

Miguel Ricardo Lopez

He/Him/His

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EDUCATION

University of Pennsylvania

PhD Candidate: Applied Math and Computational Science

Philadelphia, PA

Aug 2020 - Present

- Fontaine Fellow
- Advisor: Robert Ghrist
- Research area: Applied Topology

Boston University

Bachelor of Science: Mathematics

Boston, MA

Jan 2017 - May 2019

- *Summa Cum Laude*
- GPA: 3.88

Suffolk University

Major: Mathematics

Boston, MA

Aug 2015 - Dec 2016

- GPA: 4.00

RESEARCH EXPERIENCE

- **Network Sheaves for Opinion Dynamics:** Constructed models of lattice valued sheaves over networks for use in opinion dynamics.
 - Presented at Socio-Math Workshop in Arlington, VA. *April 11-12, 2022*
- **London Geometry and Machine Learning (LOGML):** PDE-inspired Sheaf Neural Networks with Cristian Bodnar.
 - Participated in the LOGML research week for a project on sheaf neural networks. *July 11-15, 2022*
 - *Surfing on the Neural Sheaf* poster joint with Julian Suk, Lorenzo Giusti, Tamir Hemo, Konstantinos Barmpas, Cristian Bodnar accepted to the NeurIPS 2022 Workshop on Symmetry and Geometry in Neural Representations.
- **The Adjoint School 2022:** A Compositional Theory of Timed and Probabilistic Processes: Cospan/Span(Graph) with Nicoletta Sabadini and Mario Román.
 - Attended research week at University of Strathclyde in Glasgow, Scotland. *July 11-15, 2022*
 - Extended abstract *Cyclic Causal Networks via Partial Markov Categories* submitted to Symposium on Compositional Structures.
 - Published a blog post joint with Ruben Van Belle on compositional Markov processes on the n-Category Cafe.
- **AMS Math Research Communities 2022:** Models and Methods for Sparse (Hyper)Network Science
 - Participated in a week long research retreat at the Beaver Hollow Conference Center in Java Center, NY. *June 5-11, 2022*
 - Completed research in finding tractable approaches to modelling edge dependent hypergraph random walks.
- **Combinatorics of k -Farey Graphs:** Research project from the 2018 ICERM REU at Brown University. Investigated topological properties of graph relating to curve system.
 - Publication: *Combinatorics of k -Farey Graphs*, Jonah Gaster, Miguel Lopez, Emily Rexer, Zoë Riell, Yang Xiao, Rocky Mountain Journal of Mathematics, Rocky Mountain J. Math. 50(1), 135-151, (February 2020)
 - Presented at Joint Mathematics Meeting 2019 poster session. Received MAA Mathfest Outstanding Presentation Award.
 - Presented at Underrepresented Students in Topology & Algebra Research Symposium (USTARS) poster session.

TEACHING EXPERIENCE AND OTHER SKILLS

- **Directed Reading Program** Philadelphia, PA
 - *Mentor for the following projects:*
 - Mason Larkin, *Applications of TDA to the Detection of Bifurcations* *Spring 2022*
 - Joshua Ibrahim, *Topological Data Analysis and Persistent Homology* *Fall 2021*

- **Mathnasium of Brookline** Boston, MA
 - *Math Instructor* *Sept 2019 - July 2020*
 - Instructed small groups of students from grades 2–12 on tailored math curriculum for 20-25 hours a week. Graded student work and reported progress each session with detailed notes for parents.

- **Programming Languages**
 - *Proficient in:*
 - **Python.** Relevant coursework:
 - *CS 111: Intro to Computer Science I (Boston Univ.)*
 - *CIS 580: Machine Perception (Univ. of Penn.)*
 - *ESE 5140: Graph Neural Networks (Univ. of Penn.)*
 - **Java.** Relevant coursework:
 - *CS 112: Intro to Computer Science II (Boston Univ.)*
 - **MATLAB.** Relevant coursework:
 - *ENM 522: Numerical Methods for PDEs (Univ. of Penn.)*
 - **R.** Relevant coursework:
 - *MA 575: Linear Models (Boston Univ.)*

- **Teaching Assistant** Philadelphia, PA
 - *University of Pennsylvania* *Fall 2021*
 - Math 810: Video Production for Mathematics. Required proficiency in: Microsoft Powerpoint, Maxon Cinema 4D, Adobe Premier Pro, Adobe Audition.

- **Course Grader** Boston, MA
 - *Boston University*
 - MA 123S: Calculus I *Summer 2018*
 - MA 511: Intro to Analysis I *Fall 2018*
 - MA 512: Intro to Analysis II *Spring 2019*

- **Course Grader** Philadelphia, PA
 - *University of Pennsylvania*
 - AMCS 6025: Numerical Linear Algebra *Fall 2022*
 - MATH 3200: Computer Methods in Mathematical Science I *Fall 2022*