MSCS MESS

Department of Mathematics, Statistics, and Computer Science
St. Olaf College, Northfield, MN 55057
27 September 2019 | Volume 48, No. 3

Today's Research Seminar

Title:	Galois Orders
Speaker:	Erich Jauch
Time:	3:30 PM
Date:	September 27
Place:	RNS 204

About the talk: Galois rings and Galois orders form a class of algebras that contain many important elements such as $U(\mathfrak{gl}_n)$, the universal enveloping algebra of the general linear algebra. We will look at the simple example, how to realize $U(\mathfrak{gl}_n)$ as a Galois order, and an extension of $U(\mathfrak{gl}_n)$.

About the Speaker: Erich Jauch is a graduate student at Iowa State University where he has been pursuing a PhD in Mathematics since August of 2016. In his free time, he enjoys reading, playing board games, and bicycling.

Monday's Colloquium

Title:	Genetics of extreme body size evolution in mice from Gough Island
Speaker:	Karl W. Broman
Time:	3:30 PM
Date:	September 30
Place:	RNS 310

About the Talk: Animals on islands often rapidly diverge in body size from their mainland relatives. The mice on Gough Island, a remote island in the south Atlantic Ocean, are a dramatic example. They are twice as heavy as other wild mice, and this difference evolved in just a few hundred years. To understand the mechanisms that caused these changes, Gough Island mice were crossed to a smaller-bodied inbred strain, and 1315 intercross mice were weighed weekly for 16 weeks, to reconstruct growth curves for individual mice, and were genotyped at high density markers. I will show how we used these data to identify genetic loci that contributed to the extreme body size of Gough Island mice. Talk will feature analysis of variance, permutation tests, multiple test corrections, and interactive graphs. Also pictures of large mice.

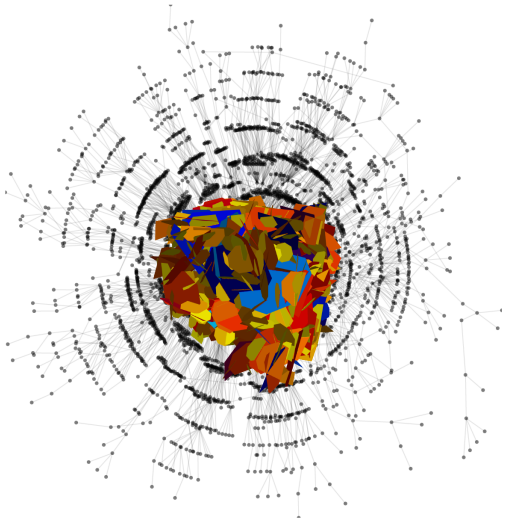
About the Speaker: Karl Broman is a Professor in the UW Madison Department of Biostatistics and Medical Informatics. He develops R/qtl for R, is a Senior Editor for *Genetics*, and is an applied statistician focusing on problems in genetics and genomics

Upcoming 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 PhD in Applied Mathematics with a PhD 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.

Math Across the Cannon

Eugenia Cheng will be coming to St. Olaf on Thursday, October 3 for this year's iteration of Math Across the Cannon. She will be giving an afternoon colloquium on "Category Theory and Life" while on campus. Later that evening she will be at Carleton to speak on "The Art of Logic". More information about her talks and Math Across the Cannon will be available as the occasion draws nearer.

Goldwater Scholarship

Juniors and Seniors that intend to pursue a PhD and research career in math or science should look into the Goldwater Scholarship. Approximately 450 scholarships of $7500 are awarded each year and St. Olaf students have competed successfully in prior years. For more information, visit the Goldwater website and contact either your department chair or Professor Walczak.

Joke of the week

Q: What do you get when you cross a mountain goat and a mountain climber?
A: Nothing—you can't cross two scalars.

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