

# Maximilien Péroux

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## Research interests

Algebraic topology, stable homotopy theory, higher category theory, higher algebraic structures, topological data analysis, computer science.

## Academic Appointments

2020 – Present **University of Pennsylvania**, Philadelphia, PA  
Hans Rademacher Instructor of Mathematics (Postdoctoral appointment)  
Advisor: Professor Mona Merling.

## Education

2015 – 2020 **University of Illinois at Chicago (UIC)** – Chicago, IL  
Doctor of Philosophy (PhD) in Mathematics  
Advisor: Professor Brooke Shipley.

Fall 2014 **Massachusetts Institute of Technology (MIT)** – Cambridge, MA  
Visiting scholar for Master thesis.

2013 – 2015 **École Polytechnique Fédérale de Lausanne (EPFL)** – Lausanne, Switzerland  
Master of Science (MSc) in Fundamental Mathematics  
Advisors: Professors Kathryn Hess & Haynes Miller.

2010 – 2013 **École Polytechnique Fédérale de Lausanne (EPFL)** – Lausanne, Switzerland  
Bachelor of Science (BSc) in Mathematics.

## Publications

2022 **Coalgebras in the Dwyer-Kan localization of a model category**  
Maximilien Péroux  
*Proceedings of American Mathematical Society*, vol. 150, no. 10.

2022 **The coalgebraic enrichment of algebras in higher categories**  
Maximilien Péroux  
*Journal of Pure and Applied Algebra*, vol. 266, no. 3.

2019 **Coalgebras in symmetric monoidal categories of spectra**  
Brooke Shipley, Maximilien Péroux  
*Homology, Homotopy and Applications*, vol. 21, no. 1.

To appear **Spanier-Whitehead duality for topological coHochschild homology**  
Haldun Özgür Bayındır, Maximilien Péroux  
*Journal of London Mathematical Society*.

To appear **Koszul duality in higher topoi**  
Jonathan Beardsley, Maximilien Péroux  
*Homology, Homotopy and Applications*

## Preprints

Submitted **Trace methods for coHochschild homology**  
Sarah Klandermand, Maximilien Péroux [ArXiv:2301.11346](#)

**A monoidal Dold-Kan correspondence for comodules**  
Maximilien Péroux [ArXiv:2108.04835](#)

**Rigidification of connective comodules**  
Maximilien Péroux [ArXiv:2006.09398](#)

In preparation **Topological Hochschild homology for twisted  $G$ -rings**  
Gabriel Angelini-Knoll, Mona Merling, Maximilien Péroux

**Monoidal structures on the Dold-Kan correspondence in higher categories**  
Liam Keenan, Maximilien Péroux

**Partially coinductive methods in computer science**  
Paige North, Maximilien Péroux

**Topological data analysis methods for understanding team diversity at scientific conferences**  
Daniel Abrams, Andrew Feig, Kimberly Huynh, Olga Lew-Kiedrowska, Maximilien Péroux, Richard Wiener, Emma Zajdela

## Awards

- 2021 Good Teaching Award (University of Pennsylvania)  
*For MATH3700 (Spring 2021) and MATH3710 (Fall 2021)*
- 2021 Simons Travel Grant (American Mathematical society)
- 2019 Award for Graduate Research (University of Illinois at Chicago)  
*The award is intended to recognize outstanding researchers among UIC graduate students, to enhance the quality of research, and to assist in the progress toward completion of the degree.*

## Teaching & mentorship experience

2020 – Present **Instructor (University of Pennsylvania)**  
MATH2400: Calculus III (over 150 undergraduate students), class taught 3 times. Calculus coordinator in Spring 2023.  
MATH3120: Linear Algebra for non-math majors (over 80 undergraduate students).  
MATH3700: Abstract Algebra I (over 30 undergraduate students).  
MATH3710: Abstract Algebra II (over 20 undergraduate students), class taught 3 times.  
MATH7300: Topic course in Algebraic Topology (graduate level)  
*Average student rating: 3.2/4*

- Spring 2023 **Host for a Fulbright Scholar**  
Organized by the Burkina-Faso U.S. Embassy, this program is intended for university faculty members to go to the United States to conduct research for collaboration on research projects.
- Spring 2022 **Master theses advisor (University of Pennsylvania)**  
Advisor of 2 graduate students in their master theses in Algebraic Topology.
- Spring 2019 **Project supervisor (University of Illinois at Chicago)**  
Supervised an undergrad project on the Dold-Thom Theorem for a visiting student.
- Spring 2018 **Mentor in Math-en-Jean (Lycée Français de Chicago)**  
French initiative aiming to introduce middle and high schoolers, especially girls, to math research. Moderated sessions and served as a mentor to the students. More information [here](#).
- 2015 – 2020 **Teaching assistant (University of Illinois at Chicago)**  
Supervised discussion sections from two to three classes per semester. Responsible for at least 20 students in each class. Classes: Calculus I, Calculus II and linear algebra.
- Summer 2013 **Member of EMaHP: EPFL Mathematical Humanitarian Project**  
A 2 week long humanitarian trip to South Africa with 22 other EPFL math students. The goal was to introduce and to popularize basic mathematical notions through workshops for South African students from 4 to 18 years old. Video of the journey can be found [here](#).
- 2012 – 2013 **Teaching assistant (École Polytechnique Fédérale de Lausanne)**  
Abstract Algebra and General Topology for undergrads.

### Invited talks

- Jan 4, 2023 Equivariant variations of topological Hochschild homology  
*Joints Mathematics Meetings – Homotopy theory: connections and applications*
- Sep 9, 2022 Topological Hochschild homology for twisted  $G$ -rings  
*Columbia University*
- Jun 3, 2022 Topological Hochschild homology for twisted  $G$ -rings  
*Algebraic structures in topology – Puerto Rico*
- Apr 8, 2022 Fibrantly generated model categories  
*Joint Mathematics Meetings – AWM Special Session on Women in Topology*
- Nov 16, 2021 Equivariant variations of topological Hochschild homology  
*Cornell University Topology and Geometric Group Theory Seminar*
- Nov 10, 2021 Equivariant variations of topological Hochschild homology  
*Rutgers University Algebra Seminar*
- Nov 2, 2021 Equivariant variations of topological Hochschild homology  
*University of Regina Topology Seminar*
- Apr 30, 2021 Duality in higher algebra  
*University of Reno Topology Seminar*
- Apr 13, 2021 Coalgebras and comodules in stable homotopy theory  
*Florida State University Homotopy theory Seminar*
- Jan 12, 2021 Coalgebras and comodules in stable homotopy theory  
*University of Warwick Algebraic Topology Seminar*

- Sep 24, 2020 Coalgebras and comodules in stable homotopy theory  
*University of Pennsylvania Topology-Geometry seminar*
- Mar 5, 2020 Coalgebras and comodules in stable homotopy theory  
*University of Virginia Topology Seminar*
- Feb 27, 2020 Rigidification of coalgebras and comodules in stable homotopy theory  
*Ohio State University Homotopy Theory Seminar*
- Jan 15, 2020 Rigidification of coalgebras and comodules  
*Purdue University Topology Seminar*
- Oct 14, 2019 Rigidification of coalgebras and comodules  
*Northwestern University Topology Seminar*
- Oct 9, 2019 Rigidification of coalgebras and comodules  
*University of Rochester Topology Seminar*
- Sep 14, 2019 Coalgebras and comodules in stable homotopy theory  
*AMS Sectional Meeting: Special Session on Homotopy Theory, University of Wisconsin-Madison*
- Aug 1, 2019 Coalgebras and comodules in stable homotopy theory  
*Equivariant Topology & Derived Algebra, NTNU*
- Jul 23, 2019 Coalgebras and comodules in stable homotopy theory  
*Young topologist meeting, EPFL*
- Jun 1, 2019 Coalgebras in Algebraic Topology  
*LG&TBQ, University of Michigan*
- Apr 22, 2019 Coalgebras and comodules in stable homotopy theory  
*John Hopkins University Topology Seminar*
- Apr 11, 2019 Homotopy theory for coalgebras  
*University of Washington Topology Seminar*

## Professional Activities & Service

- Spring 2023 **Mid-Atlantic Topology Conference**  
Co-organizer
- 2021 – Present **UPenn Mathematics Colloquium**  
Co-organizer
- 2020 – present **Referee for mathematical journals**  
Journal of pure and applied algebra; Homology, homotopy and applications; Algebraic and geometric topology; Journal of homotopy and related structures; *Discussiones mathematicae*, general algebra and applications.

## Technical skills

### Programming languages

Proficient in: C++

Familiar with: Matlab, Python

### Software

LaTeX, Git, Word, Excel

### Languages

English (fluent), French (mother tongue), Italian (reading proficient), Spanish (reading proficient)