Joseph Schoonover

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Education

PhD in Geophysical Fluid Dynamics June 2011 - May 2016
Geophysical Fluid Dynamics Institute

Bachelor of Science in Applied Mathematics August 2008 - May 2011
Florida State University

Research/Work Experience

Post-Doctoral Researcher January 2016 - Present
Los Alamos National Laboratory
Mentors : Drs. Wilbert Weijer and Matthew Hecht

Graduate Research Assistant June 2011 - December 2015
Geophysical Fluid Dynamics Institute
Advisor : Dr.William K. Dewar

Programming

Languages : Fortran, C/C++, Python, MATLAB
Parallel : OpenACC, CUDA, OpenMP, MPI

Software Development

Spectral Element Libraries in Fortran
(www.github.com/schoonovernumerics/SELF-v3.0)

The SELF provides a set of Object-Oriented Fortran data-structures that facilitate rapid implementation of Spectral Element Methods for scientific problems. High end solvers of hyperbolic conservation laws are parallelized through OpenMP, MPI, and OpenACC.

Fast Equilibration of Ocean Tracers Software

FEOTS comprises a set of offline Fortran routines for accelerating the equilibration of passive ocean tracers using the Jacobian-Free Newton Krylov method.

Teaching and Outreach

Co-Lead/Mentor
Parallel Computing Summer Research Internship June 2016-present
Los Alamos National Laboratory
parallelcomputing.lanl.gov

Teaching Assistant
Introduction to Oceanography Fall 2011, Fall 2015
Florida State University, EOAS Department

Lecturer
Simple Climate Models Fall 2014
Florida State University, Geophysical Fluid Dynamics Institute

Tutor
Math Help Center Fall 2009 - Summer 2011
Florida State University, Dept. of Mathematics

Presentations

- J. Schoonover, J. Estrada, and Y. Zamora, "Spectral Element Libraries in Fortran with OpenACC", (October 2016), Oak Ridge National Laboratory Hackathon, Knoxville, Tennessee.
- J. Estrada, J. Schoonover, and B. Robey, "You CUDA had it all : Object Oriented Fortran and Porting to CUDA", (August 2016), Los Alamos National Laboratory Student Symposium, Los Alamos, New Mexico.
- Y. Zamora, B. Robey, and J. Schoonover, "Effective OpenMP Implementations",(August 2016), Los Alamos National Laboratory Student Symposium, Los Alamos, New Mexico.
- J. Schoonover, W.K. Dewar, N. Wienders, and B. Deremble, "The Gulf Stream Separation and Topographic Wave Arrest", (February 2016), *Ocean Sciences Meeting*, New Orleans, Louisianna.
- J. Schoonover and W.K. Dewar, "Gulf Stream separation", (June 2015), 7^{th} *International Workshop on Modelling of the Ocean, ANU*, Canberra, ACT, Australia.
- J. Schoonover, "A tutorial on spectral element methods and the SELF software", (June - July 2015), *Organized and presented tutorial sessions at the Geophysical Fluid Dynamics Institute*, Tallahassee, FL
- J. Schoonover, W.K.Dewar, N. Wienders, J. Gula, J. Molemaker, J.McWilliams, S. Bates, G. Danabasoglu, and S. Yeager, "North Atlantic barotropic vorticity budgets

and the Gulf Stream separation", (May 2015) , *Center for Non-Linear Studies* , Los Alamos, NM.

- J. Schoonover, W.K.Dewar, N. Wienders, J. Gula, J. Molemaker, J.McWilliams, S. Bates, G. Danabasoglu, and S. Yeager, "North Atlantic barotropic vorticity balances and the Gulf Stream separation in numerical models", (Dec. 2014) , *American Geophysical Union Fall meeting,* San Francisco, CA.

- W.K.Dewar, N. Wienders, J. Schoonover, S. Bates, and G. Danabasoglu, J. Gula, J. Molemaker, J.McWilliams, "Topographic Control of the Gulf Stream", (June 2012), *NSF Earth System Models PI meeting*, Washington DC.

Publications

[1] W.K. Dewar, J. Schoonover, T.J. McDougall, and R. Klein. Semi-Compressible Ocean Thermodynamics and Boussinesq Energy Conservation. *Fluids*, 1:1–9, 2016.

[2] W.K. Dewar, J. Schoonover, T.J. McDougall, and W.R. Young. Semi-Compressible Ocean Dynamics. *J. Phys. Oceanogr.*, 45:149–156, 2015.

[3] J. Schoonover. The cost of removing the sigma-coordinate pressure gradient error in terrain following models. *J. Comp. Phys*, (in preparation).

[4] J. Schoonover, W.K. Dewar, N. Wienders, and B. Deremble. Local Sensitivities of the Gulf Stream Separation. *J. Phys. Oceanogr.*, 47:353–373, 2017.

[5] J. Schoonover, J. Estrada, and Y. Zamora. The Spectral Element Libraries in Fortran. *J. Open Source Software*, (in preparation), 2016.

[6] J. Schoonover, W.K.Dewar, N. Wienders, J. Gula, J. Molemaker, J.McWilliams, S. Bates, G. Danabasoglu, and S. Yeager. North Atlantic Barotropic Vorticity Balances and the Gulf Stream Separation in Numerical Models. *J. Phys. Oceanogr.*, 46:289–303, 2016.