Ryan O'Dowd
ryan.o'dowd@cgu.edu

Objective: Secure postdoctoral research position.

Long-term goal: Pursue productive mathematics research and education career.

EDUCATION

PhD in Mathematics — Anticipated May 2025
Claremont Graduate University (CGU), Claremont CA
Advisor: Professor Hrushikesh Mhaskar

Master of Science in Mathematics — May 2022
Claremont Graduate University, Claremont CA

Bachelor of Science in Mathematics — May 2019
Linfield University, McMinnville OR

EXPERIENCE

Graduate Research Assistant — Jan. 2022-Present
Research assistant under Dr. Mhaskar at CGU, with research topics including:

- Direct approximation method on data defined manifolds.
- Classification procedure for use in active learning paradigm.
- Theory for local transfer learning between two manifolds.

Graduate Researcher — Sept. 2024-Jan. 2025
Radar Division at Naval Research Laboratory (NRL) supervised by Dr. Raghu Raj.

- Investigate convergence for regularization methods in generalized compressive sensing problems.
- Provide numerical results to support theoretical findings.
- Explore future directions of generalized sampling to problems outside of traditional compressive sensing.

Qualifying Exam Preparatory Assistant — Spring 2022, 2024, and (planned) 2025
Tutor for Mathematics PhD qualifying exam at CGU.

- Give lectures on topics and problems in linear algebra, real analysis, complex analysis, ODE's, PDE's, and probability.
- Run study sessions to assist students preparing for the qualifying exam.
- Advise students on studying and exam-taking strategies.

Graduate Assistant — Fall 2020-Spring 2022
Department Assistant for the Institute of Mathematical Sciences at CGU.

- Plan and run departmental events including the weekly Math Club.
- Manage department books and digital files.
- Provide miscellaneous departmental assistance.

T.A. Positions:
Optimization T.A., CGU — Fall 2023
Complex Analysis T.A., Pomona College — Spring 2020
Galois Theory Grader, Harvey Mudd College — Spring 2020

PAPERS

H.N. Mhaskar and Ryan O'Dowd. "Learning on manifolds without manifold learning". In: *Neural Networks* 181 (2025), ISSN: 0893-6080.
DOI: https://doi.org/10.1016/j.neunet.2024.106759

H.N. Mhaskar and Ryan O'Dowd. "Local transfer learning from one data space to another". Accepted in the conference proceedings title: Inverse Problems, Regularization Methods and Related Topics - A Volume in Honour of Thamban Nair, Eds. Sergei V. Pereverzyev, R. Radha, and S. Sivananthan, 2024.
ArXiv preprint at: abs/2302.00160.

Ryan O'Dowd, Raghu G. Raj, and H.N. Mhaskar. "Aspects of a generalized theory of sparsity based inference in linear inverse problems". Submitted to IEEE ISIT2025.

H. N. Mhaskar, Ryan O'Dowd, Efstratios Tsoukanis. "Active Learning Classification from a Signal Separation Perspective". Submitted to SampTA 2025.

In preparation:

- "A signal separation view of classification".
- Parameter estimation from biexponential decay data for magnetic resonance relaxometry.
- Extension of function approximation results on manifolds to include tubular neighborhoods of manifolds.

INVITED TALKS

- 10th International Congress on Industrial and Applied Mathematics: Minisymposium on Interaction between Harmonic Analysis and Data Science, 2023, Tokyo Japan.
- Functional Analysis, Approximation Theory and Numerical Analysis: Session on Multivariate Polynomials in Approximation and Signal Analysis, 2022, Matera Italy.

POSTER PRESENTATIONS

- Fall Fourier Talks, 2024, College Park MD.
- NSF Compmath PI Meeting, 2024, Seattle WA.
- Southern California Applied Mathematics Symposium, 2024, San Diego CA.
- Fall Fourier Talks, 2023, College Park MD.
- Center for Approximation and Mathematical Data Analytics Conference, 2023, College Station TX.
- Southern California Applied Mathematics Symposium, 2022, Claremont CA.

OUTREACH

- REU workshop on "Navigating Graduate School": invited panelist for Q/A session with undergraduate, graduate, and young faculty members, June 30 2023, Pomona College.
- Gateways to Exploring Mathematical Sciences (GEMS): led session on graph coloring for students in 8-10th grade, April 6 2024, Harvey Mudd College.

SKILLS

LaTeX including Beamer.
MATLAB and Python.
Microsoft Office products.
Zoom and Microsoft Teams.
Canvas, Sakai, and Gradescope.

AWARDS AND ASSOCIATIONS

Outstanding Senior Mathematics Student (Linfield University 2019)
Graduate Magna Cum Laude, Linfield University (2019)
1st place team, Kryptos Cryptanalysis Competition (2019)
Pi Mu Epsilon National Mathematics Society Member (2017-present)

SELECT COURSEWORK

Mathematics of Machine Learning (Audit, 2024)
Topics in Geometry (2022)
Advanced Big Data Analysis (2022)
Independent Study: Operator Theory (2021)
- With Professor Stephan Garcia at Pomona College.

Discrete Mathematical Modeling (2021)
Topics in Analysis (2021)
Number Theory (2021)
Representation Theory (2020)
Continuous Mathematical Modeling (2020)
Fourier Analysis (2020)
Partial Differential Equations (2020)
Probability (2019)
Galois Theory (2019)
Complex Analysis (2019)
Real Analysis (2018)
Graph Theory (2018)
Topology (2017)
Linear Algebra (2016)
Ordinary Differential Equations (2016)
Vector Calculus (2015)