Joseph DeSimone, Ph.D.

Chancellor's Eminent Professor of Chemistry, College of Arts and Sciences at UNC-Chapel Hill
Chapel Hill, NC, US

DeSimone’s lab uses nanotechnology to engineer new disease treatment approaches, as well as 3D printing to engineer novel medical devices.

Professor DeSimone is the Chancellor’s Eminent Professor of Chemistry at UNC and the William R. Kenan Jr. Professor of Chemical Engineering at NC State. DeSimone has published over 350 scientific articles and has nearly 200 issued patents in his name, with over 200 patents pending.

DeSimone is one of fewer than 20 individuals ever who have been elected to all three branches of the U. S. National Academies: the National Academy of Medicine (2014), the National Academy of Sciences (2012), and the National Academy of Engineering (2005). He is also an elected member of the American Academy of Arts and Sciences (2005). In May 2016, DeSimone was recognized by President Barack Obama with the National Medal of Technology and Innovation, the highest honor in the U.S. for achievement and leadership in advancing technological progress. DeSimone has earned numerous other major awards as well, including the 2017 Heinz Award for Technology, the Economy and Employment, and the 2008 Lemelson-MIT Prize.

Among DeSimone’s notable inventions is an environmentally friendly manufacturing process that relies on supercritical carbon dioxide instead of harmful solvents for the creation of fluoropolymers or high-performance plastics, such as Teflon.

DeSimone and students also developed a groundbreaking roll-to-roll nanoparticle fabrication technology called PRINT (Particle Replication in Non-wetting Templates) in 2004. Since then, employing PRINT’s precise and independent control over all particle attributes, such as size, shape, and chemical composition, DeSimone’s research group has focused on engineering new approaches to vaccines and medicines for a range of health conditions. Based on PRINT, in 2004 DeSimone co-founded RTP company, Liquidia Technologies, which went public in 2018 (NASDAQ:LQDA).

In 2005, his research group's work led to the creation of the Carolina Center for Cancer Nanotechnology Excellence, a 10-year, nearly $40 million initiative based at UNC’s Lineberger Comprehensive Cancer Center and funded by the National Cancer Institute. With renewed funding as of 2015, it is now only one of six CCNEs in the country.

Currently on leave from the university, DeSimone now serves as CEO of Carbon, Inc. in Silicon Valley, a 3-D manufacturing company he co-founded in 2014. Carbon’s technology enables production-grade parts to form rapidly and continuously from a liquid media rather than being built layer by layer.

Education/Learning, Research, Advanced Medical Equipment, Nanotechnology

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3-D Printing, Nanotechnology, Chemical Engineering, Biomedical Engineering, Innovation, Chemistry, Entrepreneurship

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Member of the National Academy of Medicine (2014), Member of the National Academy of Sciences (2012), Member of the National Academy of Engineering (2005, Member of the American Academy of Arts and Sciences (2005), Fellow American Association for the Advancement of Science (AAAS) (2006)

Virginia Polytechnic Institute and State University
Ph.D. Polymer Chemistry

Ursinus College
B.S. Chemistry

Heinz Award in Technology, the Economy and Employment
Presented by the Heinz Family Foundation, this award honors individuals who have created and implemented innovative efforts to advance regional or national economic growth through job creation, technology advancement, competitiveness, and fair trade—all in a sustainable and environmentally safe manner.

National Medal of Technology and Innovation
Bestowed by the White House, this award recognizes those who have made lasting contributions to America's competitiveness and quality of life and helped strengthen the nation's technological workforce.

Kabiller Prize in Nanoscience and Nanomedicine
Inaugural recipient of award by Northwestern University

Dickson Prize for Science
2015

Awarded by Carnegie Mellon University

Industrial Research Institute Medal
2014

Kathryn C. Hach Award for Entrepreneurial Success
2014

Fellow, National Academy of Inventors
The NAI recognizes investigators who translate their research findings into inventions that benefit society, drive economic development and improve lives.

AAAS Mentor Award
This award recognized DeSimone's efforts to advance diversity in the chemistry and chemical engineering PhD workforce. Half of the doctoral students DeSimone has mentored in his career have been women and members of underrepresented minority groups in science and technology.

2010

Lemelson–MIT Prize
Recipient of $500,000 prize for invention of PRINT® (Particle Replication in Non-wetting Templates) technology used to manufacture nanocarriers in medicine.
