

Marc Kjerland

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Computational scientist with experience in modeling real-world multiscale systems and applying novel quantitative techniques in a variety of fields.

Research interests

- Geophysical modeling and climate change impacts
- Nonlinear and multiscale systems
- Numerical methods
- Data analysis

Current position

July 2015 – present **Disaster Prevention Research Institute**, *Kyoto University*, Uji, Japan.
Postdoctoral researcher

- Develop and validate storm surge simulations using adaptive mesh refinement
- Quantify impacts of changing typhoon distributions on coastal hazards
- Contributed module to GeoClaw (GitHub) incorporating atmospheric model output.

Education

2010 – 2015 **PhD**, *Applied Mathematics*, University of Illinois at Chicago.
Thesis: Linear response closure approximations for multiscale systems.

2007 – 2009 **M.S.**, *Applied Mathematics*, University of Illinois at Chicago.

2002 – 2005 **B.S.**, *Mathematics*, University of Minnesota, Twin Cities.

Technical skills

Programming languages: C/C++, Python, Fortran 77/90, Matlab

Python packages: numpy, scipy, sklearn, pandas, matplotlib, jupyter, gdal

Operating systems: GNU/Linux, Mac OS X, Windows

Other: L^AT_EX, Bash scripting, OpenMP, GitHub, QGIS, Excel, Photoshop

Natural languages: English, French, German, Japanese

Publications and Proceedings

- Kjerland, M., and Mori, N. (2017). Estimating climate change impacts on storm surge using adaptive mesh refinement. *Proceedings of Coastal Dynamics 2017*, Helsingør, Denmark, p. 158-167.
- Mori, N., Kjerland, M., Nakajo, S., Shibutani, Y., Shimura, T. (2016). Impact assessment of climate change on coastal hazards in Japan. *Hydrological Research Letters*, Vol. 10, No. 3, p. 101-105.
- Abramov, R. & Kjerland, M. (2016). The response of reduced models of multi-scale dynamics to small external perturbations. *Communications in Mathematical Sciences*, Vol 14, No 3.

- Christodoulides, P., Dias, F., Ghidaglia, J.-M., & Kjerland, M. (2010). On the Effect of Compressibility on the Impact of a Falling Jet. *Proceedings of the 20th International Offshore and Polar Engineering Conference*, Vol. III, Beijing, China.

Previous positions

- 2014 – 2015 **Institute for Environmental Science and Policy, UIC.**
Research assistant
- Applied urban metabolism perspective to evaluate university performance
 - Implemented multivariate regression models, linear optimization methods for weighted comparisons, and regime shift detection
- 2010 – 2014 **Department of Mathematics, University of Illinois at Chicago.**
Research assistant
- Examined dynamics of closure approximations to two-timescale systems in chaotic and quasi-periodic parameter regimes
 - Generated ensemble solutions to estimate perturbation response and invariant statistics of multiscale and reduced systems
- Sep 2009 – March 2010 **Centre de Mathématiques et de leurs applications, École Normale Supérieure de Cachan, France.**
Research assistant (*Stage de recherche*)
- Improved boundary conditions for multiphase compressible fluid solver using a finite volume discretization with Lagrangian interface tracking
 - Compared solutions of faucet flow for compressible and ideal fluids

Awards

- September 2016 **SIAM poster prize, SIAM Conference on Mathematics of Planet Earth.**
Title: *Simulating storm surge of [Tropical Cyclone] Haiyan in a future climate condition using adaptive mesh refinement*
- March – June 2010 **NSF visiting fellowship, Institute for Pure and Applied Mathematics, University of California, Los Angeles.**
Long program: Model and Data Hierarchies for Simulating and Understanding Climate
- April 2009 **Graduate Student Teaching Award, Dept of Mathematics, UIC.**
Awarded for exceptional teaching and strong academic progress

Other Interests

I greatly enjoy traveling, bicycling, cooking & baking, live music, board games, and do-it-yourself culture.