Olivia Borghi

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oliviaborghi.github.io

Education

2020-2024 **University of Melbourne. Melbourne, Victoria Australia** •PhD Candidate (projected graduation 2024): Commutativity in Higher Algebraic Structures
Pure Mathematics •advised by Dr. Marcy Robertson

2017-2019 **University of Washington. Seattle, Washington USA** •Masters of Science: Factorization Homology for Sutured Manifolds
Pure Mathematics •advised by Dr. Max Lieblich

2009-2014 **Lewis and Clark College. Portland, Oregon USA** •Bachelors of Arts
Pure Mathematics, Computer Science •advised by Dr. Jeffrey Ely

Research

I am interested in **higher category theory, homotopy theory and operads**. My current program offers a generalization of symmetric notions in higher monoidal categories and operads. Specifically I have developed notions of G-monoidal ∞-categories, and ∞-G-operads which extend the notions of symmetric equivariance to a larger array of groups called "action operads" in a way that corroborates the extent literature on symmetric monoidal ∞-categories and ∞-operads.
In mathematics, collaborators are listed in alphabetical order and are considered equal contributors.

Publications:

- Borghi, Olivia and Robertson, Marcy. **Lecture Notes on modular infinity operads and Grothendieck-Teichmüller theory**. To appear in the proceedings of the CRM Workshop on **Higher Structures and Operadic Calculus**. arXiv:2210.13640v2

In Preparation:

- Borghi, Olivia. **Infinity G-operads**. Draft available upon request.
- Borghi, Olivia **G-Monoidal Infinity Categories**. Draft available upon request.
- Julia E. Bergner, Olivia Borghi, Pinka Dey, Imma G´Alvez-Carillo, and Teresa Hoekstra-Mendoza. working title: **2-Segal Sets from Cuts of Rooted Trees**. Draft available upon request.

Invited Talks

Seminar Talks:

- University of Louisiana Lafayette Topology Seminar 2022
  - "G-Monoidal ∞-Categories"
- University of Nevada Reno Topology Seminar 2021
  - "Coboundary Categories and an Operadic Unitarization 'trick'"

Conference Talks:

- Plenary speaker at LGBTQ+ Maths Day, University of Toronto (attended through Zoom) 2022
  - "G-Monoidal Categories".
- Categories and Companions Symposium, Matrix Maths Institute 2022
  - "Notions of Commutativity in Higher Monoidal Categories".

- Australian Kittens Conference, University of Melbourne 2021
  - "G-Monoidal ∞-Categories"
- Workshop for Women in Topology, Matrix Maths Institute 2021
  - Presented on the preliminary material I developed while at the workshop.
- Categories and Companions Symposium, 2021
  - "G-Monoidal Categories"
- Runner up for best student talk at AUSTMS Conference, Online 2020
  - "A Diagrammatic Language for Cactus Groups"

Awards and Outside Funding

- Australian Mathematical Society WIMSIG Cheryl Praeger Travel Award
  - 1577USD
- University of Melbourne Science Abroad Travelling Scholarship
  - 946USD
- MSRI Workshop Floer Homotopy Vancouver, BC, Canada 2022
  - lodging, food, transport 694USD
- MSRI Workshop Higher Categories and Categorification Berkeley, CA, USA 2020
  - lodging, food and transport 1388USD
- LGandTBQ Conference for queer mathematicians Ann Arbor, MI, USA 2019
  - lodging, food, transport 1500USD
- MIT Talbot Workshop Model Independent Theory of Infinity Categories Government Camp, OR, USA 2018
  - lodging, food and transport 1100USD

Teaching Experience

- Mathematics Tutor, University of Melbourne 2022-2023
  - Lead tutorials in linear algebra and advanced linear algebra. Work included multiple weekly in class sessions as well as grading.
- Linear Algebra Lecturer, University of Washington 2018
  - Organised, taught and graded a summer linear algebra course.
- Teaching Assistant, University of Washington 2017-2019
  - Courses included the entire calculus cycle as well as high school algebra. Graded for higher level analysis and differential equations courses.
- Teaching Assistant, Boise State University 2016-2017
  - Courses included the calculus cycle and high school algebra.

University Service

- University of Melbourne Topology Seminar 2022
  - This was a paid position helping organise the weekly research seminar as well as redesign the topology website.
- University of Melbourne Topology Group Webpage 2022
  - This was paid work for updating and maintaining the topology group webpage at University of Melbourne.