Samuel Stewart

Specialties: PDEs, Python, C++, Mathematica, Matlab
PhD Candidate in Pure Math

Research

Since 2016	**High-density crowd dynamics**
	Developing simulation in Julia and Python with my advisor.
2015 - 2016	**1D De Gregorio Model for Euler Equations with Swirl**
	Pseudo-spectral methods to obtain numerical evidence of attractor solutions. My advisor, Prof Jia at IAS, and I proved local linear stability.
2014 (3 months)	**Singularities of Quadratic Nonlinear Wave Equations**
	Wrote a PDE solver (Python + NumPy) with conformal compactification.
2013 (3 months)	**Orbigraphs - Graph Theoretic Analogues of Orbifolds**
	Wrote library in Mathematica for testing conjectures computationally. Used Markov Chain theory to prove surprising classification result. 2013 (5 months)
	Root-Parallelized Computer Go
	Parallelized Computer Go player on a cluster of five machines.
2012 (3 months)	**Win/Loss State Optimization**
	Implemented statistical compression algorithm during freshman summer for my advisor's Computer Go player.

Publications and Talks

2017	*The Beauty of Fluid Dynamics* (Public outreach talk at Minneapolis Café Scientifique) *Why you should study pure math in grad school*. Outreach talk at Normandale community college.
2016	*Pseudo-spectral methods in Matlab*. PDE seminar.
	Realtime fluid simulation with WebGL in Google Chrome. Talk at PDE seminar.
	De Gregorio's Equation: a 1D model of Euler equations with Swirl. Paper in preparation with Sverak, Vladimir; Stewart, S; Jia, H.
2015	*Singularities of Nonlinear Wave Equations with Quadratic Nonlinearities*. Senior thesis with Paul T. Allen.
	Wave Equations with Quadratic Nonlinearities. JMM.
	Does water blow-up?. Lewis & Clark Fesitval of Scholars.
2013	*Introduction to programming in R*. Supported by small grant from my advisor.
	Orbigraphs - Graph Theoretic Analogue of Orbifolds. (Young Mathematicians Conference)
2012	*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.

Education

2015-Current	**PhD in Mathematics at University of Minnesota** (Minneapolis, MN).
	Speciality: crowd dynamics.
	Advisor: Vladimir Sverak.
	Expected graduation Spring 2019.
2011-2015	**BA in Mathematics at Lewis & Clark College** (Portland, OR).
	Honors Thesis Title: Wave Equations with Quadratic Nonlinearities
	Advisor: Paul T. Allen
	3.78 general GPA and 3.84 GPA in Mathematics.
2013-2014	**Budapest Semesters in Mathematics** (Budapest, Hungary).

Awards

2016	NSF GRFP Honorable Mention
2015	John Ordway Departmental Fellowship (small supplemental fellowship)
2014	Dean's List
	Pi Mu Epsilon (national math honor society)
	Phi Beta Kappa
2012	Best Machine Learning Poster at NW-CCSC

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