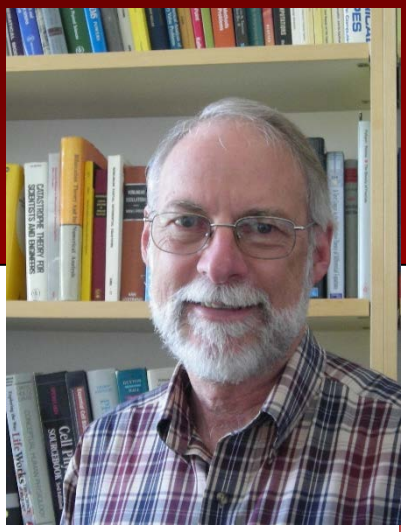

Department of Mathematical Sciences welcomes

Jim Keener
University of Utah

The Mathematics of Life: Making Diffusion Your Friend

ABSTRACT:

Diffusion is the enemy of life. This is because diffusion is a ubiquitous feature of molecular motion that is constantly spreading things out, destroying molecular aggregates. However, all living organisms, whether single cell or multicellular have ways to use the reality of molecular diffusion to their advantage. That is, they expend energy to concentrate molecules and then use the fact that molecules move down their concentration gradient to do useful things. In this talk, I will show some of the ways that cells use diffusion to their advantage, to signal, to form structures and aggregates, and to make measurements of length and size of populations. Among the examples I will describe are signaling by nerves, cell polarization, bacterial quorum sensing, and determination of cell size. In this way, I hope to convince you that living organisms have made diffusion their friend, not their enemy.

ABOUT THE SPEAKER:

Dr. Keener is a Distinguished Professor of Mathematics, Adjunct Professor of Biomedical Engineering and member of the Center for Cell and Genome Science at the University of Utah. He has a Ph.D. in Applied Mathematics from the California Institute of Technology. He is author of two graduate textbooks as well as author or co-author of more than 175 research journal articles on applied mathematics and biology. His book (with co-author James Sneyd) Mathematical Physiology was selected by the American Association of Publishers as the "Best New Title in Mathematics" in 1998. In 2017, he was the recipient of the Society for Mathematical Biology John Jungck Prize for Excellence in Education. His research has been supported continuously since 1975 by the National Science Foundation. His primary research interests are in the modeling and analysis of the dynamics of physiological systems. He has done extensive work on the dynamics of cardiac arrhythmias, with emphasis on the initiation, subsequent behavior and termination of ventricular arrhythmias. His recent work includes the study of the effect of micro domains on cardiac action potential propagation, the dynamics of biofilmgrowth and chemical signaling by bacteria, the construction of flagellar rotary motors, movement of chromosones during mitosis, the formation and degradation of blood clots and the dynamics of swelling of mucus vesicles.

February 21, 2020

Hosted by:
Prof. Julia Arciero

Tea begins at 3:00
in LD 259

Research Topic
begins at 3:30
in LD 229

STATISTICS & THEIR APPLICATIONS - IUPUI - WORLD RENOWNED RESEARCHERS EXPLORING MATHEMATICS
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