

CHEMICAL HERITAGE FOUNDATION

JOSEPH M. DESIMONE

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Transcript of an Interview
Conducted by

David J. Caruso and Jody A. Roberts

at

University of North Carolina
Chapel Hill, North Carolina

on

1-2 May 2013

(With Subsequent Corrections and Additions)

CHEMICAL HERITAGE FOUNDATION
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JOSEPH M. DESIMONE

1964 Born in Norristown, Pennsylvania, on 16 May

Education

1986 B.S., Chemistry, Ursinus College

1990 Ph.D., Chemistry, Virginia Polytechnic Institute and State University

Professional Experience

University of North Carolina, Chapel Hill

1990-1994 Assistant Professor of Chemistry
1995 Mary Ann Smith Associate Professor of Chemistry
1996-1999 Mary Ann Smith Professor of Chemistry
1999-2008 William R. Kenan, Jr. Distinguished Professor of Chemistry
1999-2009 Director, NSF Science and Technology Center for
Environmentally Responsible Solvents and Processes
2003-2012 Founding Director, Institute for Advanced Materials, Nanoscience
and Technology
2005-present Faculty Member, Lineberger Comprehensive Cancer Center and
Department of Pharmacology, School of Medicine
2005-present Co-PI, Carolina Center of Cancer Nanotechnology Excellence
2008-present Founding Director, Institute for Nanomedicine at UNC-CH
2008-present Chancellor's Eminent Professor of Chemistry at UNC
2012-2013 Director, Kenan Institute of Private Enterprise, Kenan Flagler
Business School

North Carolina State University

1995-1996 Mary Ann Smith Associate Professor of Chemical Engineering
1996-1999 Mary Ann Smith Professor of Chemical Engineering
1999-2008 William R. Kenan, Jr. Distinguished Professor of Chemical
Engineering

Memorial Sloan Kettering Cancer Center

2010-present Adjunct Member, Memorial Sloan Kettering Cancer Center and
Sloan-Kettering Institute for Cancer Research

Honors

- 1992 National Science Foundation Young Investigator, Division of Materials Research
- 1993 Philip and Ruth Hettleman Prize for Artistic and Scholarly Achievement
- 1993 Presidential Faculty Fellow Award, National Science Foundation
- 1995 Finalist, Discovery Award for Technological Innovation
- 1995 Charles H. Stone Award
- 1995 Waldo Semon Award Lecturer, University of Akron
- 1997 Chancellor's Award for Excellence
- 1997 Governor's Award for Excellence
- 1997 Presidential Green Chemistry Challenge Award
- 1998 R&D Award with Micell Technologies
- 1998-2001 Alfred P. Sloan Research Fellowship
- 1999 Honorary Doctorate of Science from Ursinus College
- 1999 Carl S. Marvel Creative Polymer Chemistry Award
- 1999 Fresenius Award of the Phi Lambda Upsilon Honorary Chemical Society
- 2000 Oliver Max Gardner Award from the University of North Carolina
- 2001 Outstanding Young Alumnus Award from the Virginia Tech Alumni Association
- 2001 Esselen Award
- 2001 Governor's Entrepreneurial Company of the Year Award for Micell Technologies
- 2001 Inventor of the Year Award from the Triangle Intellectual Property Law Association
- 2001 Ernst & Young 2001 Entrepreneur of the Year in Technology (Carolinas)
- 2002 Wallace H. Carothers Award from the Delaware Section of the American Chemical Society
- 2002 Engineering Excellence Award by DuPont
- 2002 John Scott Award presented by the City Trusts, Philadelphia
- 2005 American Chemical Society Award for Creative Invention
- 2005 Entrepreneurial Excellence Award for Life Science Spin-out of the Year for Liquidia Technologies
- 2005 Member of the National Academy of Engineering
- 2005 Member of the American Academy of Arts and Sciences
- 2006 Fellow, American Association for the Advancement of Sciences (AAAS)
- 2006 H.F. Whalen, Jr. Award for Entrepreneurship by ACS Division of Business Development & Management
- 2006 Elected, College of Fellows, American Institute for Medical and Biological Engineering
- 2007 Collaboration Success Award from The Council for Chemical Research
- 2008 Inductee into the Order of the Golden Fleece
- 2008 Business Leader Magazine's 2007/2008 Impact Entrepreneur of the Year for the Triangle

2008 Named one of the “One Hundred Engineers of the Modern Era” by the American Institute of Chemical Engineers

2008 Tar Heel of the Year, Raleigh News & Observer

2008 Recipient of the \$500,000 Lemelson-MIT Prize

2009 Alexander M. Cruickshank Award, Gordon Research Conferences

2009 Distinguished Graduate Alumni Achievement Award, Virginia Tech

2009 North Carolina Award

2009 NIH Director’s Pioneer Award

2009 Tar Heel of the Year, Undergraduates at the school newspaper selection of the Person of the Year

2010 Founding POLY Fellow, Division of Polymer Chemistry, American Chemical Society

2010 AAAS Mentor Award

2011 PMSE Fellow, Division of Polymeric Material Science and Engineering, American Chemical Society

2011 Harrison Howe Award by the Rochester Section of the American Chemical Society

2011 Mendel Medal from Villanova University

2012 Chair, Gordon Research Conference on Drug Carriers in Medicine and Biology

2012 Fellow, American Chemical Society

2012 Walston Chubb Award for Innovation, presented by Sigma Xi, The Scientific Research Society

2012 Named a Paul Harris Fellow by the Rotary Foundation of Rotary International

2012 Member of the National Academy of Sciences

2013 National Academy of Inventors

ABSTRACT

Joseph DeSimone began his childhood in Norristown, Pennsylvania, one of three children. His father, an Italian immigrant, was a tailor; his mother was an accountant; there was a large Italian extended family. DeSimone attended St. Teresa of Avila Elementary School; when not in school he and friends were outside playing. Education was important in the family. The children attended the Catholic school until about junior high school, when the family moved to Collegeville, Pennsylvania. DeSimone was in gifted classes. High school brought discovery of programming and interest in solar architecture. He had typical science classes and labs, but in summer he was selected for a Lebanon Valley College project. He also attended Ursinus College for math classes, resulting in a scholarship to Ursinus.

At Ursinus, DeSimone felt academically challenged for the first time. He conceived a love for polymers and was recruited by Virginia Polytechnic Institute (Virginia Tech) for graduate school. After his PhD he intended to return to Philadelphia, but University of North Carolina persuaded him to join their faculty. There he began work with supercritical fluids. He published many papers, obtained grants from the National Science Foundation (NSF) and the Office of Naval Research, and was granted tenure early. He became the first Kenan Professor of Chemical Engineering at North Carolina State University, eventually establishing an NSF Science and Technology Center. His next interest was supercritical CO₂, with which he replaced water to manufacture surfactants. He won a Presidential Green Chemistry Award; founded dry cleaning soap company, Micell Technologies; and developed dry cleaning equipment. DeSimone found further use for supercritical CO₂, producing bioabsorbable stents with Richard Stack, and founding another company, whose stents are in clinical trials around the world. He met Stephen Quake and changed the direction of the STC from CO₂ to more microfluidics, inventing “liquid Teflon,” then molds. He and his students invented PRINT (Particle Replication in Non-Wetting Templates), which allowed them to make uniform colloidal particles for the delivery of nucleic acids and medicines, and founded, Liquidia Technologies.

DeSimone established the Institute for Advanced Materials, Nanoscience, and Technology, increasing knowledge in medicine and energy. Because of PRINT's nanotechnology DeSimone was asked to establish the Carolina Center for Cancer Nanotechnology Excellence, using funding from the National Cancer Institute. He is affiliated with Memorial Sloan-Kettering Cancer Center. He has been elected to National Academy of Sciences and the National Academy of Engineering. He is now the Director of the Kenan Institute of Private Enterprise at UNC.

DeSimone concludes his interview with some general thoughts. He says his wife and son are his present mentors; he credits earlier mentoring and friendship from Chad Mirkin, Robert Langer, and Edward Samulski. He says he is currently working on grants and renewals.

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