Olivia McGough

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Education

Bachelor of Arts, Mathematics, Reed College | Portland, OR | GPA: 3.94 | May 2023

- Commendation for Academic Excellence from Reed College: Awarded by Reed President's Office to top 5 percent of each class, 2019-2020, 2020-2021, 2021-2022, and 2022-2023

PhD, Statistics, University of Washington | Seattle, WA | GPA: 3.92 | June 2028 (expected)

Publications

[1] R. Perry, Z. Xu, O. McGough, D. Witten. "Infer-and-Widen versus Split-and-Condition: Two Tales of Selective Inference", *arXiv preprint arXiv:2408.06323v1* (2024).

[2] G. Goel., O. McGough, & D. Perkinson. "Counting weighted maximal chains in the circular Bruhat order." *Journal of Combinatorial Theory, Series A*, vol. 195, p. 105709, April 2023.

[3] X. Ding, X. Dong, O. McGough, C. Shen, A. Ulichney, R. Xu, W. Swartworth, J.T. Chi, D. Needell. "Population based Hierarchical Non-negative Matrix Factorization for Survey Data." *IEEE/ACM International Conference on Big Data Computing, Applications, and Technologies*, Dec. 2022.

Research Positions

Research Assistant | University of Washington | Jan. 2024 - present

- Meet weekly with UW professor Daniela Witten and UNC professor Daniel Kessler to discuss research projects in selective inference

- Derive proofs of main results and code simulation studies in R

- Collaboration with two other PhD students resulted in "Infer-and-Widen versus Split-and-Condition: Two Tales of Selective Inference" preprint

Collaborative Mathematics Research Group | Reed College | Summer 2023

- Studied applications of topological data analysis (TDA) in image symmetry detection with two other Reed College students, mentored by Reed College math professors Kyle Ormsby and Angélica Osorno

- Funded by NSF Research in Undergraduate Institutions (RUI) Grant

Applied Math Research Experience for Undergraduates (REU) | UCLA | Summer 2022

- Conducted AI and machine learning research for data analysis, mentored by UCLA math professor Deanna Needell

- Developed a new variant of non-negative matrix factorization, resulting in the paper "Population-Based Hierarchical Non-negative Matrix Factorization for Survey Data"

Rosenbaum Fellowship | Reed College | Summer 2021

- Won competitive funding from the Reed college math department to conduct mathematical research with Reed professor David Perkinson and MIT undergrad Gopal Goel to prove a theorem in algebraic combinatorics

- Rigorous daily research and study with collaborators yielded paper "Counting weighted maximal chains in the circular Bruhat order"

Presentations

- December 2022: **Population-Based Hierarchical Non-Negative Matrix Factorization for Survey Data** | International Conference on Big Data Computing, Applications and Technologies (BDCAT): Symposium for Undergraduate Research in Data Science, Systems, and Security | IEEE/AMC | Portland, Oregon

- October 2022: **Population-Based Hierarchical NMF** | Reed College Mathematics Colloquium | Reed College Math Dept. | Portland, Oregon

- April 2022: **Counting Weighted Maximal Chains in the Circular Bruhat Order** | Joint Mathematics Meetings | American Mathematical Society | Remote

- August 2021: **Counting Weighted Maximal Chains in the Circular Bruhat Order** | Young Mathematicians Conference | Ohio State University | Remote

Work Experience

Teaching Assistant, STAT 311 | University of Washington Statistics Dept. | Sept 2023 - Dec 2023

- Commendation for Academic Excellence from Reed College: Awarded by Reed President's Office to top 5 percent of each class, 2019-2020, 2020-2021, 2021-2022, and 2022-2023

- Prepare weekly labs in RStudio and lead 60 undergraduates through the labs in quiz sections (4 hours per week)

Course Assistant, Vector Calculus & Intro to Analysis | Reed College | Aug 2021– May 2023

- Administer multiple weekly meetings for vector calculus students to attend for assistance with coursework

- Manage study environment for up to 20 students and address their questions simultaneously

Tutor, Vector Calculus & Linear Algebra & Real Analysis | Reed College | Jan 2021– May 2023

- Conduct individual tutoring sessions with Reed vector calculus, linear algebra, and real analysis students

Grader, Linear Algebra & Discrete Structures | Reed College | Aug 2020–May 2021

- Produce answer keys and construct grading rubric for weekly problem sets

- Write feedback and guidance on problem sets for students who struggle with the material

Volunteer/Mentorship

Mentor for Undergraduate Directed Reading Program | University of Washington | Sept 2024 - present

- Weekly meeting with undergraduate to discuss directed reading of Introduction to Statistical Learning textbook

Diversity, Inclusion, Community and Equity (DICE) Committee Member | University of Washington | Sept 2023 - present

- Monthly meetings discussing DICE initiatives, and participation in initiatives throughout the school year, e.g. administration of DEI department survey, organization of seminar speakers, and establishment of tribal collaboration program

Reviewer for UW Department of Statistics Pre-Application Review Service | University of Washington | Autumn 2023

Skills

Experienced: R, Python, LaTeX

Basic: Git, Bash, MATLAB