Sam Stewart

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Education

PhD Candidate, Math, University of Minnesota (Minneapolis, MN).	2020
MS, Math, University of Minnesota (Minneapolis, MN).	2017
BS, Math, Lewis & Clark College (Portland, OR).	2011-2015
Budapest Semesters in Mathematics (Budapest, Hungary).	2014

- Took three graduate level classes
- Studied Hungarian and interacted with local culture via language exchange program

Research Experience

Graduate Research Assistant (Minneapolis, MN)   2015-2020

- **PhD Project**: Designing fast algorithm for simulating a crowd model inspired by fluid dynamics. Proving that algorithm is well-posed.
- **Masters Project**: Implemented spectral method in Matlab to obtain numerical evidence of attractor solutions for a fluid model. Proved existence of attractor solutions using techniques from spectral theory and published the results in top journal.

Summer Undergraduate Research Experiences (Portland, OR)   2012-2015

- **Summer 2014**: Coded a custom PDE solver in Python / Numpy for a nonlinear wave equation to find numerical evidence of blowup and presented my results at the Joint Mathematical Meetings.
- **Summer 2013**: Developed custom library in Mathematica to search through thousands of graphs to help prove a statistical classification condition. Published classification result in undergraduate journal.
- **Summer 2012**: Wrote statistical compression algorithm for a Computer Go player that significantly reduced memory usage and published the results in AI journal. Built and deployed a parallelized Computer Go player across a cluster of five machines to compare voting schemes.

Work Experience

Tractors for Africa (Burkina Faso)   2017

- Acted as language and cultural liaison between US team and local team in a rural town in Burkina Faso.
- Wrote weekly reports for US team
- Managed finances of local team and coordinated funds with US team

Contract Developer, Upsight Analytics (Portland, OR)   2013-2015

- Wrote Android advertising framework that served millions of ads per month
- Built an automated UI testing framework
- Mentored junior developers
- Patched high-pressure bugs in both iPhone and Android SDKs

iPhone Development Intern, Yelp Reservations (San Francisco, CA)   2011

- Wrote core UI components for main application now used by hundreds of restaurants.

Teaching

Teaching Assistant, Calculus I & II   2015-2017

- Taught thirty students each semester
- Organized groupwork among students
- Conducted office hours to help students solve homework problems

Publications

Mathematics

- "De Gregorio's Equation: a 1D model of Euler equations with Swirl". Hoa, J; Stewart, S; Sverak, V. *Archive for Rational Mechanics and Analysis* 2 (2019): 1269-1304. Print
- "Orbigraphs - Graph Theoretic Analogue of Orbifolds". Daly, K; Gavin, C; Montes de Oca, G; Ochoa, D; Stanhope, E; Stewart, S. To appear in *Involve, a Journal of Mathematics.*

Computer Science

- "Two Online Learning Playout Policies in Monte Carlo Go: An Application of Win/Loss State." Basaldua, J; Stewart, S; Moreno-Vega, JM; Drake, PD. *IEEE Transactions on Computational Intelligence and AI in Games* 1 (2014): 46-54. Print.

Presentations

Public Audience

- Presented "Lost in the Crowd: How Mathematicians Model Crowds" at Cafe Scientifique, Duluth, MN, Nov 29, 2018.
- Presented "The Beautiful Problem of Turbulence" at Café Scientifique, Minneapolis, MN, Jan 17, 2017.

Academic Audience

- Presented "Wave Equations with Quadratic Nonlinearities" at the Joint Mathematical Meetings, San Antonio, TX, Jan 10-13, 2015.

Posters

- "Cellular Automata Models of Dense Crowds", Pedestrian Dynamics: Modeling, Validation, and Calibration, Brown University, Providence, RI. Aug 21 - 25, 2017.

Skills

- **Programming:** Linux, Git, Python, C/C++, Mathematica, Matlab, R, Julia, Java, Vim, LaTeX
- **Math:** PDEs, convex optimization, numerical PDE
- **Software:** Excel, Word, PowerPoint, Blender3D
- **Languages:** French (professional working proficiency)

Awards

NDSEG Fellowship   2017

Competitive (<10% awarded) Department of Defense fellowship with four years of full funding.

NSF Fellowship Honorable Mention   2016
Phi Beta Kappa   2015

Service

Professional

- Associate Social Event Organizer for the Council of Graduate Students, 2016.

Community

- Volunteer, Alliance Francaise, Minneapolis, MN. 2018-Present