Tracey Oellerich

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EDUCATION

- *Ph.D,* Mathematics,
  George Mason University, Fairfax, VA — expected May 2023
- *MS.,* Mathematics,
  George Mason University, Fairfax, VA — Fall 2019
- *Bachelor of Science,* Mathematics,
  Bachelor of Arts, Physics,
  Minors, Statistics and Secondary Education
  Wilkes University, Wilkes-Barre, PA — May 2016

RESEARCH INTERESTS Mathematical Biology, Data Science, Numerical Methods, Network Analysis, Dynamical Systems, Machine Learning, Modeling of Nonlinear Systems, Optimization

CITIZENSHIP: United States Citizen

RESEARCH

George Mason University (GMU)

- Network Analysis of Biological Systems: Adaptation and Inferring Dynamics — 2018 - present
  Advisor: Dr. M. Emelianenko, Department of Mathematics, GMU

National Institutes of Health (NIH)
National Center for Advancing Translational Sciences (NCATS)

- Deep Learning on Embedded Protein-Protein Interaction Networks to Prioritize Disease Targets, — June 2021 - August 2021
  Mentor: Dr. V. Siramshetty, NCATS

Wilkes University

- Enhanced Protein Folding through Confinement Inside a Hydrophilic Nanopore, — 2015 - 2016
  Advisor: Dr. D. Lucent, Department of Physics, Wilkes University
- Squaring the Circle using Hyperbolic Geometry — Spring 2015
  Advisor: Dr. L. Berard, Department of Mathematics, Wilkes University
- Stern's Diatomic Sequence, with E. Klemchak — Fall 2014
  Advisor: Dr. R. Pryor, Department of Mathematics, Wilkes University

TEACHING EXPERIENCE

George Mason University

- Instructor of Record
  - MATH 446: Numerical Analysis I — Summer 2019, Summer 2020
  - MATH 108: Introductory Calculus with Business Applications — Summer 2020
  - MATH 111: Linear Math Modeling — Summer 2018

- Graduate Teaching Assistant
  - MATH 213: Analytic Geometry/Calculus III — Spring 2018
  - MATH 114: Analytic Geometry and Calculus II — Spring 2017 - Fall 2017
  - MATH 113: Analytic Geometry and Calculus I — Fall 2016

Wilkes University

- Teaching Assistant, Wilkes University Physics Department — Spring 2013 - Spring 2016
- Teacher Education Student, Wilkes University Education Department — Fall 2013 - Spring 2016
- Supplemental Instructor, Wilkes University Physics Department — Fall 2015 - Spring 2016
- Tutor, Wilkes University Learning Center — Fall 2015

PUBLICATIONS

T. Oellerich, M. Emelianenko, M. Pierobon, and E. Baldelli. "Learning biological network dynamics from data". *In Preparation.*

T. Oellerich, M. Emelianenko, L. A. Liotta, and R. P. Araujo. "Biological networks with singular jacobians: their origins and adaptation criteria". *Submitted.* doi:https://doi.org/10.1101/2021.03.01.433197.

LEADERSHIP AND OUTREACH

- Treasurer of SIAM George Mason Chapter, George Mason University — Fall 2017 - Spring 2018, Fall 2021 - present
- Vice-President of SIAM George Mason Chapter, George Mason University — Fall 2020 - Spring 2021
- Organizer for the Student Research Talks (StReeTs) seminar, George Mason University — Spring 2019 - present
- President of SIAM George Mason Chapter, George Mason University — Fall 2018 - Spring 2020
- Representative for the Mathematics Graduate Program Graduate and Professional Student Association (GAPSA), George Mason University — Spring 2020-Spring 2021
- Mentor for NSF funded EXTREEMS-QED Undergraduate Research Program, George Mason University — Summer 2018
- Member of the SIAM Festivals Working group, Society for Industrial and Applied Math — Spring 2018
- President of Math and Computer Science Club, Wilkes University — Fall 2013 - Spring 2015.
- Treasurer of Education Club, Wilkes University — Spring 2015 -Fall 2015.
- Treasurer of Math and Computer Science Club, Wilkes University — Fall 2015 - Spring 2016.

HONORS AND AWARDS

- Participant in the American Mathematical Society's Mathematics Research Community (MRC) on Models and Methods for Sparse (Hyper)Network Science, Java Center, NY — June 5 – June 11, 2022.
- One of 200 students selected worldwide to participate in the 8th Heidelberg Laureate Forum, Heidelberg, Germany — September 19-24, 2021
- Participant in Equity in Education Data-thon Library of Virginia, Richmond, VA — October 3-4, 2019
- Travel grant to participate in the Fields-CQAM Industrial Problem Solving Workshop (IPSW), Fields Institute — May 6 - 10, 2019

National Institutes of Health (NIH)

- One of 15 students selected to participate in the Graduate Data Science Summer Program (GDSSP) — Summer 2021

George Mason University

- Finalist in George Mason University's 3MT® (Three-Minute Thesis) Competition — April 8, 2022
- Recipient of the 2022 Summer Research Fellowship — Summer 2022
- Awarded Research Funding through the George Mason Industrial Immersion Program — Fall 2018-present
- Received the Teaching Award in Mathematics — Spring 2017

Wilkes University

- Wilkes University Dean's List — Fall 2012-Spring 2016.
- Received the James DeCosmo Award in Mathematics — Spring 2016
- Received the Frederick E. Bellas Award for Outstanding Physics Student — Spring 2016
- Received the College of Science and Engineering Outstanding Student Award — Spring 2016

COMPUTER SKILLS

- Matlab
- Data analysis with Matlab, Python, Mathematica, R, MySQL.
- Python (including scientific programming with Scipy, Numpy, Pandas, Matplotlib).
- UNIX Command-line and Bash for automated data analysis.
- Molecular dynamics simulation with Gromacs and OpenMM.
- Molecular visualization with PyMOL and VMD.
- Master-Equation Modeling with MSMBuilder and PyEMMA.

RELEVANT COURSEWORK

- BIOL 575: Bench to Bedside: Translational Molecular Research
- BINF 760: Machine Learning for Bioinformatics
- CSI 786: Molecular Dynamics
- MATH 625: Numerical Linear Algebra
- MATH 675: Linear Analysis
- MATH 677: Ordinary Differential Equations
- MATH 678: Partial Differential Equations
- MATH 685: Numerical Methods
- MATH 686: Numerical Solutions to Differential Equations
- MATH 689: Bifurcation Theory
- MATH 689: Computational Learning and Discovery
- MATH 689: Deep Learning and Optimization with PDEs
- MATH 689: Differential Equations and UQ in Data Science
- MATH 689: Dynamics and Stability of Nonlinear Waves
- MATH 689: Topics in Mathematics of Data Science
- MATH 776: Measure and Integration
- MATH 781: Advanced Topics in Applied Math

ORAL PRESENTATIONS

- "Inferring Dynamics of Biological Systems", July 11, 2022
  SIAM Conference on the Life Sciences,
  Pittsburg, PA
- "Inferring Dynamics of Biological Systems", May 18, 2022
  Biology and Medicine through Mathematics (BAMM!),
  Richmond, VA
- "Network Analysis of Biological Systems: Adaptation and Inferring Dynamics,
  3 Minute Thesis (3MT) Competition, George Mason University, April 8, 2022
  Fairfax, VA
- "Singular Jacobians and Their Effect on Adaptation in Biological Networks",
  Joint Mathematics Meeting, April 6, 2022
  Online
- "Network Analysis of Biological Systems: Adaptation and Inferring Dynamics,"
  Industrial Immersion Program, January 28, 2022
  Student Research Talks, George Mason University
  Fairfax, VA
- "Singular Jacobians and Their Effect on Adaptation in Biological Networks",
  We Speak: Early-Career Mathematicians Lightning Talks, September 24, 2021
  Association for Women in Mathematics,
  Online
- "Adaptability Conditions in Biological Networks", January 18, 2020
  Joint Mathematics Meeting, Denver, CO
- "Adaptability Conditions in Biological Networks", September 13, 2019
  Student Research Talks, George Mason University, Fairfax, VA
- "An Introduction to Robust Perfect Adaptation Networks", March 1, 2019
  student Research Talks, George Mason University, Fairfax, VA
- "Dirac Measure", George Mason University, Fairfax, VA October 4, 2017

- "Numerical Solutions to Nonlinear Equations", May 26, 2017
  George Mason University, Fairfax, VA

POSTER PRESENTATIONS

- "Inferring Dynamics of Biological Systems", July 12, 2022
  AWM Poster Session at the SIAM Annual Meeting,
  Pittsburgh, PA
- "Inferring Dynamics of Biological Systems", April 8, 2022
  AWM Poster Session at the Joint Mathematics Meeting,
  Online
- "Deep Learning on Embedded Protein-Protein Interaction
  Networks to Prioritize Disease Targets", August 5, 2021
  National Institutes of Health Summer Research Presentations,
  Bethesda, MD
- "Mathematical Conditions for Adaptation in Biological Networks",
  AWM Poster Session at the SIAM Annual Meeting, July 10, 2020
  Online
- "Mathematical Conditions for Adaptation in Biological Networks",
  Southeast Center for Mathematical Biology Symposium, February 17, 2020
  Atlanta, Georgia
- "Exploring Robust Perfect Adaptation", January 28, 2019
  Southeast Center for Mathematical Biology Symposium, Atlanta, Georgia