

MATT BIERBAUM

PHYSICS | SIMULATION | WEB

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EDUCATION

- 2009 - 2015 **Cornell University** - Ph.D. Physics, advisor James P. Sethna
- 2009 - 2012 **Cornell University** - M.S. Physics, advisor James P. Sethna
- 2005 - 2009 **Northwestern University** - B.A. Physics and Integrated Science, advisor Frederic Rasio

RESEARCH

- Current **Collective motion in moshpits** - describing the phase transition between mosh pit and circle pit
Continuum plasticity - dynamics of line defects in metals using PDEs
Colloidal stresses - developing experimental techniques to measure forces in suspensions
OpenKIM pipeline - developing backend and testing framework for repository of interatomic models
Surface energies - using OpenKIM framework to create broken bond fits to surface energies
Phonon spectra - using symmetries to create small parameter fits for phonon spectra
Smectic A - creation and dynamics of focal conic defects in layered materials
- Past **Zombie disease dynamics** - modeling spread of zombieism across the entire US population
Globular cluster dynamics - formation of intermediate mass black holes in primordial clusters
Hidden paintings - using subsurface scattering to infer paintings below the surface

EXPERIENCE

- General Numerical simulation (PDEs, automata, MC) || High performance computing and GPUs || Constraint satisfaction || Analytical prediction || Data analysis
- Major Python || C / C++ || CUDA || Javascript || Linux || Git || Vim || HTML5 / Canvas || CSS || AWS
- Minor Web{Sockets,Workers} || SQL || MongoDB || Java || GLSL || GIS || Arduino || Blender || etc

HOBBIES

- Daily Bicycles - Carbon road, single speed road, single speed mountain bike
Short films / photography - filming, editing, timelapse
Fun physics - cost of a pot hole, physics of bubbles, projects below
- Projects *Cupgame chaos* - formation of fractals from carnival games || *Plinko simulation* - investigating 'Price is Right' game || *Clicky* - one shared dot for the entire internet || *Onelook* - Ludum dare game uses light as game mechanic || *Billiards* - statistical study of pool shots