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iHealthtech

Institute for Health Innovation
& Technology

"Innovating Health"

Distinguished Speaker Seminar Series

Prof Zhenan Bao

**LCY: K.K. Lee Professor of Chemical Engineering
Stanford University, USA**



From Electronic Skin to NeuroString

4 DEC 2026, FRI, 4 PM - 5 PM

NUS, College of Design and Engineering, Building E7, Level 3, Seminar Room 4

Hosted by: Assistant Professor Liu Yuxin, iHealthtech Principal Investigator

Human skin combines mechanical compliance with diverse sensory functions, inspiring us to develop materials and devices that impart skin-like properties to electronics. Our work has progressed from electronic skin (e-skin) for robotics and wearable sensing toward soft bioelectronic interfaces with the nervous system and internal organs.

A central materials challenge is achieving high electronic performance together with softness and stretchability. We have developed molecular and materials design strategies for intrinsically stretchable semiconductors, conductors, dielectrics, and sensors, integrating them into electronic skin systems that detect pressure, strain, temperature, and chemical signals. For robotics, multimodal e-skin provides information unavailable from vision alone, including contact, force, texture, and slip.

We are extending these principles through NeuroString, a soft, fiber-shaped bioelectronic platform created by rolling integrated two-dimensional sensor arrays into a small-diameter fiber. NeuroString combines tissue-like mechanics with high-density multimodal sensing, integrating electrophysiological recording and stimulation with sensors for neurotransmitters, hormones, pH, pressure, and other physiological signals.

Together, these developments illustrate the evolution of skin-like materials from mimicking human sensory functions to enabling robotic touch and interfaces that interrogate communication between the brain and body.

Speaker Biography | Zhenan Bao is the LCY: K.K. Lee Professor of Chemical Engineering at Stanford University and, by courtesy, Professor of Chemistry, Materials Science and Engineering, and Bioengineering. She directs the Stanford Wearable Electronics Initiative (eWEAR) and served as Chair of the Department of Chemical Engineering from 2018 to 2022. Prior to joining Stanford in 2004, Professor Bao was a Distinguished Member of Technical Staff at Bell Labs, Lucent Technologies (1995-2004). She received her Ph.D. in Chemistry from the University of Chicago in 1995.

Professor Bao is a member of the National Academy of Sciences, the National Academy of Engineering, the American Academy of Arts and Sciences, and the National Academy of Inventors, and is a foreign member of the Chinese Academy of Sciences. She is widely recognized for her work on artificial electronic skin, which is enabling a new generation of skin-like electronics for restoring the sense of touch in neuroprosthetics, advancing human-friendly robotics, enhancing human-machine interfaces, and enabling seamless health-monitoring devices. Nature has named her a "Master of Materials."

Her honors include the VinFuture Prize for Female Innovators (2022), the ACS Chemistry of Materials Award (2022), the Gibbs Medal (2020), the Wilhelm Exner Medal (2018), and the L'Oréal-UNESCO For Women in Science Award (2017).

Professor Bao is a co-founder of multiple start-ups, which have developed materials used in commercial smartphones and FDA-approved blood pressure monitors used in hospitals. In addition, research from her group has been licensed as foundational technology for startups founded by her students.



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