MSCS ⚜ MESS

Today's Research Seminar

Title:	The Mathematics of Sperm Motility
Speaker:	Julie Simons
Time:	3:40 PM
Date:	October 4
Place:	RNS 204

About the Talk: As sperm travel towards the egg, they use a primarily planar flagellar waveform to swim. During this process, they must effectively navigate a highly complex environment that includes interactions with surfaces and nearby neighbors. We will discuss mathematical modeling approaches to understand this process in a Stokes flow regime and introduce a model that is robust to fully three-dimensional effects. This model will enable us to understand experimentally-observed motility patterns and postulate on the importance of waveforms, swimming in groups, and the complexity of the fluid environment.
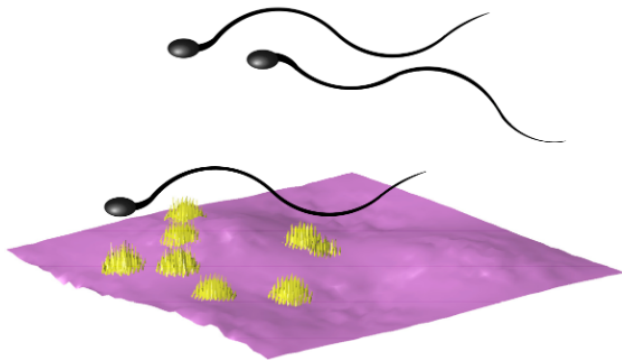
About the Speaker: Julie Simons is an applied mathematician with a passion for teaching and mathematical biology. She pursued her Ph.D. at UW Madison in applied mathematics with a minor in computational biochemistry. Before coming to Cal Maritime, she taught and studied biological fluid mechanics problems at Tulane's Center for Computational Science. Below is some math art that Dr. Simons worked on.
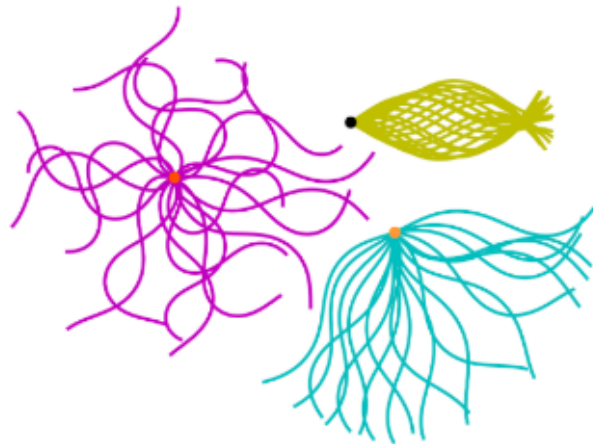

Monday's Colloquium

Title:	Discrete fracture networks modeling
Speaker:	Jeffrey Hyman '07
Time:	3:30 PM
Date:	October 7
Place:	RNS 310

About the talk: Isolated regions of high fluid velocity are routinely observed in field and laboratory experiments with flow and transport through fractured media. These flow channels indicate the existence of primary sub-networks in the fractured system, also referred to as the network backbone, where the fastest transport occurs. However, identifying these backbones a priori and linking their geophysical attributes with hydrological observations is a daunting task and heuristics are commonly used. Through the use of high-fidelity discrete fracture network

(DFN) simulations and graph theory we've developed a data-driven approach to classify fractures in the network for backbone membership based solely on geophysical properties. Along with presentation of this physics-informed machine learning approach, I'll discuss some of the issues surrounding backbone identification in fracture networks and what we can do about them.
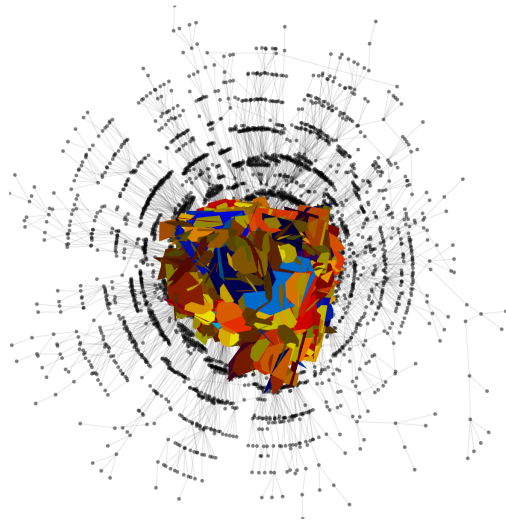
About the Speaker: Dr. Jeffrey Hyman is a research scientist in the Computational Earth Science group at Los Alamos National Laboratory. His research combines applied mathematics, high performance computing, and subsurface hydrology to advance our understanding of complex subsurface hydrological systems. He received his Ph.D. in Applied Mathematics with a Ph.D. Minor in Hydrology and Water Resources from the University of Arizona in 2014 and his BA in mathematics from St. Olaf College in 2007. His current research focuses on discrete fracture networks modeling and what insights they can bring to a better understanding of flow and transport in fractured media.

Sign up for the MSCS Tailgate!

The long-awaited MSCS Tailgate Party is back! It's a feast of entertainment, information, and awesome food prepared by the MSCS faculty. Interested in partaking in this wonderful event? You'll be able to sign up in MSCS classes, Ellen's office (RMS 307), or via this form. Any questions should be directed to Ellen. See you there!
When: October 17 at 5 pm
Where: TOH 280

New Organization for Women in Mathematics

The St. Olaf chapter of the Association of Women in Mathematics (AWM) has been started on campus and seeks to support everyone in mathematics regardless of gender and inspire others to do the same. Those interested in getting updates can add their email address through this form. Everyone is welcome and encouraged to join regardless of gender, race, sexuality, etc. Low-key events include having free food while meeting other math enthusiasts.

To submit an article, event, or anything else for publication in the mess, email jadkow1@stolaf.edu; *to receive the Mess digitally each Friday, email* habero1@stolaf.edu; *visit* http://wp.stolaf.edu/mscs/mscs-mess/ *for a digital archive of previous MSCS Mess issues. Happy October!*

Will Jadkowski, Editor
Jesse Miller, Faculty Adviser
Ellen Haberoth, Mess Czar