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Cameron Walker

Professor Dorit Hanein recognized for pioneering high resolution cryo-imaging technologies

Dorit Hanein, a UC Santa Barbara professor with joint appointments in the Department of Bioengineering and the Department of Chemistry & Biochemistry, has been elected to the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows. Each year AIMBE elects leaders from academia, industry, education, clinical practice and government through a competitive peer-review process. Hanein was recognized for her “pioneering high-resolution, multimodal cryo-imaging technologies that transform understanding of complex biological systems, and leadership in education, advocacy and community-building.”

“We are so proud of Dorit for this important recognition of her leadership in developing new approaches in structural biology and biological imaging,” said Michelle O’Malley, interim chair of the Bioengineering Department and a professor of chemical engineering and bioengineering. “Her work reflects the strengths of our campus in bringing together interdisciplinary science supported by powerful core facilities, and we look forward to her continued leadership in advancing cryogenic electron microscopy (cryoEM) at UCSB.”

Cryo-ET (part of cryo-EM) is a type of transmission electron microscopy that lets scientists see cells and their tiny biological machines in 3D, close to how they exist in real life. The sample is rapidly frozen to preserve it in a natural state. In the

microscope, many images are taken from different angles, similar to a medical CT scan. A computer then combines these images into a 3D view. By identifying and averaging repeating structures from various images, scientists can reveal much finer details of these molecular assemblies while inside cells, sometimes approaching near-atomic resolution.

“I am driven by the idea that the complexity of life emerges from the precise organization of its smallest parts,” said Hanein. “By visualizing molecular systems within their native cellular environment, we are beginning to understand how structure, force and how dynamics come together to create function and how their disruption leads to disease.”

Hanein’s research focuses on how cells respond to physical forces from their environment, a process known as mechanotransduction. These responses are carried out by molecular machines that form and reorganize within cells as conditions change. Her group develops advanced imaging methods to study these systems directly in intact cells and tissues, revealing how they form, interact and function.

These insights are directly relevant to human health, as disruptions in these processes are linked to conditions such as chronic inflammation, cancer progression and neurodegenerative disease.

Hanein also designed and established cryo-EM facilities at Institut Pasteur in Paris, France; Sanford Burnham Prebys in La Jolla; and, most recently, at UCSB. She is widely recognized for expanding access to these technologies and fostering collaboration across disciplines.

“Being part of AIMBE is not only a recognition, but also an opportunity to contribute to a broader mission, advocating for science and for the role of biomedical engineering in society,” Hanein added. “Through initiatives such as AIMBE’s Hill Day — an annual advocacy event hosted by AIMBE in Washington, D.C., where fellows meet with members of Congress — we engage with policymakers to highlight the importance of federal support for research and innovation, helping to ensure and sustain scientific advances that translate into improved human health.”

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