Adam Rumpf

Instructor of Applied Mathematics
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Education

2020 Ph.D. in Applied Mathematics
Illinois Institute of Technology, Chicago, IL

Dissertation Title: Mathematics of Civil Infrastructure Network Optimization
Advisor: Hemanshu Kaul, Ph.D., Illinois Institute of Technology

2011 B.S. in Applied Mathematics for the Life and Social Sciences, Minor in Geological Sciences
Arizona State University, Tempe, AZ

Publications

2022 H. Kaul and A. Rumpf. A linear input dependence model for interdependent networks. *European Journal of Operational Research*, 302(2):781–797, doi:10.1016/j.ejor.2022.01.020.

2021 A. Rumpf and H. Kaul. A public transit network optimization model for equitable access to social services. In *Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO'21)*, October 5–9. Association for Computing Machinery, New York, NY, doi:10.1145/3465416.3483288.

2011 J. Ames, A. Feiler, G. Mendoza, A. Rumpf, and S. Wirkus. Determination of Tuscon, Arizona as an Ecological Trap for Cooper's Hawks (Accipiter cooperii).

Poster session award recipient at the 2011 Ana G. Mendez University System (AGMUS) Research Symposium in Tuscon, AZ.

Conference Activity

2024 Getting to the good part: An applications-first approach to Calculus II through differential equations modeling. AMS Special Session on Modeling to Motivate the Teaching of the Mathematics of Differential Equations, Joint Mathematics Meetings 2024, San Francisco, CA, January 3–6.

2022 Trilevel Network Interdiction Game for the Minimum-Cost Flows Problem with Interdependent Networks. 44th Annual Suncoast Regional MAA Meeting, Florida Polytechnic University, Lakeland, FL, December 2.

From math avoider to math curator: How mathematical modeling changed my life. SIMIODE EXPO 2022, Virtual, February 10–13.

2021 A public transit network optimization model for equitable access to social services. Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO'21), Virtual, October 5–9.

2017 Linear input dependence model for interdependent civil infrastructure systems with network simplex based solution algorithm. 31st Midwestern Conference on Combinatorics and Combinatorial Computing, University of West Georgia, Carrollton, GA, October 20–22.

2016 Poster on network simplex based algorithm for the minimum cost flow problem with linear interdependencies. 2016 INFORMS Annual Meeting, Nashville, TN, November 12–16.

Network simplex based algorithm for the minimum cost flow problem with linear interdependencies. Chicago Area SIAM Student Conference 2016, University of Illinois at Chicago, IL, April 16.

Departmental Talks

2022 Optimization-based models for interdependent civil infrastructure networks. Department of Applied Mathematics, Florida Polytechnic University, Lakeland, FL, October 4.

2020 Public transit network optimization with social access objectives. Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL, March 12.

2016 Network simplex based algorithm for the minimum-cost network flow problem with linear interdependencies. Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL, April 26.

Introduction to minimum cost flow and the network simplex algorithm. Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL, April 19.

Research Interests

Operations Research: civil infrastructure planning, public transit planning, disaster preplanning and recovery
Optimization: linear programming, multilevel programming, stochastic programming
Graph Theory: network flows, interdependent networks, network optimization, multilayer network design
Mathematical Biology: dynamical systems models, population ecology, epidemiology

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Teaching Experience

Florida Polytechnic University, Lakeland, FL
Analytic Geometry and Calculus 1 Instructor (2021 – 2023)
Analytic Geometry and Calculus 2 Instructor (2021 – 2024)
Course Coordinator (2023 – 2024)
Analytic Geometry and Calculus 3 Instructor (2022 – 2023)
Course Coordinator (2022 – 2023)
Differential Equations Instructor (2023)
Optimization Theory Instructor (2023)
Designed Initial Version of Course (2023)

Art of Problem Solving Online, URL https://artofproblemsolving.com
Introductory Algebra Instructor (2020 – 2021)
Precalculus Instructor (2020 – 2021)
Introductory Programming and Python Instructor (2020 – 2021)
Introductory Number Theory Instructor (2020 – 2021)

Illinois Institute of Technology, Chicago, IL
Applied Mathematics Teaching Assistant (2012 – 2017)
Introductory Calculus Instructor (2015)
Precalculus Instructor (2014)

Ferris State University, Big Rapids, MI
Mathematics and Science Tutor (2011 – 2012)

Service to Profession

Open Access Educational Resources
QUBES Hub Resources (2021 – present), URL https://qubeshub.org/community/members/23700/contributions
Python Packages (2021 – present), URL https://pypi.org/user/arumpf
Mathematical Games (2019 – present), URL https://adam-rumpf.itch.io
Wolfram Demonstrations (2017 – 2018), URL demonstrations.wolfram.com/author.html?author=Adam+Rumpf

SIMIODE Challenge Using Differential Equations Modeling (SCUDEM)
Volunteer Judge (2021 – 2023)

Departmental Service

Department of Applied Mathematics, Florida Polytechnic University, Lakeland, FL
Calculus Reform Committee (2022 – 2024)
Mathematics Placement Committee (2022)
Undergraduate Mathematical Modeling Competition Team Coordinator (2022 - 2024)

Department of Applied Mathematics, Illinois Institute of Technology, Chicago, IL
SIAM Student Chapter President (2016 – 2017)
    Awarded a SIAM Student Chapter Certificate of Recognition (2017)
Chicago Area SIAM Student Conference Organizing Committee (2016 – 2017)
SIAM Student Chapter Vice President (2015 – 2016)

Related Professional Skills

Programming Languages: Python, C++
Mathematical Software: Mathematica, CPLEX, MATLAB
Markup Languages: LaTeX, HTML

Professional Affiliations

Systemic Initiative for Modeling Investigations & Opportunities with Differential Equations (SIMIODE)
Member (2021 – present)

Society for Industrial and Applied Mathematics (SIAM)
Member (2015 – present)