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Education

University of Illinois Urbana-Champaign (Illinois), Urbana, IL
- Ph.D., Computer Science — Aug 2023
  Advisor: Sheldon H. Jacobson
  Thesis: "Graph Partitioning: Redistricting Games & the Spherical Zoning Problem"

Rose-Hulman Institute of Technology (RHIT), Terre Haute, IN
- B.S., Computer Engineering & Mathematics — Nov 2016

Experience

Rose-Hulman Institute of Technology (RHIT), Terre Haute, IN — Aug 2023 – Present
- Assistant Professor of Computer Science and Software Engineering

Honors

NSF Graduate Research Fellow	2019–2023
Outstanding Teaching Assistant–Lifetime, Illinois CS	Spring 2022
Finalist – *Research Live!*, Illinois Graduate College	Spring 2022
Graduate Teacher Certificate, Illinois CITL	Spring 2021
Mavis Future Faculty Fellow, Grainger College of Engineering	2020–2021
Outstanding Teaching Assistant, Illinois CS	Fall 2019
Saburo Muroga Endowed Fellowship, Illinois CS	2017–2018

Teaching

Rose-Hulman Institute of Technology
- CSSE/MA 474: Theory of Computation — Spring 2024
- CSSE/MA 474: Theory of Computation — Winter 2023-24
- CSSE 220: Object-Oriented Software Development — Fall 2023

Instructor of Record, Illinois CS
- CS 173: Discrete Structures (Section AL1, asynchronous online) — Summer 2020

Teaching Assistant, Illinois CS
- CS 482/IE 413: Simulation — Spring 2021
- CS 482/IE 413: Simulation — Spring 2020
- ⋆ CS 374: Algorithms & Models of Computation — Fall 2019
- CS 482/IE 413: Simulation — Spring 2019
- CS 481/IE 410: Stochastic Processes — Fall 2018
- ⋆ CS 173: Discrete Structures — Spring 2018
- ⋆ CS 173: Discrete Structures — Fall 2017

Course Aide, Grainger College of Engineering
- ENG 598 TL: Teaching and Leadership — Fall 2019 – Spring 2023

⋆ — Recognized in the CITL List of Teachers Ranked as Excellent

Service

Social Media + Newsletter Committee, RHIT CSSE — Sep 2023 – Present
- Collaborate with other committee members to write, edit, and distribute monthly Student Spotlight newsletter

Application Reviewer for Noblitt Scholars Program — Jan 2024
- Reviewed eight applicant videos and materials as part of the selection process

Grad Fellow, CRA-E Committee — June 2020 – June 2022
- Manage, write, and edit Undergraduate Research Highlights for CRA-E website
- Plan and deliver webinar for undergraduates considering a PhD in CS
- Provide graduate student perspective on CRA-E activities during annual meeting

Community Computer Lab Volunteer, Salt & Light — July 2021 – Mar 2023
- Supervise public computer lab of not-for-profit grocery and thrift store
- Develop and deliver training program for REcompute refurbished laptop recipients

PURE Program Mentor — Fall 2020
- Mentor three undergraduate students on redistricting visualization project
- Cultivate research skills, e.g., reading papers, using Git, and presenting results

Grad Academy for College Teaching Volunteer, Illinois CITL — Fall 2018 – Spring 2023
- Facilitate pre-semester small-group session for new CS teaching assistants

Journal reviewing — 2019 – Present
- *The American Statistician*
- *Computational Optimization and Applications*
- *Computers and Operations Research*
- *Discrete Optimization*
- *Journal of Air Transport Management*
- *Journal of Computational Social Science*
- *Journal of Quantitative Analysis in Sports*
- *Networks*

Peer-reviewed Journal Papers

1. Swamy, R., D.M. King, **I.G. Ludden**, K.W. Dobbs, and S.H. Jacobson (2024). "A practical optimization framework for political redistricting: A case study in Arizona." *Socio-Economic Planning Sciences*, 92. DOI: 10.1016/j.seps.2024.101836.
2. Dobbs, K.W., R. Swamy, D.M. King, **I.G. Ludden**, and S.H. Jacobson (2024). "An Optimization Case Study in Analyzing Missouri Redistricting." *INFORMS Journal on Applied Analytics*, 54(2):162-187. DOI: 10.1287/inte.2022.0037.
3. **Ludden, I.G.**, D.M. King, and S.H. Jacobson (2023). "3D geo-graphs: Efficient flip verification for the spherical zoning problem." *Discrete Applied Mathematics*, 338:329-346. DOI: 10.1016/j.dam.2023.07.004.
4. **Ludden, I.G.**, R. Swamy, D.M. King, and S.H. Jacobson (2023). "A Bisection Protocol for Political Redistricting." *INFORMS Journal on Optimization*, 5(3):233-255. DOI: 10.1287/ijoo.2022.0084.
5. **Ludden, I.G.**, S.H. Jacobson, and J.A. Jokela (2022). "Excess Deaths by Sex and Age Group in the First Two Years of the COVID-19 Pandemic in the United States." *Health Care Management Science*. DOI: 10.1007/s10729-022-09606-3.
6. Pavlik, J.A., **I.G. Ludden**, and S.H. Jacobson (2021). "SARS-CoV-2 aerosol risk models for the Airplane Seating Assignment Problem." *J Air Trans Mgmt*, 99. DOI: 10.1016/j.jairtraman.2021.102175.
7. Pavlik, J.A., **I.G. Ludden**, S.H. Jacobson, and E.C. Sewell (2021). "Airplane Seating Assignment Problem." *Service Science*, 13(1):1-52. DOI: 10.1287/serv.2021.0269.
8. **Ludden, I.G.**, A. Khatibi, D.M. King, and S.H. Jacobson (2020). "Models for Generating NCAA Men's Basketball Tournament Bracket Pools." *JQAS*, 16(1):1-15. DOI: 10.1515/jqas-2019-0022.

Peer-reviewed Conf. Papers

9. Deshpande, S.P., **I.G. Ludden**, and S.H. Jacobson (2023). "Votemandering: Strategies and Fairness in Political Redistricting." *Third ACM conference on Equity and Access in Algorithms, Mechanisms, and Optimization (EAAMO'23)*.

Presentations

INFORMS Optimization Society Conference (IOS) — Mar 2024
- Session SunB3 – Topics in mixed integer programming
- "A Bilevel Mixed-Integer Program for the Define-Combine Redistricting Procedure"

Wabash College Math/CS Colloquium — Oct 2023
- "Connected Recursive Bisection and Perfect Hierarchical Matchings"

INFORMS Annual Meeting — Oct 2022
- Session TD09 – PSOR Flash Session
- "A Bilevel Define-Combine Formulation with Applications to Political Redistricting"

INFORMS Computing Society Conference (ICS) — Jan 2022
- Session MB4 – Network Applications
- "Analyzing and Modeling the Define-Combine Procedure for Political Redistricting"

INFORMS Annual Meeting — Oct 2021
- **Chair**: Session WE25 – Combinatorial Optimization
- "3-D Geo-graphs: Efficient Flip Verification for 3-D Graph Partitioning"

INFORMS Annual Meeting — Oct 2019
- Session WC43 – Political Redistricting
- "A Bisection Protocol for Political Redistricting"

Consulting

Project PRE.CISE — Summer 2021
- Organize eight-week program (workshops, panels) for NSF REU Supplement students
- Objectives: build community; inform students of grad school and research careers
- Collaboration between CRA-E, CERP, and NSF CISE directorate

Industry Experience

Software Engineer, PilotFish Technology (Tampa, FL) — Jan–Aug 2017
- Integration platform development (Java, XML/XPath)

Computer Science Intern, LGS Innovations (Tampa, FL) — Summer 2016
- Communication system modeling (MATLAB)

Software Engineer Intern, Garmin Intl. (Olathe, KS) — Summer 2015
- Embedded development for GPS fitness watches (C)

Programming Intern, FitzMark, Inc. (Indianapolis, IN) — Summer 2014
- Dispatch application development