

# MSCS MESS

Department of Mathematics, Statistics, and Computer Science  
St. Olaf College, Northfield, MN 55057  
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## Today's Research Seminar

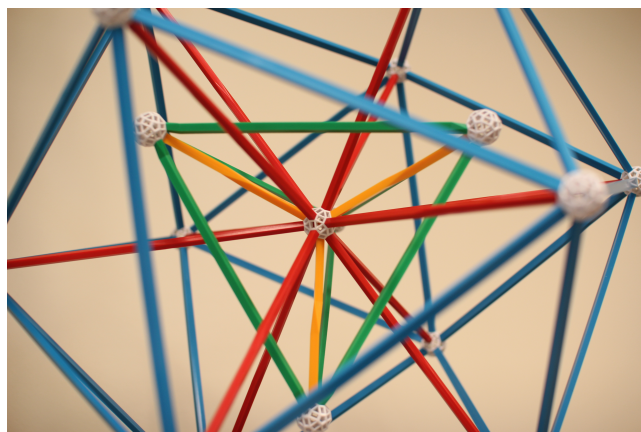
Title: Can We Predict Microbial  
Community Function?  
Speaker: Karna Gowda  
Time: 3:30 PM  
Date: Today!  
Place: RNS 204

## Next Monday's Colloquium

Title: Euler Characteristic and Appli-  
cations  
Speaker: Matthew Wright  
Time: 3:30 PM  
Date: September 16  
Place: RNS 310

**About the Talk:** Microbes live in complex, multi-species communities that play a central role in global nutrient cycles. The genes and organisms present in microbial communities (“structure”) define the flows of metabolites (“function”) in these cycles. Therefore a primary objective of microbial ecology is to determine the quantitative relationship between community structure, observable now via high-throughput sequencing, and metabolic function. We approach this objective using denitrification, a key part of the global nitrogen cycle, as a model metabolic process. Using metabolite measurements and sequencing of natural bacterial isolates, we develop a statistical approach to mapping community-level metabolic rates to genomic composition.

**About the Speaker:** Karna studies the relationship between genomes, physiology, and ecology of denitrifying soil bacteria using a combination of high-throughput culture experiments, dynamical systems modeling, and genomic data analysis. He is currently a postdoctoral fellow in Physics at UIUC and holds a PhD in applied mathematics from Northwestern University.



**About the talk:** Euler characteristic is much more than a number associated with polyhedra—it is a topological invariant with many applications, both within mathematics and to real-world problems. For example, Euler characteristic can be used to classify digital images. Euler characteristic also extends to a topological integral for real-valued functions. This talk will be an introduction to Euler characteristic, its applications, and the field of topological data analysis

**About the Speaker:** Matthew Wright understands the difference between topology and topography, and he appreciates both. He is starting his fifth year teaching at St. Olaf College and does research in the area of applied topology. Matthew has visited 34 US states and 14 other countries.

### Upcoming Research Seminar

Title: Understanding Problem Solving and Collaboration in Open-Ended Environments  
Speaker: Aaron Bauer  
Time: 3:30 PM  
Date: September 20  
Place: RNS 204

**About the Talk:** Countless human pursuits depend upon creative problem solving, especially in complex, open-ended domains. As technological support or doing this kind of work in online digital environments grows, an opportunity exists to create a new generation of intelligent problem-solving systems. These environments could actively guide and facilitate individual and collaborative problem solving toward the most productive outcomes. For this to be possible, however, we need a deep understanding of the problem-solving process in the domain of interest. In this talk, Aaron will investigate individual and collaborative problem-solving behavior in open-ended environments to address the question: what makes groups and individuals successful problem solvers?

**About the Speaker:** Aaron Bauer is a professor across the Cannon with Carleton's Computer Science Department. He works across a broad

range of areas on projects related to problem solving, educational technology, and learning. He holds a PhD from the University of Washington and enjoys musical theater, hiking, Dungeons & Dragons, and writing about history.

### Mark your calendars!

Food, talking to professors, a lecture—what more could one want? Stay tuned for more information, but in the meantime, mark your calendars for the annual MSCS Tailgate at 5:00 PM on Thursday, October 17.

### MSCS Picture Days

Want to update or get a photo on the MSCS “Wall of Fame?” MSCS students can stop by RMS 307 rain or shine on the dates below to get a new photo taken. Contact Ellen (habero1) if you have any questions.

Monday, September 16, 3-4 pm

Thursday, September 19, 10-10:45 am

### A Joke

**Q:** Why did the computer program feel unwell?

**A:** It had bug bytes!

*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.*

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