

THE *Current*

September 11, 2025

Cameron Walker

Dorit Hanein honored for research revealing the cellular roots of disease

UC Santa Barbara professor Dorit Hanein, a leading expert in cellular tomography — a technique that allows researchers to see the inside of a cell in three dimensions with remarkable detail — has been elected as a Fellow of the American Society for Cell Biology (ASCB). Hanein, who holds joint appointments in bioengineering and in chemistry & biochemistry, is one of 14 scientists recognized this year for advancing the field through groundbreaking research, leadership and service. Her work on how cells sense and respond to their environment is shedding light on processes linked to chronic inflammation, cancer and age-related conditions such as neurodegenerative disease and chronic pain.

Over the course of her career, [Hanein](#) has investigated cellular changes that affect health and established three state-of-the-art research facilities, most recently the UCSB Structural Biology cryo-Electron Microscopy (SB2EM) facility.

“We are so proud of Professor Hanein and her most deserving recognition as a Fellow of the ASCB,” said Michelle O’Malley, interim chair of the Bioengineering Department and a professor of chemical engineering and bioengineering. “Dorit has been a fearless pioneer of cryogenic electron microscopy (cryo-EM) approaches throughout her distinguished career. We are so lucky to have her here at UCSB, where she is continuing to lead our new SB2EM facility and mentor the next

generation of leaders who will decipher the inner workings of cells.”

“I am honored to receive this recognition,” Hanein said. “It reaffirms the importance of boundary-crossing research and inclusive mentorship. ASCB’s commitment to education, inclusion and cell biological discovery mirrors my values as a scientist and mentor.”

Using powerful microscopes, Hanein studies how cells sense and respond to signals from their environment — specifically, how they convert mechanical signals into a biological response, a process known as mechanotransduction. These tasks are carried out by nanomachines, molecular assemblies that form on-demand inside cells. While most of the individual parts that make up these nanomachines are already known, how they come together and function inside living cells is still not fully understood.

Hanein is closing this gap by developing innovative imaging platforms aimed at revealing changes in the architecture and behavior of these nanomachines while in their natural context, even under stress and stiffness. Such changes in their cellular environment can contribute to chronic inflammation, cancer progression and age-related conditions such as neurodegenerative disease and chronic pain.

“Cryo-EM technologies offer a window into the inner architecture of cells, enabling us to ask and answer questions that were previously out of reach,” Hanein said. The idea that we can use imaging to ‘see’ these processes in real time, at a molecular level, and link them to bigger questions in health, like cancer, tissue repair, or aging is incredibly exciting. By combining these techniques, we hope to uncover new insights into the biology of cancer and aging and help guide the development of treatments of conditions that affect millions of people worldwide.”

Hanein received her doctoral degree at the Weizmann Institute in Israel, where her Ph.D. research led to a [Science](#) paper defining that cells sense the chirality of the underlying substrates at the onset of adhesion. As a Fulbright postdoctoral fellow at Brandeis University, she worked with David DeRosier, one of the founders of 3-D image reconstruction techniques using electron microscopy. Early in her career, the Pew Charitable Trusts selected Hanein as a Pew Scholar in the Biomedical Sciences, an award that led to the characterization of the nanomachine that allows cells’ internal skeleton to generate forces to drive cell movement ([Science](#)). More recently, Pew awarded her and a collaborator a Pew Innovation Fund grant to pursue

interdisciplinary research on how proteins sculpt membranes ([Nat Struct Mol Biol](#)), a process closely linked to neurodegenerative disease.

In 2017, Hanein moved to Paris to become a distinguished professor at Institut Pasteur, where she expanded the toolkit of cellular tomography to allow incorporating dynamics, directly tying cell signaling to the onset of a cell's skeleton assembly ([PNAS](#)).

Hanein arrived at UCSB in 2022. Here, she is developing approaches that integrate structural biology with engineering, materials science and the physical sciences, drawing on the university's collaborative and interdisciplinary atmosphere to study mechanotransduction in nanomachines within complex environments that more closely resemble their natural biological setting.

Hanein designed, built and commissioned cryo-EM facilities at Institut Pasteur, at Sanford Burnham Prebys in La Jolla, where she served as a faculty member, and, most recently, at UCSB, where she also serves as scientific director of the SB2EM cryo-EM facility. Alongside these efforts, she has launched training programs and symposia to ensure that advanced cryo-EM technologies are accessible to researchers and students, with a strong emphasis on mentoring and community.

"My goal has been to democratize cryo-EM by training the next generation of scientists, creating shared resources, and fostering a culture where discovery is supported by collaboration as much as by technology," Hanein said.

Hanein will be recognized at the joint meeting of ASCB and the European Molecular Biology Organization, to be held in Philadelphia in December.

Tags

[Awards](#)

[Health and Medicine](#)

Media Contact

Debra Herrick

Associate Editorial Director

(805) 893-2191

debraherrick@ucsb.edu

About UC Santa Barbara

The University of California, Santa Barbara is a leading research institution that also provides a comprehensive liberal arts learning experience. Our academic community of faculty, students, and staff is characterized by a culture of interdisciplinary collaboration that is responsive to the needs of our multicultural and global society. All of this takes place within a living and learning environment like no other, as we draw inspiration from the beauty and resources of our extraordinary location at the edge of the Pacific Ocean.