# Sam Stewart

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## Education

2020

**PhD Candidate, Math, University of Minnesota** (Minneapolis, MN)

2017

**MS, Math, University of Minnesota** (Minneapolis, MN)

2011-2015

**BS, Math, Lewis & Clark College** (Portland, OR)

2014

**Budapest Semesters in Mathematics** (Budapest, Hungary)

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

## Research Experience

2015-2020

**Graduate Research Assistant (Minneapolis, MN)**

* **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

2012-2015

**Summer Undergraduate Research Experiences (Portland, OR)**

* **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

2017

**Tractors for Africa (Burkina Faso)**

* 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

2013-2015

**Contract Developer, Upsight Analytics (Portland, OR)**

* 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

2011

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

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

## Teaching

2015-2017

**Teaching Assistant, Calculus I & II**

* 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

2017

**NDSEG Fellowship**

Extremely competitive Department of Defense fellowship with four years of full funding

2016

**NSF Fellowship Honorable Mention**

2015

**Phi Beta Kappa**

## Service

**Professional**

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

**Community**

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