



# Adam Rumpf

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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

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## Publications

- 2022     H. Kaul and A. Rumpf. Trilevel network interdiction game for the minimum cost flow problem with linear input dependence. In preparation.
- 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](https://doi.org/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](https://doi.org/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*). URL <https://mtbi.asu.edu/2011-2>.
- Poster session award recipient at the 2011 Ana G. Mendez University System (AGMUS) Research Symposium in Tuscon, AZ.

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## Conference Activity

- 2022     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.

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## Departmental Talks

- 2022      Informational meeting for the [COMAP Mathematical Contest in Modeling \(MCM\)](#). Department of Applied Mathematics, Florida Polytechnic University, Lakeland, FL, January 27.
- 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.

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## 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)

Analytic Geometry and Calculus 2 Instructor (2021 – 2022)

Analytic Geometry and Calculus 3 Instructor (2022)

**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)

Mathematics and Python Teaching Assistant (2019 – 2020)

**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)

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## 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](https://demonstrations.wolfram.com/author.html?author=Adam+Rumpf)

### SIMIODE Challenge Using Differential Equations Modeling (SIMIODEM)

Volunteer Judge (2021)

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## Departmental Service

### Department of Applied Mathematics, Florida Polytechnic University, Lakeland, FL

Analytic Geometry and Calculus 3 Course Coordinator (2022)

Calculus Reform Committee (2022)

Mathematics Placement Committee (2022)

### 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)

Student Chapter Vice President (2015 – 2016)

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## Related Professional Skills

**Programming Languages:** Python, C++

**Mathematical Software:** Mathematica, Jupyter Notebook, CPLEX, MATLAB

**Markup Languages:**  $\text{\LaTeX}$ , HTML

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## Professional Affiliations

### Systemic Initiative for Modeling Investigations & Opportunities with Differential Equations (SIMIODEM)

Member (2021 – present)

### Institute for Operations Research and the Management Sciences (INFORMS)

Member (2021 – present)

### Society for Industrial and Applied Mathematics (SIAM)

Member (2015 – present)