

## Kyle T. Mandli

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### CONTACT INFORMATION

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### EDUCATION

**Ph.D., University of Washington, Applied Mathematics**, June 2011

- Advisor: Randall J. LeVeque
- Thesis: “Finite Volume Methods for the Multilayer Shallow Water Equations with Applications to Storm Surges”

**M.Sc., University of Washington, Applied Mathematics**, June 2005

**B.S. Applied Mathematics, Engineering and Physics, University of Wisconsin**, May 2004

### POSITIONS

Department of Applied Physics and Applied Mathematics, Columbia University

- Assistant Professor, July 2014 - Present.

Institute for Computational and Engineering Science, University of Texas at Austin

- Research Associate, September 2013 - August 2014.
- JTO Fellow, September 2012 - September 2013.
- ICES Postdoctoral Research Fellow, September 2011 - September 2012.

Applied Mathematics Department, University of Washington

- Research Assistant, 2004-2011.
- Teaching Assistant, 2004-2010.

AMANDA (IceCube) project, University of Wisconsin

- Undergraduate research assistant, 2001-2004.

### RESEARCH INTERESTS

Numerical methods for hyperbolic PDEs

Numerical methods for hazardous geophysical flow problems

Modeling of hazardous geophysical flows incorporating computational efficiency

Uncertainty quantification for geophysical flow problems

Software development practices in scientific software such as reproducibility and V&V

### HONORS AND AWARDS

NSF Vigre Graduate Fellow, University of Washington, 2008-2009

Boeing Award for Service, University of Washington, 2007

ARCS Graduate Fellowship, University of Washington, 2004-2007

Top Scholar Award, University of Washington, 2004-2005

Applied Math, Engineering and Physics Leadership Prize, University of Wisconsin, 2003

### GRANTS AWARDED

KAUST Competitive Research Grant Program, 2015.

AMS-MRC Travel award, 2012.

TEACHING  
EXPERIENCE

Assistant Professor -

- **APMA 4301** - Numerical Methods for PDEs (Spring 2016)
- **APMA 4300** - Introduction to Numerical Methods (Fall 2015)
- **APMA 3102** - Applied Mathematics II - Partial Differential Equations (Spring 2015)

Postdoctoral Lecturer -

- **Gene Golub Summer School 2012** - Simulation and Supercomputing in the Geosciences.

Predoctoral Lecturer - Gave lectures, wrote exams and homework, organized class with teaching assistants.

- **Amath 301** - Beginning scientific computing (Spring 2008)
- **Amath 574** - Finite volume methods (Winter 2007)
- **Short Course at Schlumberger** - Finite volume methods and conservation laws (Winter 2008)

Teaching Assistant - Ran discussion sections, held office hours, ran review sessions and graded exams.

- **Amath 301** - Beginning scientific computing (Fall 2008)
- **Math 120** - Precalculus (Fall 2005)
- **Math 124,125,126** - Calculus sequence (Fall 2004, Spring 2005 and 2006, Winter 2010)

OPEN SOURCE  
SOFTWARE  
DEVELOPMENT

**PyClaw** - A scalable nonlinear wave propagation solver in Python.

Available from <http://www.github.com/clawpack/pyclaw>.

**GeoClaw** - A Clawpack based shallow water solver employing adaptive mesh refinement.

Available from <http://www.github.com/clawpack/geoclaw>.

**Clawpack** - Conservation Laws Package, a nonlinear wave propagation solver.

Available from <http://www.github.com/clawpack/>.

**ManyClaw** - Research into exploitation of intra-node parallelism for hyperbolic PDE solvers via Clawpack like interfaces. Available from <http://www.github.com/manyclaw/>

SERVICE AND  
LEADERSHIP

Organizer of IMA hot topics workshop "Impact of Waves Along Coastlines", 2014

Birds of a Feather Co-Chair, SciPy 2013-2015.

Co-organized  $[HPC]^3$  2012 and 2014.

Organized the High Performance Computing Seminar (Spring 2009)

Graduate student representative, 2006-2007

Organizer of the Numerical Analysis Research Club

Organized reading groups on discontinuous Galerkin methods, finite element methods, and conservation laws

Vice President, SIAM student chapter at the University of Washington (2009-2010)

PROFESSIONAL  
AFFILIATIONS

Society for Industrial and Applied Mathematics (2004-Present)

American Geophysical Union (2010-Present)

CONSULTING

KatRisk LLC, May 2013 - 2014

OTHER  
PROFESSIONAL  
ACTIVITY

Referee for Current Climate Change Reports (CCLR), Computing in Science and Engineering (CiSE), Computational Geosciences (COMG, Transport in Porous Media (TIPM, Engineering and Computational Mechanics (EACM, Ocean Dynamics (OCDYN, Applied Numerical Mathematics (APNUM, Pure and Applied Geophysics (PAAG, Journal of Applied Mathematics and Computing (JAMC, SIAM Journal of Scientific Computing (SISC, Journal of Computational Physics (JCP)

NSF CRGF Reviewer

INVITED  
PRESENTATIONS

Stevens Institute Davidson Lab Seminar, March 9, 2016,  
New Jersey Institute of Technology, Mathematics Seminar, February 19, 2016,  
Lamont-Doherty, Ocean and Climate Physics Seminar, October 9, 2015,  
Frontiers in Applied and Computational Mathematics Conference, June 6, 2015,  
University of Notre Dame Environmental Dynamics Seminar, December 9, 2014.  
Universitt Hamburg, May 26, 2014.  
ASCETE Workshop, May 21, 2014.  
Technische Universitt Mnchen Seminar, May 19, 2014.  
Seattle University Mathematics Colloquium, May 15, 2014.  
Iowa State University Mathematics Colloquium, April 21, 2014.  
Texas A&M Oceanography Seminar, March 31, 2014.  
Columbia University Applied Mathematics Colloquium, March 6, 2014.  
MSU Mathematics Seminar, July 11th 2013.  
UNC Applied Mathematics Seminar, April 26th, 2013.  
Gene Golub Summer School, Monterey, CA. July 29-August 10 2012.

PUBLICATIONS

*“Visualizing Uncertainties in a Storm Surge Ensemble Data Assimilation and Forecasting System”*, Thomas Hilt, M. Umer Altaf, Kyle T. Mandli, Markus Hadwiger, Clint N. Dawson, and Ibrahim Hoteit. *Natural Hazards* 120 (2015).

*“Uncertainty quantification and inference of Mannings friction coefficients using DART buoy data during the Thoku tsunami.”* Sraj, I., Mandli, K. T., Knio, O. M., Dawson, C. N. and Hoteit, I. ,*Ocean Modelling* 83, 8297 (2014).

*“Adaptive Mesh Refinement for Storm Surge”*, Kyle T. Mandli, Clint N. Dawson, *Ocean Modelling*, Volume 75, March 2014, Pages 36-50.

*“Forestclaw: Hybrid forest-of-octrees AMR for hyperbolic conservation laws”*, Carsten Burstedde, Donna Calhoun, Kyle Mandli, and Andy R. Terrel. Accepted to ParCo 2013.

*“A Numerical Method for the Multilayer Shallow Water Equations with Dry States”*, Kyle T. Mandli. *Ocean Modelling* 72, 8091 (2013).

*“ManyClaw: Slicing and dicing Riemann solvers for next generation highly parallel architectures”*, A.R. Terrel and K. T. Mandli, TACC-Intel Symposium on Highly Parallel Architectures (2012).

*“PyClaw: Accessible, Extensible, Scalable Tools for Wave Propagation Problems”*, David I. Ketcheson, Kyle T Mandli, Aron Ahmadi, Amal Alghamdi, Manuel Quezada, Matteo Parsani, Matthew G. Knepley, and Matthew Emmett. *SIAM J. Sci. Comput.*, 34(4), C210C231, (2012).

*“The GeoClaw software for depth-averaged flows with adaptive refinement”*, M.J. Berger, D.L. George, R.J. LeVeque and K. T. Mandli. *Advancement in Water Resources* Volume 34, Issue 9, Pages 1195-1206, September 2011.

*“Finite Volume Methods for the Multilayer Shallow Water Equations with Applications to Storm Surges”*, Ph.D. Thesis, July 2011.

*“PetClaw: A Scalable Parallel Nonlinear Wave Propagation Solver for Python”*, with Amal Alghamdi, Aron Ahmadi, David I. Ketcheson, Matthew G. Knepley, and Lisandro Dalcin. 19th High Performance Computing Symposium, 2011.