Ian G. Ludden

Contact Information

2503 Burlison Dr.
Urbana, IL 61801

813-410-1021
iludden2@illinois.edu

Education

University of Illinois Urbana-Champaign (Illinois), Urbana, IL
- Ph.D., Computer Science, GPA 4.00 *Expected:* May 2023
  Advisor: Sheldon H. Jacobson
  Thesis: "Graph Partitioning: Redistricting Games and the Spherical Zoning Problem"

Rose-Hulman Institute of Technology (RHIT), Terre Haute, IN
- B.S., Computer Engineering & Mathematics, GPA 4.00 Nov 2016

Research Interests

Incorporating techniques from algorithmic game theory, graph theory, and combinatorial optimization, my dissertation evaluates potential reforms to political redistricting and introduces a tool for 3D graph partitioning. Side projects apply data science to glean insights from sports data and public health reports. My research generally seeks to combine techniques from theoretical computer science and operations research to tackle challenging problems facing our society.

Honors

NSF Graduate Research Fellow	2019–Present
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

Publications

1. **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.
2. 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.
3. 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.
4. **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.

Submitted Journal Papers

1. **Ludden, I.G.**, R. Swamy, D.M. King, and S.H. Jacobson (2022). "A Bisection Protocol for Political Redistricting." In revision.
2. **Ludden, I.G.**, D.M. King, and S.H. Jacobson (2022). "3D Geo-graphs: Efficient Flip Verification for the Spherical Zoning Problem." With referees.

Papers in Preparation

1. **Ludden, I.G.**, D.M. King, and S.H. Jacobson. "Analyzing and Modeling the Define-Combine Procedure for Political Redistricting."
2. **Ludden, I.G.**, K. Chandrasekaran, and S.H. Jacobson. "Recursive Bisection and Perfect Hierarchical Matchings."

Presentations

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"

Teaching

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

Teaching Assistant, Illinois CS — Spring 2021
- CS 482/IE 413: Simulation
  Instructor: Prof. Sheldon H. Jacobson

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

Teaching Assistant, Illinois CS — Spring 2020
- CS 482/IE 413: Simulation
  Instructor: Prof. Sheldon H. Jacobson

⋆Teaching Assistant, Illinois CS — Fall 2019
- CS 374: Algorithms & Models of Computation
  Instructor: Prof. Jeff Erickson

Teaching Assistant, Illinois CS — Spring 2019
- CS 482/IE 413: Simulation
  Instructor: Prof. Sheldon H. Jacobson

Teaching Assistant, Illinois CS — Fall 2018
- CS 481/IE 410: Stochastic Processes
  Instructor: Prof. Sheldon H. Jacobson

⋆Teaching Assistant, Illinois CS — Spring 2018
- CS 173: Discrete Structures
  Instructor: Prof. Margaret M. Fleck

⋆Teaching Assistant, Illinois CS — Fall 2017
- CS 173: Discrete Structures
  Instructor: Prof. Madhusudan Parthasarathy

In semesters marked with ⋆, I was recognized in the CITL List of Teachers Ranked as Excellent.

Professional 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

Service

Computing Research Assoc. Education Committee Grad Fellow 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 planning meeting

Community Computer Lab Volunteer, Salt & Light July 2021 – Present
- 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 – Present
- Facilitate pre-semester small-group session for new CS teaching assistants

Journal reviewing 2019 – Present
- *Networks*
- *Computers and Operations Research*
- *The American Statistician*

Consulting

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