

# Joseph Schoonover

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jschoonover@lanl.gov · (505)-664-0415  
schoonover.numerics@gmail.com · (954)-261-8243

## Education

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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

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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

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

## Software Development

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### Spectral Element Libraries in Fortran

([www.github.com/schoonovernumerics/SELF-v3.0](http://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

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### Co-Lead/Mentor

Parallel Computing Summer Research Internship June 2016-present  
*Los Alamos National Laboratory*

### 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

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- 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, Louisiana.
- J. Schoonover and W.K. Dewar, “Gulf Stream separation”, (June 2015), *7<sup>th</sup> 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

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- [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.*, (in press), 2016.
- [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.