

MATT BIERBAUM

PHYSICS | SIMULATION | WEB

✉ matt.bierbaum@gmail.com
🐱 mattbierbaum
🌐 hey.runat.me



425 Clark Hall
Cornell University
Ithaca, NY 14850

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 at heavy metal concerts** - describing the phase transition between mosh pit and circle pit, covered by NPR, Times, Atlantic, PopSci, NBC, NatGeo with 0.5M pageviews
 - Continuum plasticity** - dynamics of line defects in metals using PDEs
 - Colloidal stresses** - developing experimental techniques to measure forces in suspensions
 - OpenKIM pipeline** - frontend, backend, and testing framework for repository of interatomic models
 - Surface energies** - using OpenKIM framework to create broken bond fits to surface energies
 - Phonon spectra** - employing 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 & SKILLS

- 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

INTERESTS

- 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