attention to it. Even though I've never gotten involved myself, I pay a lot of attention to it.

VAN BENSCHOTEN: Well, then, you're probably going to be excited tonight, because they're going to have the presidential debate, right?

XIONG: Yeah.

VAN BENSCHOTEN: It's very close to here, in Wake Forest.

XIONG: Yeah, I've been following this pretty closely, actually. I like this, because this is something pretty intriguing to me and something that never could happen in China; I don't know when that could happen in China. It's pretty fascinating.

VAN BENSCHOTEN: Well, that's very refreshing to hear, because I think the standard American, the average American, is very cynical about politics in general.

XIONG: Yeah, and I don't agree with that and that is probably because of my own experiences. Yes, a lot of American people think that politicians are not always telling the truth and they will say anything or say more than they should say to get elected, but there is no comparison to the politicians in China I know of. They don't say anything; you never know what they are doing behind you. They are like a king that hides in the palace, and [there is] all of this tradition. Only very recently it's started to open a little bit, but there is no competition. There is no open dialogue.

VAN BENSCHOTEN: So I take it that you're going to vote, then, in November, in a month.

XIONG: Oh, yeah. This is the first time that I can vote. I just got my citizenship this year, so I will vote.

VAN BENSCHOTEN: Oh, congratulations. Okay, let us play a little make-believe. Let's say that you wake up tomorrow morning and you find that your lab has been taken from you, you can no longer practice biomedical research. What would you do? What would be this alternative career?

XIONG: Oh, that's pretty hypothetical. I have never thought about that. If I have to do something to make a living, it would be teaching. I'm a pretty good teacher.

VAN BENSCHOTEN: What level?

XIONG: Well, it has to be high school or above; I can't deal with anything below that. But I have never had experience teaching high school in the United States, so I don't know how much the kids love it. If they like to learn as much as the kids I taught in China, I would enjoy it. But I think I would enjoy very much teaching college level and I think that I could do it very well. That is one thing that I always wanted to do, and I think I will someday, when I start to slow down in the lab. I want to develop a class on molecular biology on this campus, not just teaching the textbook, but also teaching them the history of science and giving them a historic perspective of how molecular biology developed, so that they can put the discovery, theory, and law of science with some kind of personality and how to develop it. I don't think that has been taught so far, and I think that can definitely make students more excited and more eager to learn,

as well as learning how to do science in the future that would help them, because facts are important, but it's unlimited. There is no personality with the facts associated with this. It doesn't help much to think about what you can do when you come to that stage, because all scientific discoveries were made by scientists and scientists are human beings. Every scientist is just like every human being, has his own personality.

[END OF TAPE 6, SIDE 1]

VAN BENSCHOTEN: Again, another question from left field. We talked a little bit about your funding, the sources of it. Do you have much anxiety, much stress over where your funding is going to come from?

XIONG: That is a very interesting question, because normally I don't. I always think that we're doing good stuff, we're doing good science as a lab, as a group, and the money should not be an issue and will not be an issue. And whenever I need money, I can get it and I always tell people that, too. And that, more or less, has been the fact, but that doesn't mean that I don't have anxiety during the period when I am writing or waiting.

VAN BENSCHOTEN: Right.

XIONG: So it is very interesting. It is just like when you have a cut somewhere, and when the scar [has] healed, you forget the pain. [mutual laughter] So overall, I am doing pretty well and I still have very high confidence, and that will ease a lot of anxiety, but I do realize that it's not granted, it is not a given, and so you have to work hard and you have to pay attention to it and write a good grant. And it is a good time, most people are happy, but there will be down times down the road, which will generate some kind of anxiety at some point, especially during the stressful last couple of weeks of writing.

But generally speaking, I think I'm on a comfortable level, I am having much less anxiety than my colleagues. One of the reasons is that I am a pretty good writer, and second, I am certainly more confident than other people. Of course, the third is I have been pretty fortunate and lucky, and my grant has never been turned down so far by NIH. I was turned down and rejected a couple of times by other sources, but my major grant from NIH was never turned down. So that gives me some confidence and that also tells me that on a separate review by different groups of people, I am still doing pretty well, which means that I must be doing all right.

VAN BENSCHOTEN: Now, we might have mentioned this before, but I'll bring it up just in case we haven't. You have tenure now; do you have to use your funding in order to pay your

salary?

XIONG: Oh, yeah.

VAN BENSCHOTEN: Okay. So the University of North Carolina [at Chapel Hill] doesn't pay your salary.

XIONG: It varies from university to university.

VAN BENSCHOTEN: Right.

XIONG: What they're doing here is that it is a hard salary. What that means is that you are technically paid by the State of North Carolina. You are an employee of the state. That is what it says. So in other words, if you don't get any grants, if you don't recover any of your salary, you can still get paid, but in practice that is not the case. In the medical schools, they're not doing heavy teaching. In medical school they emphasize research, so they want to recover some money. They expect individual researchers or principal investigators or faculty to recover a portion of their salary from their grant, so we pay ourselves. I don't know if there is a specific restriction as to how much you must recover, otherwise they're going to reduce your salary. I don't think that is the case here, but common practice is that you are expected, if not required, to recover 25 percent to 30 percent of your salary. I think the number has gone up now. That has not been an issue for me. My issue is different, because I've been recovering too much and I have not gotten much back and I don't feel [that I am] being rewarded. I feel that it was not very fair doing that, because that money, if [kept] for the lab, that could help the research better, especially as a junior faculty. So I have been raising that issue repeatedly. That is the one thing I don't necessarily agree with in the policy of our medical school, that the more you recover the more they receive.

VAN BENSCHOTEN: Right.

XIONG: There is no incentive for us to do that. I am constantly recovering 50 percent or more. [This] year it was 60, 70, and at one point I calculated it, probably like— Almost all the money. I mean, all my salary [has] been coming out of my grant. But it varies depending on the grant. So we have two RO1 grants, each comes to twenty-five percent, and I have a another grant co-PI , and it covers another 8 percent. I receive two separate awards [American Cancer Society Junior Faculty Award and Career Development Awards from Department of Defense], which can only be used for my salary recovery. So, put together, that is a pretty high percentage. Of course, that makes the department and the [Lineberger Comprehensive] Cancer Center happy,

because they can use my salary from the state for doing something else. But they keep on saying, "Well, there is always down time and you're not going to expect us to reduce your salary, and so in the good time you contribute more." So that is their theory. I don't agree with it.

VAN BENSCHOTEN: All right. Well, we've reached the end of the interview, and what I'll do is I'll give the microphone to you, and if you want to add anything to the record, feel free to do so.

XIONG: I can't really [think] what I would want to add to this, and I don't know how many people are going to read this book. But I want to think that in the future some people might read this, and so I do have one thing I want to add to this. So one is [that I am] so grateful and so fortunate, being able to come here to this country, and especially for those who aware in the background where I came from, and so there is no comparison. The life I live right now, both the real life at home and the life of my career development, is so much different from my early life in childhood, given the political turmoil in my first twenty years in China. There is no comparison to it, because I feel very fortunate. Not to mention that this country of America is really a great country and I love it. It is still beyond my imagination, two hundred years ago, how the Founding Fathers could have founded this country in such a way that the country continues to move in a fast pace forward and yet the foundation remains the same. How could they predict this? That is just beyond my imagination; that was an incredibly smart group of people doing that.

So that is the one thing that has not been happening in China. It is happening so far, but it is very different. The Chinese society as a whole has been too conservative in its development, but lately it has been totally misguided, politically, by the leadership, and so [they got] into such disaster in the twenty years [after] the Communist Party [took] over. But I think now that they are getting back to normal, and I just hope that the whole process of reform will continue to move on, first on the economic front, but then on the political front, so that the country can become more and more democratic. Only after that can it become economically stable. Without stability, without democratic movement, there won't be any sustained political stability. There will not be any sustained economic movement. So by that comparison, I really feel fortunate to be here.

People ask me all the time, "Since you live in a foreign country, do you feel discriminated against, racial bias, or anything like that?" and my wife and I have been really asking ourselves and looking very carefully, and we don't know of any single time.

VAN BENSCHOTEN: Wow.

XIONG: Not a single time. I try to think about any instance. Of course, people tease me [about]

my English and students sometimes might complain that I was speaking too fast, but that probably could have happened even [if I was] teaching in Chinese. But in terms of bias against [me] simply because I am a foreigner, I am Chinese, I can't find any single instance that makes me feel that way. On the contrary, I feel so fortunate to be supported, trained, taught, and encouraged all the way from the day I got here, from Dr. Bob [Robert] Angerer, who supervised what classes I should take, to Tom [Thomas H.] Eickbush, and for the next four or five years as a graduate student with the people at Tom's lab, at the Cold Spring Harbor Lab[oratory], and the last seven years here at UNC [University of North Carolina] at Chapel Hill. The only thing I felt is that people like me, they support me, they help me, they encourage me. I don't feel any kind of bias. I have not.

So that is why I get mixed feelings when the Wen Ho Lee instance comes out and I don't know the details and I try to not rush to judgment, but I am really disturbed. All of a sudden the whole thing becomes tangled around. I trusted the American media so much. I trust the American government, more so than probably the ordinary American people, because the contrast with the Chinese government and the Chinese media—they are all the same thing—the way they tangle around has got me disturbed, and I hope that is just an isolated incident. Because they are talking [a lot] about whether there was racial bias involved. I really hope not, and I still have a lot of trust in them and the institution and system. So overall, I have to say that I feel so fortunate, so happy, and I expect that for the next forty or some years I will have a similar happy life, both at home and in my career development. So that is one thing I want to add.

And the second, if a young researcher, young scientist, ever gets a chance to read this book or wants to learn something from my career development, it's pertaining to your family life, and I am saying this and more or less talking to myself. I don't know how much I missed, and I haven't felt tremendous regret yet, but I subconsciously trust my wife's feelings that I will feel the regret down the road. So you must have the balance of life. I have benefitted a lot and been helped a lot by my family. I could not imagine what would happen if not for having my wife around or my family around. In a way, I have a sort of scientific comparison on that issue. When we were at the Cold Spring Harbor, there was a large body of postdocs and we actually had one comparison, privately, between the people that doing well as judged by their publications, that are developing in their career, [which] means that they are searching for a job and ultimately find a job, versus people that are not doing so well, [which] means that they have not been successful in terms of publishing, in terms of competing for the job, and in terms of sustaining stress, which practically everybody [has]. There is a very good correlation between the person who has a family and doing well. Whereas people who are single are not doing very well, in that kind of environment at least, because this is a long process, your research life. It is a very long process and it is not like a sport or the entertainment business [where] you only have this short period of peak time [which] you want to maximize and you can put everything behind temporarily. Scientific research is different from everything else; it is a lasting process. You have to be patient and have sustained encouragement, and the only source you could have that—Don't trust that you can always have this internal drive. It doesn't work that way, especially in a stressed environment and competitive environment like today. So the only source that can provide constant encouragement and support is your family. So that is the one thing that it is

almost impossible to overstate. hat is one thing and because of that, I can keep on doing very intense work, still, up to now.

The third thing I want to add is that we are working in a very isolated environment. We are not working in a big open environment like if you work in a supermarket and see so many different people every day, or if you work in a hospital and every day you see new people. We are working in a relatively isolated environment, in the setting of a research lab consisting of probably no more than twenty people that you are dealing with all the time. Try to make it a positive environment, encouraging people and taking care of them. Encourage them, support their career development. [It is] only after that that you can expect that they can work hard and they can develop. Then, if everybody is working hard and working positively, your own career is being enhanced. They are your colleagues, they are not your helpers. They help you and you need to help them, too. So you've got to respect them and develop along with them, not think that you are helping them and that they just come to work for you. That is the wrong philosophy. And that is the philosophy that I have tried to implement in the lab, and tell them, "You guys come here not to work for me. You come here to work with me and I am working with you as well. We both develop together. We've got to get that straight." You've got to emphasize their own career development and only after that you're on the same boat. I think that's the three things I would like to add. I think I have said it throughout, but I just want to emphasize it one more time, in case some people want to read this book.

VAN BENSCHOTEN: Okay, good. I think they are great points and I am glad you brought them up. It's a nice, fitting finish, I think, to this interview. I find your research fascinating and I find you an ideal interviewee. You're very articulate and you bring, I think, a lot to the series. So I want to thank you again for allowing us to interview you.

XIONG: Yeah, and I actually really appreciate this opportunity that you brought up, or the Pew brought up along with you. For the first time in the last fifteen or twenty years, I just [sat] down and [went] back in such a systematic way and really [went] back to review my life and my development. Otherwise, I would never get a chance to go through all of this. It's very unique and it definitely will have a positive impact on me. Otherwise, regular life is just going at [such] a fast pace and you never get a chance to sit down to think about it. It is always what is happening tomorrow, and not what happened in the past and what lesson you might learn from it.

VAN BENSCHOTEN: Okay. Well, thank you again, and good luck.

XIONG: It was definitely my pleasure.

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[END OF INTERVIEW]

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