

BIDR Director's Podium Colloquia

Monday, January 3rd, 2022 10:30-12:30 pm
George Evens Family Auditorium, BIDR

From cell circuits to collective cell behavior: what's math got to do with it?

Abstract:

For our body to heal and repair an injury, cells in sheets called "epithelia" have to move together to seal a gap. To overcome infections, white blood cells (neutrophils) search for pathogens to destroy. Biologists study such processes in their laboratories using tiny devices such as microfluidic channels and advanced microscopy and imaging techniques to probe the mysteries of mechanisms at play in these self-organizing living systems. Here I describe complementary tools (mathematics and computational modeling) that add new capabilities to the biologist's toolkit. We can use these quantitative and computational methods to understand puzzling patterns and waves inside cells and the migratory behavior of cells in embryology, melanoma, and renal clear cell carcinoma. I will describe work on these fascinating problems over the past few years.

Biosketch:

Leah Edelstein-Keshet, a native-born Israeli, grew up in Canada and returned to Israel to do her Ph.D. in Applied Mathematics at the Weizmann Institute. Leah is a mathematics professor at the University of British Columbia, where she enjoys teaching and applying mathematics to investigate how cells work. Her book "Mathematical Models in Biology" is a popular text. Leah served as President of the Society for Mathematical Biology (SMB, 1995-1997). Her awards include the Canadian Mathematical Society Krieger-Nelson Prize (2002), the Canadian Applied and Industrial Society (CAIMS) Research Award (2016), and the Society for Mathematical Biology Arthur Winfree Prize (2021). She is a Fellow of SMB and SIAM. She has served on several scientific advisory boards, including the Yale Systems Biology Institute and Center for Complex Biological Systems UC Irvine.

Host: Arik Yochelis,

The Swiss Institute for Dryland Environmental & Energy Research.

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