

# 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