



# Séminaire de Mathématiques Supérieures 2022: Floer Homotopy Theory

July 11–22, 2022 | University of British Columbia

The idea of stable homotopy refinements of Floer homology was first introduced by Cohen, Jones, and Segal in a 1994 paper, but it was only in the last decade that this idea became a key tool in low-dimensional and symplectic topology. The two crowning achievements of these techniques so far are Manolescu's use of his  $\text{Pin}(2)$ -equivariant Seiberg–Witten Floer homotopy type to resolve the Triangulation Conjecture and Abouzaid–Blumberg's use of Floer homotopy theory and Morava  $K$ -theory to prove the general Arnol'd Conjecture in finite characteristic. During this period, a range of related techniques, included under the umbrella of Floer homotopy theory, have also led to important advances, including involutive Heegaard Floer homology, Smith theory for Lagrangian intersections, homotopy coherence, and further connections between string topology and Floer theory. These in turn have sparked developments in algebraic topology, ranging from developments on Lie algebras in derived algebraic geometry to new computations of equivariant Mahowald invariants to new results on topological Hochschild homology.

The goal of the summer school is to provide participants the tools in symplectic geometry and stable homotopy theory required to work on Floer homotopy theory. Students will come away with a basic understanding of some of the key techniques, questions, and challenges in both of these fields. The summer school may be particularly valuable for participants with a solid understanding of one of the two fields who want to learn more about the other and the connections between them.

The summer school will consist of lecture courses with problem sessions; seminars on recent developments; and two panel discussions about professional development. The lecture courses will be:

## COURSES AND SPEAKERS

- **Floer Homotopy**  
Mohammed Abouzaid, Columbia University
- **Introduction to Ring Spectra**  
Omar Antolín, UNAM
- **Floer Homology Fundamentals**  
Nate Bottman, Max Planck
- **Floer Homology Fundamentals**  
Catherine Cannizzo, SCGP
- **Applications**  
Jeff Hicks, University of Edinburgh
- **Spectra and Smash Products**  
Cary Malkiewich, Binghamton University
- **String Topology**  
Katherine Poirier, NYC College of Technology
- **Operads**  
Hiro Lee Tanaka, Texas State University

## ORGANIZERS:

- Kristen Hendricks (Rutgers University)
- Ailsa Keating (University of Cambridge)
- Robert Lipshitz (University of Oregon)
- Liam Watson (University of British Columbia)
- Ben Williams (University of British Columbia)



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