

Kellie J. MacPhee

Ph.D. Student, Optimization
Department of Mathematics
University of Washington

kmacphee@uw.edu
<http://www.math.washington.edu/~kmacphee>

Graduate Studies (University of Washington)

Ph.D. Mathematics, Advanced Data Science Option; anticipated 2019

M.S. Mathematics; Class of 2017

Research Interests: nonlinear optimization and variational analysis, data science and machine learning

Advisor: Professor Dmitriy Drusvyatskiy

Sample Coursework: Numerical Optimization, Convex Analysis, Foundations of Machine Learning, Statistical Inference, Network Optimization, Integer Optimization and Lattices, Design and Analysis of Algorithms.

Undergraduate Studies (Dartmouth College)

B.A. Mathematics, Japanese Minor; Class of 2014

★ *Summa Cum Laude, Phi Beta Kappa*

★ *Rufus Choate Scholar, Presidential Scholar*

Research: graph theory research project at the NSF-sponsored Lafayette College REU in Summer 2013, advised by Professor Gary Gordon

Sample Coursework: Algebraic Combinatorics, Graph Theory, Introduction to Applied Mathematics, Linear Algebra, Real Analysis, Introduction to Programming and Computation, STEM and Education.

Publications

A. Aravkin, J. Burke, D. Drusvyatskiy, and K. MacPhee, "Foundations of gauge and perspective duality," in review for *SIAM Journal on Optimization*.

A. Chin, G. Gordon, K. MacPhee, and C. Vincent, "Pick a Tree - Any Tree," *The American Mathematical Monthly*, 122(5), May 2015.

★ *Halmos-Ford Award, from the Mathematical Association of America*

A. Chin, G. Gordon, K. MacPhee, and C. Vincent, "Subtrees of graphs," submitted to the *Journal of Graph Theory*.

Speaking

"Gauge and perspective duality." *Trends in Optimization Seminar*, University of Washington, June 2017.

"Gauge and perspective duality." Minisymposium on "Optimization Over Complex Constraints: Duality, Algorithms, and Applications," *SIAM Conference on Optimization*, May 2017.

"Random subtrees of complete graphs." Student Paper Session and Student Poster Session, *Joint Mathematics Meetings*, January 2014.

★ *Outstanding Presentation Award*

"The Subtree Polynomial: A Generating Function on Graphs." *WiMiN (Women in Mathematics in New England)* at Smith College, September 2013.

"The Subtree Polynomial: A Generating Function on Graphs." Student Paper Session, *MAA MathFest*, August 2013.

Work Experience

Ph.D. Intern, *National Security Internship Program (NSIP)*, Pacific Northwest National Laboratory, Summer 2017. Applied Statistics and Computational Modeling Team, Computing and Analytics Division, National Security Directorate. Projects included:

- Dynamic risk modeling and optimization to improve airport security (funded by TSA/DHS)
- Automating anomaly detection in multivariate Twitter time series data
- Quantitative analysis and image processing of data from compressed sensing electron microscopy (in collaboration with chemists in the Physical Sciences Directorate)

Education Intern, *Montshire Museum of Science* in Norwich, VT, Winter 2012. Duties included:

- Designing and implementing hands-on science lessons for museum visitors, school field trips, and local classrooms
- Engaging with visitors and exhibits on the museum floor

Teaching Experience

Graduate Student Instructor, *Mathematics Department*, University of Washington

Math 307: Introduction to Differential Equations, Spring 2017

Graduate Teaching Assistant, *Mathematics Department*, University of Washington

Math 111: Algebra with Applications, Winter 2015 and Fall 2015

Math 112: Application of Calculus to Business and Economics, Winter 2016 and Spring 2016

Math 124: Calculus with Analytic Geometry I, Fall 2014 and Fall 2017*

Math 125: Calculus with Analytic Geometry II, Spring 2015

Tutor in the Mathematics Study Center, Spring 2015 and Summer 2015

* also a **TA Mentor**, helping new graduate students learn how to be effective teaching assistants

Mathematics Instructor, *Women in Science and Engineering (WiSE) Summer Bridge Program*, University of Washington, Summer 2016. Responsibilities included:

- Preparing incoming undergraduate women to succeed in engineering courses
- Reviewing and previewing calculus material (on an individualized basis)
- Teaching general learning strategies and best practices for mathematics courses

Service

Homework Help Tutor, K–12 mathematics and other subjects, Seattle Public Library, 2015 – present.

Co-organizer, *Trends in Optimization Seminar (TOPS)*, University of Washington, 2016 – present.

Diversity Committee Member, *Mathematics Department*, University of Washington, 2017 – present.

Graduate Student Representative, *Mathematics Department*, University of Washington, 2016 – 2017. Responsibilities included:

- Serving on advisory committees and being a liaison between graduate students and faculty
- Organizing panel discussions on topics including transitioning from coursework to research, applying for academic jobs, and careers in industry

Activity Leader, *Julia Robinson Mathematics Festival* and *University of Washington Math Day*, 2015 – 2016.

Lesson Designer and Panelist, *Sonia Kovalevsky Math Day* for middle school girls, Dartmouth College, 2011 and 2013.

Mathematical Societies

Mathematical Association of America (MAA), 2017 – present

Society for Industrial and Applied Mathematics (SIAM), 2016 – present

American Mathematical Society (AMS), 2014 – present

Association for Women in Mathematics (AWM), 2010 – present

Skills

Programming: MATLAB, Julia, Python, CVX, Gurobi, JuMP, R

Languages: English, Japanese

Misc.

University of Washington Women's Club Water Polo, 2015 – present

Dartmouth College Women's Club Water Polo, 2010 – 2014