



## Joseph M. DeSimone

Sanjiv Sam Gambhir Professor of Translational Medicine, Professor of Chemical Engineering and, by courtesy, of Chemistry, of Materials Science and Engineering, and of Operations, Information and Technology at the Graduate School of Business  
Radiology

### CONTACT INFORMATION

#### • Administrative Contact

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### Bio

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#### BIO

Joseph M. DeSimone is the Sanjiv Sam Gambhir Professor of Translational Medicine and Chemical Engineering at Stanford University. He holds appointments in the Departments of Radiology and Chemical Engineering with courtesy appointments in the Department of Chemistry and in Stanford's Graduate School of Business.

The DeSimone laboratory's research efforts are focused on developing innovative, interdisciplinary solutions to complex problems centered around advanced polymer 3D fabrication methods. In Chemical Engineering and Materials Science, the lab is pursuing new capabilities in digital 3D printing, as well as the synthesis of new polymers for use in advanced additive technologies. In Translational Medicine, research is focused on exploiting 3D digital fabrication tools to engineer new vaccine platforms, enhanced drug delivery approaches, and improved medical devices for numerous conditions, with a current major focus in pediatrics. Complementing these research areas, the DeSimone group has a third focus in Entrepreneurship, Digital Transformation, and Manufacturing.

Before joining Stanford in 2020, DeSimone was a professor of chemistry at the University of North Carolina at Chapel Hill and of chemical engineering at North Carolina State University. He is also Co-founder, Board Chair, and former CEO (2014 - 2019) of the additive manufacturing company, Carbon. DeSimone is responsible for numerous breakthroughs in his career in areas including green chemistry, medical devices, nanomedicine, and 3D printing. He has published over 350 scientific articles and is a named inventor on over 200 issued patents. Additionally, he has mentored 80 students through Ph.D. completion in his career, half of whom are women and members of underrepresented groups in STEM.

In 2016 DeSimone was recognized by President Barack Obama with the National Medal of Technology and Innovation, the highest U.S. honor for achievement and leadership in advancing technological progress. He has received numerous other major awards in his career, including the U.S. Presidential Green Chemistry Challenge Award (1997); the American Chemical Society Award for Creative Invention (2005); the Lemelson-MIT Prize (2008); the NIH Director's Pioneer Award (2009); the AAAS Mentor Award (2010); the Heinz Award for Technology, the Economy and Employment (2017); the Wilhelm Exner Medal (2019); the EY Entrepreneur of the Year Award (2019 U.S. Overall National Winner); and the Harvey Prize in Science and Technology (2020). He is one of only 25 individuals elected to all three branches of the U.S. National Academies (Sciences, Medicine, Engineering). DeSimone received his B.S. in Chemistry in 1986 from Ursinus College and his Ph.D. in Chemistry in 1990 from Virginia Tech.

## ACADEMIC APPOINTMENTS

- Professor, Radiology
- Professor, Chemical Engineering
- Professor (By courtesy), Operations, Information & Technology
- Professor (By courtesy), Chemistry
- Professor (By courtesy), Materials Science and Engineering
- Member, Bio-X
- Member, Wu Tsai Human Performance Alliance
- Faculty Fellow, Sarafan ChEM-H
- Member, Stanford Cancer Institute

## LINKS

- My Lab site: <https://desimonegroup.stanford.edu/>

## Teaching

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### COURSES

#### 2022-23

- Career Building: Entrepreneurship / Intrapreneurship, People, Innovation, Decision-Making and Impact: CHEMENG 189, CHEMENG 289, RAD 189, RAD 289 (Win)

#### 2021-22

- Career Building: Entrepreneurship / Intrapreneurship, People, Innovation, Decision-Making and Impact: CHEMENG 189, CHEMENG 289 (Aut)

### STANFORD ADVISEES

#### Doctoral Dissertation Reader (AC)

Jerika Chiong, Caleb Jadrich, Prima Dewi Sinawang

#### Postdoctoral Faculty Sponsor

Kaiwen Hsiao, Jean Kwak, Max Saccone

#### Doctoral Dissertation Advisor (AC)

Gloria Chyr, Ian Coates, Madison Driskill, Dan Ilyin, Jason Kronenfeld, Amy Latuski, Micah Lawrence, Philip Onffroy, Netra Rajesh

#### Doctoral Dissertation Co-Advisor (AC)

Noah Eckman, Anna Makar-Limanov

#### Doctoral (Program)

Gabriel Lipkowitz

## Publications

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### PUBLICATIONS

- **Single-digit-micrometer-resolution continuous liquid interface production.** *Science advances*  
Hsiao, K., Lee, B. J., Samuelsen, T., Lipkowitz, G., Kronenfeld, J. M., Ilyn, D., Shih, A., Dulay, M. T., Tate, L., Shaqfeh, E. S., DeSimone, J. M.  
2022; 8 (46): eabq2846
- **3D-Printed Microarray Patches for Transdermal Applications** *JACS AU*

Rajesh, N. U., Coates, I., Driskill, M. M., Dulay, M. T., Hsiao, K., Ilyin, D., Jacobson, G. B., Kwak, J., Lawrence, M., Perry, J., Shea, C. O., Tian, S., DeSimone, et al  
2022

- **Injection continuous liquid interface production of 3D objects.** *Science advances*  
Lipkowitz, G., Samuelsen, T., Hsiao, K., Lee, B., Dulay, M. T., Coates, I., Lin, H., Pan, W., Toth, G., Tate, L., Shaqfeh, E. S., DeSimone, J. M.  
2022; 8 (39): eabq3917
- **Characterization of a 30 m pixel size CLIP-based 3D printer and its enhancement through dynamic printing optimization.** *Additive manufacturing*  
Lee, B. J., Hsiao, K., Lipkowitz, G., Samuelsen, T., Tate, L., DeSimone, J. M.  
2022; 55
- **Continuous Liquid Interface Production of 3D Printed Drug-Loaded Spacers to Improve Prostate Cancer Brachytherapy Treatment.** *Acta biomaterialia*  
Hagan, C. T., Bloomquist, C., Kim, I., Knape, N. M., Byrne, J. D., Tu, L., Wagner, K., Mecham, S., DeSimone, J., Wang, A. Z.  
2022
- **3D printed drug-loaded implantable devices for intraoperative treatment of cancer.** *Journal of controlled release : official journal of the Controlled Release Society*  
Tilden Hagan, C. 4., Bloomquist, C., Warner, S., Knape, N. M., Kim, I., Foley, H., Wagner, K., Mecham, S., DeSimone, J., Wang, A. Z.  
2022
- **Transdermal vaccination via 3D-printed microneedles induces potent humoral and cellular immunity.** *Proceedings of the National Academy of Sciences of the United States of America*  
Caudill, C., Perry, J. L., Iliadis, K., Tessema, A. T., Lee, B. J., Mecham, B. S., Tian, S., DeSimone, J. M.  
2021; 118 (39)
- **Transdermal vaccination via 3D-printed microneedles induces potent humoral and cellular immunity** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*  
Caudill, C., Perry, J. L., Iliadis, K., Tessema, A. T., Lee, B. J., Mecham, B. S., Tian, S., DeSimone, J. M.  
2021; 118 (39)
- **Nanostructured Titania-Polymer Photovoltaic Devices Made Using PFPE-Based Nanomolding Techniques** *CHEMISTRY OF MATERIALS*  
Williams, S. S., Hampton, M. J., Gowrishankar, V., Ding, I., Templeton, J. L., Samulski, E. T., DeSimone, J. M., McGehee, M. D.  
2008; 20 (16): 5229-5234
- **A Soft Lithography Route to Nanopatterned Photovoltaic Devices** *Conference on Nanoscale Photonic and Cell Technologies for Photovoltaics*  
Williams, S. S., Hampton, M. J., Gowrishankar, V., Ding, I., Zhang, L., Ko, D., Templeton, J. L., DeSimone, J. M., McGehee, M. D., Samulski, E. T.  
SPIE-INT SOC OPTICAL ENGINEERING.2008
- **COLL 177-Nanopatterning TiO<sub>2</sub> for photovoltaic applications**  
Williams, S., Earl, M. J., Zhou, Z., Gowrishankar, V., McGehee, M. D., Samulski, E. T., DeSimone, J. M.  
AMER CHEMICAL SOC.2007
- **COLL 467-Nanotextured transparent semiconductor oxides for energy conversion**  
Zhou, Z., Ko, D., Earl, M. J., Williams, S., Cheng, B., Gowrishankar, V., McGehee, M. D., DeSimone, J., Samulski, E. T.  
AMER CHEMICAL SOC.2007