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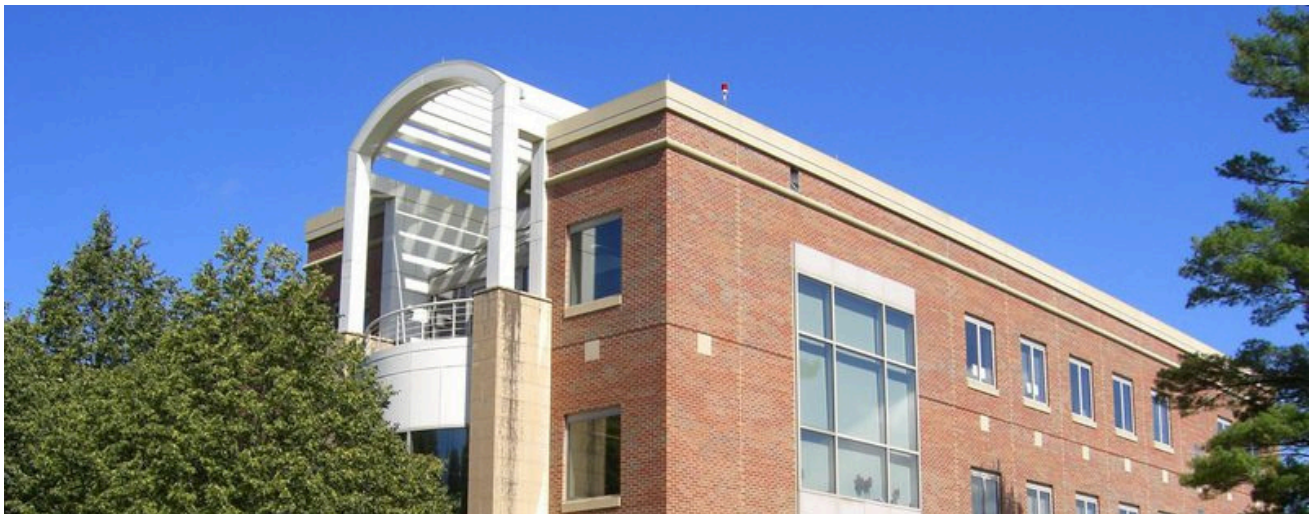
MAST MESSENGER



IN THIS ISSUE

MATH/STATS COLLOQUIUM
BUDAPEST SEMESTERS IN MATHEMATICS
MATHEMATICAL EXHIBIT
EVENTS

Math/Stats Colloquium

Speaker: Sebastian Schreiber (University of California, Davis)
Date: Tuesday, January 13, 2026
Time: 4:00 - 5:00 pm
Location: CMC 206

Title: Diversity or Collapse? How Invasion Graphs Predict the Fate of Ecological Communities

Abstract: Why do some sets of species coexist while others don't? Why does introducing one species increase community diversity while another triggers a collapse? How can environmental fluctuations promote coexistence when it's impossible in any constant environment?

I'll use differential equation models to develop a mathematical framework that uses invasion growth rates—the average per-capita growth rate of a rare species—to define a graph predicting long-term ecological outcomes. Mathematically, these growth rates are Lyapunov exponents. The invasion graph has vertices representing communities and edges representing invasion-driven transitions. For Lotka-Volterra models with acyclic invasion graphs, this yields a complete theory: necessary and sufficient conditions for permanence and a subgraph characterizing sequential community assembly. I'll illustrate these ideas with empirically parameterized Lotka-Volterra models of plant communities.

I will discuss an extension of these methods to a more general class of models accounting for discrete events, nonlinear per-capita growth rates, and auxiliary variables. I'll illustrate this extension with empirically parameterized models of competing E. coli strains experiencing alternating regimes of different antibiotics. Together, these graph-theoretic methods provide a unified framework for predicting when species coexist and how communities assemble.

Budapest Semesters in Mathematics

Study Abroad in Beautiful Budapest!

Over the past few years, Carleton has averaged about a dozen students per year attending Budapest Semesters in Mathematics in beautiful Hungary each fall.

If you are interested in learning more about the off-campus study semester in Budapest, we are planning an **information session on Tuesday, January 20, 4-5pm in CMC 206**. Administrators from both BSM and BSME will be present to answer your questions.

If you are interested in applying to BSM for the fall 2026, BSM for the summer 2026, or BSME for the summer of 2026, you need to first apply to our department **by January 31, 2026**. The application to our department is very short and simple, but it must be submitted by January 31.

Find information about the recommended background and how to apply here. Other questions can be sent to Deanna Haunsperger (dhaunspe@carleton.edu).

Mathematical Exhibit Coming Soon to the Perlman Museum

The Manifest, The Hidden: Geometry and Islam in Contemporary Art will be showing at the Perlman Teaching Museum on the Carleton College campus from January 15 - April 12. This show "explores the entanglement of Geometry and Islam in the practices of eleven contemporary artists based across the Middle East, North America, and Europe. While Geometry and Islam are often perceived as rigid systems, this exhibition invites audiences to see them anew as rich, expansive languages for expressing beauty and wonder." The exhibit was co-curated by Sara Cluggish, Professor Kambiz GhaneaBassiri, Kamala GhaneaBassiri, and Professor MurphyKate Montee.

There will be an opening talk for the show on Thursday, January 15 5-6pm at the Weitz Cinema. Kambiz and MurphyKate will talk with one of the artists featured in the show, Nima Nabavi. This will be followed by a reception 6-7pm in the Weitz Commons. Come to one or both of the opening night events, and come visit the show any time between January 15 and April 12!

Events

2026 Carleton Career Summit
Saturday, January 24 • 10:00 a.m. – 4:00 p.m. • Weitz Center for Creativity

Carleton College Investment Office Internship Information Session
Thursday, January 15 • 12:00 - 1:00 p.m. • Leighton 305

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