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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 220: Object-Oriented Software Development — Fall 2024
- 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

Session Facilitator for RHIT August Teaching Workshop — Aug 2024
- Plan & facilitate "Classroom Assessment" session for new/returning faculty

Application Reviewer for Noblitt Scholars Program — Jan 2024
- Review 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

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*
- *Optimization Letters*
- *Networks*

Peer-reviewed Journal Papers

1. Dobbs, K.W., D.M. King, **I.G. Ludden**, and S.H. Jacobson (2024). "Facilitating Compromise in Redistricting with Transfer Distance Midpoints." *INFORMS Journal on Optimization*, 0(0). DOI: 10.1287/ijoo.2023.0029.
2. 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.
3. 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.
4. **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.
5. **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.
6. **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.
7. 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.
8. 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.
9. **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

10. 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"

Mentoring

Daniel Leverett (RHIT) — Dec 2023 – Present
- Rose Research Fellow project on social deduction games

Akaash Kolachina and Kylie Zhang (UIUC) — Fall 2020
- PURE Program project on redistricting visualization

Outreach

Python Instructor for Connecting With Code 2024 — Summer 2024

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