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

- Nonlinear and multiscale systems
- Geophysical modeling
- Numerical simulation and algorithms
- Statistical data analysis

Current position

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

- Develop and validate coastal hazard simulations with adaptive mesh refinement
- Quantify impacts of changing typhoon distributions on storm surge risks
- Contributed module to open source package incorporating atmospheric data

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, Matlab

Python packages: numpy, scipy, scikit-learn, pandas, matplotlib, jupyter, gdal

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

Other: LaTeX, 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 multiscale 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.