

Dr. Manu Sebastian Mannoor, Ph.D.,
Associate Professor

Biomedical Engineering | College of Science, Technology, Engineering and Mathematics
mmannoor@alasu.edu | Phone: 334-604-8424

EDUCATION

Doctor of Philosophy (Ph.D.), Princeton University, Mechanical & Aerospace Engineering, 2014.
Master of Arts (MA), Princeton University, Mechanical & Aerospace Engineering, 2012.
Master of Science (MS) New Jersey Institute of Technology (NJIT), Biomedical Engineering, 2008
Bachelor of Technology (B. Tech.), University of Calicut, Electronics & Communication Engineering, 2006.

Short Biography

Professor Mannoor's research interests focuses on the integration of biological sciences with electronics and mechanical engineering concepts. This interdisciplinary research builds up on Dr. Mannoor's highly interdisciplinary academic training bridging across the fields of Electronics & Communications Engineering Biomedical Engineering and Mechanical and Aerospace Engineering. Dr. Mannoor's research work in the areas of bionic organs and nanobionic sensors has been highlighted by major scientific journals such as Science, Nature and Nature Nanotechnology and popular media outlets, including being featured as "*an innovation that will change your tomorrow*" by New York Times Magazine and one of the inventions in The CNN 10: Inventions. His research has led to publications in major journals, significant patent applications and numerous presentations and invited talks. Dr. Mannoor's research was also recognized by a number of awards, most prominently, the **Material Research Society (MRS) Gold Award (2012)** for outstanding graduate research and the **Emerging Alumni Scholars Award (2013)** by Princeton University "*for the excellence of his dissertation work and the merits of his distinguished career at Princeton*". Dr. Mannoor's teaching efforts has also been recognized by the **Luigi Crocco Award for Teaching Excellence** for the undergraduate instruction (MAE 306, *Mathematics in Engineering*) at Princeton. Dr. Mannoor worked as a Research Assistant at the Microelectronics Research Center, class 10 clean room facility at NJIT from 2006-2008 and as a Principal Research Engineer at Rational Affinity Devices LLC, a New Jersey based bio-tech Company from 2007-2009, where he conducted research for the development of Aptamer based nano-gap dielectric sensors for biosensing applications.

AWARDS AND HONORS

Emerging Alumni Scholars Award, Princeton University (2013).
Material Research Society (MRS) Gold Award (2012).
Luigi Crocco Award for Teaching Excellence (2012).
Princeton University Graduate Fellowship (2009).
Provost Fellowship, New Jersey Institute of Technology (2006-2007).
The CNN 10: Inventions- Tooth 'tattoo' sensor (2013).
New York Times Magazine: 32 Innovations That Will Change Your Tomorrow (2012).

Areas of Research

Engineering Research:

- 3D Printed Bionic Organs
- 3D Printed Neuro-Bionic Organoids
- Bionic Soft Robotics
- Bacterial Nanobionics
- Nano-Bionic Sensors
- Bionic Systems Hybrids for Energy

Educational Research:

Great Books in Science and Engineering Education

PUBLICATIONS [[Google Scholar Profile](#)]

Peer-Reviewed Journals (most significant 5)

1. [Yasamin A. Jodat](#), [Kiavash Kiaee](#), [Daniel Vela Jarquin](#), [Manu S. Mannoer](#), [Su Ryon Shin](#). “A 3D-Printed Hybrid Nasal Cartilage with Functional Electronic Olfaction.” *Wiley Advanced Science*, 2020, 7
2. .S. Joshi, E. Cook, **M.S. Mannoer**, “Bacterial Nanobionics via Three Dimensional Printing” *Nanoletters* 2018, 18 (12), pp 7448–7456
3. **Mannoer M. S.**, Z. Jiang, T. James, Y. L. Kong, K. A. Malatesta, W. O. Soboyejo, N. Verma, D. H. Gracias, M. C. McAlpine, “3D Printed Bionic Ears.” *Nano Letters* 13, 2634-2639 (2013).
4. **Mannoer, M. S.**; Tao, H.; Clayton, J. D.; Sengupta, A.; Kaplan, D. L.; Naik, R. R.; Verma, N.; Omenetto, F. G.; McAlpine, M. C., Graphene-based wireless bacteria detection on tooth enamel. *Nature Communications* 3, 763 (2012).
5. **Mannoer, M. S.**; Zhang, S.; Link, A. J.; McAlpine, M. C., Electrical detection of pathogenic bacteria via immobilized antimicrobial peptides. *Proceedings of the National Academy of Sciences of the United States of America*, 107 (45), 19207-19212 (2010).

Book Chapters

1. “**Bionic Organs**” Cambridge University Press Press (2020).
2. “**Bioinspired and Biomimetic Design of Multilayered and Multiscale Structures**” Cambridge University Press Press (2020).
3. “**BioMEMS - Integrating Micro/Nano fabrication with Biomolecular Technologies**” in Standard Hand Book of Biomedical Engineering & Design. Second Edition, Fundamentals, Vol 1, Myer Kutz (Editor), McGraw-Hill.
4. “**Carbon Nanomaterials for Biomedical Applications**” Book chapter, Springer International Publishing, 2015.

Patents Awarded

1. **M.S. Mannoer**, et al “multi-functional hybrid devices/structures using 3d printing”US20140257518

2. **M.S. Mannoer**, et al “Use and Making of Biosensors Utilizing Antimicrobial Peptides for Highly Sensitive Biological Monitoring.” U.S. Patent 9,029,168.

Selected Invited Talks

1. Material Research Society (2021) Engineered Functional Multicellular Circuits, Devices and Systems
2. IEEE NANOMEDICINE, November 2015, Hawaii, USA.
Flexible Nano/Bio Devices for Biomedicine
3. SPIE, Micro-Nanotechnology Sensors, Systems, and Applications, May, 2014, Baltimore, MD.
3D Printing: An Emerging Technology for Micro/Nano Device Fabrication.
4. 3D Printshow New York, NY, February, 2014. **Bio-Integrated Electronics-from 2D to 3D**
5. NASA Tech Briefs - National Nano Engineering Conference, (NNEC) Nov, Boston, MA.

Courses and Teaching Subjects (in BME at ALASU)

BME 200 Statics

BME 325 Transport Phenomena in Biological Systems

BME 220 Biomechanics

BME 350 Biomedical Imaging

BME 370 Medical Devices and Systems

BME 440 Anatomy and Physiology for Engineers

BME 210 Computing for Engineers

BME 490/491 Senior Design

BME 470 Nanobiotechnology

BME 473 Neural Engineering and Neurobionic Prosthetics

BME 471 Digital Design

BME 472 Solid State Electronic Devices and Basic Electronics