

Ethan T. Coon

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Education

B.S.	Applied Mathematics, University of Rochester, 2003 <i>Phi Beta Kappa, magna cum laude</i>
M.S.	Applied Mathematics, Columbia University, 2004
M.Phil.	Applied Mathematics, Columbia University, 2006
Ph.D. candidate	Applied Mathematics, Columbia University Advisor: Marc Spiegelman

Research Experience

➤ **Student Fellow**

Summer 2006

T-7, Theoretical Division, Los Alamos National Laboratory

Research: Upscaling for multiscale, multiphase porous flow

Advisor: [David Moulton](#)

➤ **Student Researcher**

Summer 2002

Department of Mathematics, James Madison University

Research: Nonlinear elastic deformation in anisotropic materials

Advisor: Debra Warne

➤ **Student Researcher**

Summer 2001

Department of Mathematics, University of Illinois, Urbana-Champaign

Research: Evolutionary game theory

Advisor: Robert Muncaster

Research Interests

- Computational methods for capturing sub grid-scale features in physics-based models, especially modeling discontinuous fields such as those associated with fault networks and tectonic structures and upscaling for porous flow. Typically these methods involve extending finite element spaces to incorporate multiscale effects.
- Geophysical localization of deformation in both mantle and crustal regimes, including viscoelastic shear zone deformation and melt localization. These systems often require nonlinear constitutive equations to describe stress, melt, and temperature weakening mechanisms.

- The development of computational frameworks and software for allowing easier and more efficient production of geophysical models. Ideally these frameworks incorporate meshers, discretization methods, solvers, data input/output, visualization, and other libraries to allow scientists to focus on science.

Computing Experience

- Experience in the development and use of many PDE-based models using various algorithms including finite differences, FEM, and FVEM; structured and unstructured grids; and parallel and serial codes.
- Have contributed to the development of [PETSc](#), a toolkit of solvers and data structures for the solution of PDE-based applications.
- Proficient in C/C++, Python, Fortran, MPI, Matlab, Maple, Mathematica, \LaTeX

Scholarships, Fellowships and Awards

09/2005	- current	DOE Computational Science Graduate Fellow
09/2003	- 08/2005	NSF IGERT Fellow
05/2003		Arthur S. Gale Memorial prize <i>for top graduating mathematician, University of Rochester, 2003</i>
01/2003		First Prize, Undergraduate Poster Session <i>at the 2003 AMS/MAA National Meeting</i>

Selected Publications

- [1] E. T. Coon, D. P. Warne, and P. G. Warne. Asymptotic analysis of finite deformation in a nonlinear transversely isotropic incompressible hyperelastic half-space subjected to a tensile point load. *Journal of Elasticity*, 75(3):197 – 228, June 2004.

Selected Talks

- [1] E. T. Coon, P. B. Kelemen, G. Hirth, and M. Spiegelman. Periodic viscous shear heating instability in fine-grained shear zones: Mechanism for intermediate depth earthquakes. *Eos Trans. AGU*, 86(52):Fall Meet. Suppl., Abstract T14A–05, 2005.
- [2] E. T. Coon, S. P. MacLachlan, and J. D. Moulton. Deflation in two-phase flow through multilevel upscaling. *SIAM Conference on Mathematical and Computational Issues in the Geosciences, Santa Fe, NM*, March 19 – 22, 2007. Invited speaker.