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

Extremely competitive 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