

Sami Davies

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EDUCATION

- University of Washington** September 2016 - present
Ph.D. in Mathematics
3.86/4.0
- University of Illinois at Chicago** August 2015 - July 2016
M.S. in Mathematics (enrolled in Ph.D. program)
3.84/4.0
- Carnegie Mellon University** August 2011 - May 2015
B.S. in Mathematical Sciences, minor in Economics
College and University Honors
3.78/4.0

CURRENT PROJECTS

- The Santa Claus Problem** October 2017 - present
Thomas Rothvoss: UW
- Constructing an approximation algorithm for the Santa Claus problem, a variant of the classic NP-complete jobs/machines scheduling problem
 - Primarily using techniques from matroid optimization and graph theory

PAST PROJECTS

- Mechanism Design: Healthcare & the FedEx Problem** June 2017 - October 2017
Anna Karlin: UW
- Examined economists' work in adverse and advantageous selection settings to understand the issues arising in healthcare allocation from the perspective of mechanism design
 - Designed and proved results for a deterministic algorithm for the FedEx problem, which seeks to design a pricing system for package deliveries
- Planted Clique** October 2015 - June 2016
Lev Reyzin: UIC
- Studied variants of the planted clique problem and other graph distinguishing problems using statistical algorithms
- Knight's Tours on Aztec Diamonds** February 2015 - May 2015
Carl Yeger: CMU and Davidson College
- Implemented algorithms that find knight's tours on small Aztec diamonds
 - Proved traditional inductive arguments for knight's tours fail for Aztec diamonds

Examining Euler Equations
Johnny Guzman: Brown University

June 2014 - August 2014

- Research was performed under the Leadership Alliance Summer Research Program at Brown University, which aims to prepare underrepresented groups for graduate school
- Numerically and analytically examined the behavior of solutions of the one dimensional generalized model vorticity equation

Binomial Coefficients with the Bhargava Factorial
Gregory Johnson: CMU

June 2013 - August 2013

- Research was performed during the 2013 Summer Undergraduate Applied Mathematics Institute at CMU
- Discovered properties in binomial coefficients produced using the factorial defined by Manjul Bhargava over geometric progressions

PUBLICATIONS AND PRESENTATIONS

1. Samantha Davies, Chenxiao Xue, Carl R. Yerger, "Algorithms for finding knight's tours on Aztec diamonds," *Involve, a Journal of Mathematics*, Vol. 10 (2017), No. 5, 721-734.
2. *On Globally Defined Solutions of the Generalized Constantin-Lax-Majda Equations*. MAA Undergraduate Poster Session: 2015 Joint Mathematics Meeting. Joint presentation with Gopal Yalla.
3. *On Globally Defined Solutions of the Generalized Constantin-Lax-Majda Equations*. 2014 Leadership Alliance National Symposium.
4. *Searching for Combinatorial Interpretations Using the Bhargava Defined Factorial*. 2013 Summer Undergraduate Applied Mathematics Institute Symposium. Joint presentation with Joe Gault.

AWARDS AND FELLOWSHIPS

Craig McKibben and Sarah Merner Endowed Fellowship in Mathematics: UW
September 2017

Awarded to two students who were exceptional in their preliminary exams and first year courses

Department of Mathematics, Statistics, and Computer Science Fellowship: UIC
August 2015

Awarded to outstanding incoming first year students in the department of MSCS at UIC

Senior Leadership Recognition Award: CMU
May 2015

One of 40 students honored for making significant contributions to CMU's community

Leadership Alliance Scholar
July 2014

The Leadership Alliance selects talented undergraduates from underrepresented groups with the aim to provide them mentorship and resources to becoming leaders in academia and industry.

TEACHING

Math 111*	Algebra with Applications	UW Fall 2017
Math 124*	Calculus I	UW Winter & Spring 2017
Math 126**	Multivariable Calculus	UW Fall 2016
Math 121*	Pre-Calculus	UIC Fall 2015 & Spring 2016
21-241**	Matrices and Linear Transformations	CMU Spring 2015

* : Taught 2 active learning styled sections twice each week, held weekly office hours, graded exams and weekly quizzes.

** : Taught 2 lecture styled sections twice each week, held weekly office hours, graded exams and weekly quizzes.

VOLUNTEER AND LEADERSHIP EXPERIENCE

Freedom Education Project Puget Sound

September 2017 - present

Tutoring math weekly to students at the Washington Corrections Center for Women

Community Advisor for Morewood Gardens

August 2014 - May 2015

Lead the house staff in the development of a shared house vision for 470 residents, while serving as an active point of interface between the house community and the greater CMU community

PROGRAMMING LANGUAGES

Intermediate in in \LaTeX , Python, Julia

Novice in Matlab, Maple, Ruby, Java

SELECTED TOPICS COURSEWORK

Carnegie Mellon University:

Operations Research	Linear Algebra (2 semesters)	Mathematical Finance (2 semesters)
Graph Theory	Probability (2 semesters)	Adv. Macroeconomic Theory
Market Design	Numerical Methods	Adv. Microeconomic Theory

University of Illinois at Chicago:

Probabilistic Method	Foundations in Data Science	Adv. Computer Algorithms
Discrete Geometry	Measure Theory	

University of Washington:

Counting & Sampling Adv. Linear Algebra (2 quarters) Optimization

Preliminary exams passed at UW in Complex Analysis and Algebra in September 2017