

Curriculum Vitae - Jeffrey M. M. Connors

University of Connecticut - Avery Point
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Research Interests

- numerical algorithms for fluid-fluid interaction, *a posteriori* error estimation, large eddy simulation, operator splitting methods, uncertainty quantification, generally numerical methods for partial differential equations

Education

- **Ph. D. in Mathematics** - University of Pittsburgh, 2006-2010.
Advisor: William J. Layton.
Dissertation: Partitioned time discretization for atmosphere-ocean interaction.
- **B. S. Engr. in Engineering Physics** - University of Pittsburgh, 1998-2003.

Academic and Professional Appointments

- **Assistant Professor - University of Connecticut**
Department of Mathematics, current.
- **Post Doctoral Research Associate - Lawrence Livermore National Laboratory**
Center for Applied Scientific Computing, August 2010 - July 2013.
Scientific Mentor: Carol Woodward.
- **Andrew Mellon Predoctoral Fellow - University of Pittsburgh**
August 2009 - April 2010.
- **Teaching Fellow - University of Pittsburgh**
August 2008 - April 2009.
- **Teaching Assistant or Graduate Student Researcher - University of Pittsburgh**
August 2006 - April 2008.

Awards

- **NSF Postdoctoral Fellowship**: awarded in 2010 - declined award for LLNL postdoc
- **SIMUMAT Summer School acceptance and funding**: July 2008
- **University Scholar** (merit based undergraduate scholarship): 1998 - 2003

Teaching

- **Calculus I** - current
- **PreCalculus** - current
- **Prep. for Business Calculus** - 1 semester (assistantship)
- **Calculus III** (Multivariable) - 3 semesters (assistantship)
- **Grading for Linear Algebra** - 1 semester (assistantship)
- **Mathematics Assistance Center coordinator** - 1 semester (assistantship)

Computing

MatLab, FreeFEM++, C, Maple, MPI, *hypr*, Fortran

Synergistic Activities

- **Scientific Mentor** for summer student (Nick Wilson - Clemson University) at Lawrence Livermore National Laboratory, summer 2011
- **Referee Service**
 - Advances in Numerical Analysis
 - Applied Numerical Mathematics
 - Computer Methods in Applied Mechanics and Engineering
 - Numerical Methods for Partial Differential Equations
 - SIAM Journal on Numerical Analysis
 - SIAM Journal on Scientific Computing
- **Review author** for AMS Mathematical Reviews
- **Minisymposium organizer**
 - *A Posteriori Error Estimation for Convection Dominated PDEs* at the SIAM 2013 Conference on Computational Science and Engineering.
 - *Advances in Theory and Application of Operator Splitting Methods* at the SIAM Annual Meeting 2012.
- **Session chair** at the SIAM Conference on Mathematical and Computational Issues in the Geosciences 2011

Professional Societies

- Society for Industrial and Applied Mathematics
- American Mathematical Society

Accepted Publications

1. *A method to calculate numerical errors using adjoint error estimation for linear advection*, Jeffrey M. Connors, Jeffrey W. Banks, Jeffrey A. Hittinger and Carol S. Woodward, SIAM Jour. Num. Analysis, Vol. 51, No. 2, 2013, pp. 894-926.
2. *A posteriori error estimation via nonlinear error transport with application to shallow water*, Jeffrey W. Banks, Jeffrey A. Hittinger, Jeffrey M. Connors and Carol S. Woodward, Recent Adv. Sci. Comput. Appl., Contemporary Mathematics, Vol. 586, 2013, pp. 35-42.
3. *Multiphysics Simulations: Challenges and Opportunities*, David E. Keyes, ... , Jeffrey Connors, et. al., Int. J. High Perfor. Comput. Appl., Vol. 27, No. 1, 2013, pp. 4-83.
4. *Numerical error estimation for nonlinear hyperbolic PDEs via nonlinear error transport*, Jeffrey W. Banks, Jeffrey A. Hittinger, Jeffrey M. Connors and Carol S. Woodward, Computer Methods in Applied Mechanics and Engineering, Vol. 213-216, 2012, pp. 1-15.
5. *A fluid-fluid interaction method using decoupled subproblems and differing time steps*, Jeffrey M. Connors and Jason S. Howell, Numerical Methods for PDEs, Vol. 28, No. 4, 2012, pp. 1283-1308 .
6. *Decoupled time stepping methods for fluid-fluid interaction*, Jeffrey M. Connors, Jason S. Howell and William J. Layton, SIAM Jour. Num. Analysis, Vol. 50, No. 3, 2012, pp. 1297-1319.
7. *Stability of algorithms for a two domain natural convection problem and observed model uncertainty*, Jeffrey M. Connors and Benjamin Ganis, Computational Geosciences, Vol. 15, No. 3, 2011, pp. 509-527.

8. *On small-scale divergence penalization for incompressible flow problems via time relaxation*, Jeffrey M. Connors, Eleanor W. Jenkins and Leo G. Rebholz, Int. Jour. of Computer Mathematics, Vol. 88, No. 15, 2011, pp. 3202-3216.
9. *Partitioned time discretization for parallel solution of coupled ODE systems*, Jeffrey M. Connors and Attou Miloua, BIT, Vol. 51, No. 2, 2011, pp. 253-273.
10. *Convergence analysis and computational testing of the finite element discretization of the Navier-Stokes-alpha model*, Jeffrey M. Connors, Numerical Methods for PDEs, Vol. 26, No. 6, 2010, pp. 1328-1350.
11. *On the accuracy of the finite element method plus time relaxation*, William J. Layton and Jeffrey M. Connors, Mathematics of Computation, Vol. 79, No. 270, 2010, pp. 619-648.
12. *Partitioned time stepping methods for a parabolic two-domain problem*, Jeffrey M. Connors, Jason S. Howell and William J. Layton, SIAM Jour. Num. Analysis, Vol. 47, No. 5, 2009.

Submitted Publications

1. *Quantification of errors for operator-split advection-diffusion calculations*, Jeffrey M. Connors, Jeffrey W. Banks, Jeffrey A. Hittinger and Carol S. Woodward, submitted to CMAME, 2013.

Conference and Seminar Communications

1. *Finite volume adjoint error estimates for weak solutions*, minisymposium talk at the 2013 SIAM Conference on Computational Science and Engineering, Boston, MA, February, 2013.
2. *The error transport and adjoint methods of numerical error estimation*, minisymposium talk at the 2013 Joint Mathematics Meetings, San Diego, CA, January, 2013.
3. *Quantification of operator-splitting effects in finite volume calculations of advection-diffusion*, invited minisymposium talk at the 2012 SIAM Annual Meeting, Minneapolis, MN, July, 2012.
4. *An adjoint error estimation technique using finite volume methods for hyperbolic equations*, invited minisymposium talk, SIAM Conference on Uncertainty Quantification, Raleigh, NC, April, 2012.
5. *Decoupling fluid-fluid calculations with partitioned time stepping*, invited talk at the ICiS Summer Workshop on Multiphysics Simulations: Challenges and Opportunities, Park City, UT, August, 2011.
6. *Adjoint error estimation for hyperbolic conservation laws and application to uncertainty quantification*, invited minisymposium talk at the US National Conference on Computational Mechanics, Univ. of Minnesota, July, 2011.
7. *Calculating numerical error in a quantity of interest for nonlinear algorithms applied to linear advection*, invited talk at the Bay Area Scientific Computing Day, May 8, 2011, Stanford University.
8. *Stable algorithms for a two domain natural convection problem and observed model uncertainties*, contributed talk at the SIAM Conference on Mathematical and Computational Issues in the Geosciences, March, 2011.
9. *Adjoint error estimation formulations for nonlinear algorithms applied to linear advection*, invited minisymposium talk at the SIAM Conference on Computational Science and Engineering, March, 2011, Reno, NV.
10. *Uncertainty quantification for a two domain natural convection problem*, invited minisymposium talk at the 2010 SIAM Annual Meeting, Pittsburgh, PA.
11. *Models of the coupled atmosphere and ocean*, invited talk at the CNA Working Group on Recent Advances in Analysis and Approximation of Fluids, Carnegie Mellon University, October, 2009.
12. *Partitioned time stepping techniques for fluid-fluid interaction*, invited talk for the Computational Mathematics Seminar, University of Pittsburgh, October, 2009.

13. *Partitioned time stepping algorithms for a parabolic problem on two subdomains*, contributed talk at the SIAM CSE09, Miami, FL, March 2009.
14. *Finite element analysis for a modified Navier-Stokes-alpha model*, invited talk at the ICAM Graduate Miniconference, Virginia Tech, February 2009.
15. *Partitioned time stepping methods providing stable decoupling of heat equations on two subdomains*, contributed talk at the RSV80 Conference in honor of Richard S. Varga's 80th birthday, Kent State University, October 2008.
16. *Convergence of NS-alpha model finite element discretizations*, invited talk at the SIMUMAT Summer School on Fluid Dynamics, Control and Optimization, CIEM, Castro Urdiales, Cantabria, Spain, July 2008.