

Samuel Stewart

Tools: Unix, Git, Python, C++, Mathematica, Matlab, R, Julia, Java
Math: PDEs, convex optimization, numerical methods

Relevant Experience

- 2018-Current **A discrete contact model for crowd simulation**
Fast numerical algorithm and well-posedness results for a crowd model (Matlab, Julia, Mathematica).
- 2015 - 2017 **1D De Gregorio Model for Euler Equations with Swirl**
Pseudo-spectral method to obtain numerical evidence of global attractor solutions. Proved local stability of attractors (Matlab).
- Summer 2017 **Tractors for Africa**
Worked with NGO "Tractors for Africa" in Burkina Faso as translator.
- Summer 2014 **Singularities of Quadratic Nonlinear Wave Equations**
PDE solver with conformal compactification to handle boundary (Python / NumPy).
- Summer 2013 **Orbigraphs - Graph Theoretic Analogues of Orbifolds**
Proved geometric classification via Markov Chain theory (Mathematica).
- Spring 2013 **Root-Parallelized Computer Go**
Parallelized Computer Go player on a cluster of five machines (Java).
- Summer 2012 **Win/Loss State Optimization**
Compression algorithm during freshman summer for computer Go (Java).
- Fall 2013 - Fall 2015 **Android / iPhone Development**
Android / iPhone developer for Upsight Analytics (Portland, OR) during college. Wrote their entire Android client in a month, built an automated UI testing framework, and mentored junior developers (Java, Objective-C).

Publications and Talks

- 2019 "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*.
- 2018 "Lost in the Crowd: How Mathematicians Model Crowds" (Public outreach talk at Duluth Cafe Scientifique and University of Minnesota-Duluth)
"Cellular Automata models of dense crowds", poster at ICERM Conference on Crowd Modeling, Brown University.
- 2017 "The Beauty of Fluid Dynamics" (Public outreach talk at Minneapolis Café Scientifique)
- 2012 "Two Online Learning Payout 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.

Education

- 2017-2020 **PhD in Mathematics at University of Minnesota** (Minneapolis, MN).
Speciality: fluids, granular media, convex optimization.
Advisor: [Vladimir Sverak](#).
- 2015-2017 **Masters in Mathematics** (Minneapolis, MN).
Masters Thesis: "De Gregorio's Equation: a 1D model of Euler equations with Swirl"

2011-2015 **BA in Mathematics at Lewis & Clark College** (Portland, OR).
Honors Thesis Title: Wave Equations with Quadratic Nonlinearities
Advisor: [Paul T. Allen](#)

2013-2014 **Budapest Semesters in Mathematics** (Budapest, Hungary).

Awards

2017-2021 National Defense Science and Engineering Graduate Fellowship.
2016 National Science Foundation Graduate Student Fellowship Honorable Mention
2015 John Ordway Departmental Fellowship
2014 Phi Beta Kappa, Pi Mu Epsilon (honors in mathematics)

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