

Biohybrid Materials and Technologies for Today and Tomorrow: A Workshop

Committee

Megan T. Valentine

Chair

Megan T. Valentine is a Professor of Mechanical Engineering and Co-Director of the California NanoSystems Institute at the University of California, Santa Barbara. Her research group investigates biological and bioinspired materials, with an emphasis on understanding how forces are generated and transmitted in living materials, how these forces control cellular outcomes, and how the extraordinary features of living systems can be captured in manmade materials. This highly interdisciplinary experimental work lies at the intersection of engineering, physics, biology and chemistry, and advances diverse application areas, ranging from marine-inspired materials to mechanobiology to soft robotics. Professor Valentine's work has been recognized with numerous awards including a NSF CAREER Award for her work on neuron mechanics, and a Fulbright CORE scholar award to study adhesion mechanics in Paris, France. She is a Fellow of the American Physical Society and American Institute for Medical and Biological Engineering. She received her Ph.D. in Physics from Harvard University, and completed a postdoctoral fellowship at Stanford University in the Department of Biological Sciences, where she was the recipient of a Damon Runyon Cancer Research Postdoctoral Fellowship, and a Burroughs Wellcome Career Award at the Scientific Interface.

Robert J. Full

Member

Robert J. Full is a Howard Hughes Medical Institute Professor of Integrative Biology at the University of California at Berkeley where he holds a joint appointment in Electrical Engineering and Computer Science. Professor Full directs the Poly-PEDAL Laboratory investigating the Performance, Energetics and Dynamics of Animal Locomotion. He has authored over two hundred research contributions in animal motion science using diverse biological designs as natural experiments. He has collaborated closely with engineers, applied mathematicians, material scientists, and industry by providing biological principles to inspire the design of search-and-rescue and hazard detection robots, artificial muscles, novel control algorithms, and self-cleaning, dry adhesives. Professor Full has created a new Howard Hughes Medical Institute-supported education program on Bioinspired Design. He is the founder and director of the Center of Interdisciplinary Bio-inspiration in Education and Research (CiBER), and served as the Editor-in-Chief of the journal Bioinspiration & Biomimetics from 2013-2021. He received his undergraduate, masters, and doctoral degrees at SUNY Buffalo and then held a postdoctoral position at The University of Chicago. He has served on the NAS's Board of Life Sciences since 2017, and is an elected Fellow of the American Association for the Advancement of Science and the American Academy of Arts and Sciences. Professor Full currently serves on the Scientific Advisory Boards for the Wyss Institute at Harvard University and the Swiss National Science Foundation National Centre of Competence in Research Robotics.

Alshakim Nelson

Member

Alshakim Nelson is a Professor Chemistry and the Molecular Engineering and Sciences Institute Director of Education at the University of Washington. Professor Nelson's laboratory develops stimuli-responsive and biohybrid materials for additive manufacturing. Prior to his current position, he was a Research Staff Member at IBM Almaden Research Center for 10 years, where he developed polymeric materials for microelectronics applications. Since his move to the University of Washington in 2015, his laboratory has pioneered protein-based resins that can be 3D printed into degradable hydrogels and shape-memory bioplastics. Professor Nelson has over 70 publications and 30 issued patents. His awards and recognition include IBM Master Inventor, ACS PMSE Young Investigator, Kavli Fellow, NSF CAREER Award, and Washington State Academy of Sciences Fellow. He received his B.A. in chemistry from Pomona College, his Ph.D. from UCLA in 2004, and was an NIH Postdoctoral Fellow at Caltech before starting his independent career at IBM in 2005.

Fiorenzo G. Omenetto

Member

Fiorenzo G. Omenetto is the Frank C. Doble Professor of Engineering, and a Professor of Biomedical Engineering at Tufts University. He also holds appointments in the Department of Physics and the Department of Electrical Engineering. His research interests are in the convergence of technology, biologically inspired materials, and the natural sciences with an emphasis on new, transformative approaches for sustainable materials for high-technology applications and solutions for global health and sustainability. He has proposed and pioneered the use of silk as a material platform for advanced technology with uses in photonics, optoelectronics, and nanotechnology applications, and is co-inventor on several disclosures on the subject. Professor Omenetto was formerly a J. Robert Oppenheimer Fellow at Los Alamos National Laboratories, a Guggenheim Fellow, and is a Fellow of the Optical Society of America, the National Academy of Inventors, and of the American Physical Society and a recipient of the Tällberg global leadership prize. He received his Ph.D. in Electrical Engineering and Applied Physics at the University of Pavia.

Professor Omenetto's technologies are licensed by major corporations and he has co-founded multiple companies such as Vaxess LLC, Mori LLC, and Sofregen, LLC.

Deepti Tanjore

Member

Deepti Tanjore is Director of the Advanced Biofuels Process Demonstration Unit (ABPDU) at Lawrence Berkeley National Laboratory and interfaces with several scientists from industry, academia, and start-ups that are each individually trying to resolve scale-up challenges for their synthetic biology-based technologies. Deepti's interests lie in articulating industry-wide issues and developing technologies that no single company is incentivized to pursue. Her research at ABPDU focuses on modeling the impact of bioprocess conditions on microbial heterogeneity and developing in-line analytical tools for real-time adaptation of process development in bioreactors. Dr. Tanjore holds a B.Tech. degree in Chemical Engineering from Andhra University, an M.S. in Biological Engineering from North Carolina State University, and a Ph.D. in Biological Engineering from Pennsylvania State University and is currently enrolled for an MBA from University of California - Berkeley. She is currently a member of the Standing Committee on Biotechnology Capabilities and National Security Needs and was also a member of the workshop planning committee for Successes and Challenges in Biomanufacturing – A Workshop.