Erich L Foster

Contact Information

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Research Interests

Large Eddy Simulation, Lagrangian Coherent Structures, Finite Element Methods, Climate/Ocean Modeling, Hydrogeology, Contaminate Transport.

Education

Virginia Polytechnic Institute and State University, Blacksburg, Virginia

Ph.D. Candidate, Applied Mathematics **Expected: May 2013**

- Dissertation Topic: "Finite Elements for the Quasi-geostrophic Equations of the Ocean"
- Advisor: Traian Iliescu

Virginia Commonwealth University, Richmond, Virginia

M.Sc., Mathematics **2009**

- Thesis Topic: "An Agent Based Gene Flow Model for *Cornus florida*"
- Advisor: David Chan

University of Nevada Reno, Reno, Nevada

M.Sc., Hydrogeology **2006**

- Thesis Topic: "An Improved Numerical Result for Henry's Problem of Seawater Intrusion"
- Advisor: Stephen Wheatcraft

B.Sc., Applied Mathematics **2003**
Selected Course Work: Partial Differential Equations, Numerical Methods, Linear Algebra, Computer Science, Physics, and Chemistry.

Honors and Awards

SIAM CSE 4th BGCE Student Paper Prize Finalist, Boston, MA, 2013

Skills

Operating Systems: Linux, Mac OS X, Windows.
Programming: FORTRAN 95, Matlab, LaTeX, Perl, C++, Python, Java.
Software: COMSOL, Excel, MODFLOW, Aquifer Win32, ArcGIS 9.X.

Publications

4. E. Foster, T. Iliescu, and D. Wells. A Two-Level Finite Element Discretization of the Streamfunction Formulation of the Stationary Quasi-Geostrophic Equations of the Ocean. CAMWA, In Revision, 2013
3. E. Foster, T. Iliescu, and Z. Wang. A Finite Element Discretization of the Streamfunction Formulation of the Stationary Quasi-Geostrophic Equations of the Ocean. CMAME, In Revision, 2013
2. E. Foster, and J. Overfelt. Clipping of Arbitrary Polygons with Degeneracies. Submitted, 2012
1. E. Foster, D. Chan, and R. Dyer. Gene Flow Modelling by Correlated Random Walk. Submitted, 2012

Conference Presentations

Invited Talks

- SIAM Computer Science and Engineering (CSE13), Boston, MA. 25 February – 01 March 2013
- Computational Technology Laboratory Seminar, KTH Stockholm, Sweden. 18 January 2013

- Computer Science and Mathematics Division Seminar, Oak Ridge National Laboratory, TN. 15 November 2012

Contributed Talks

- Clemson/Pitt/UTK/VT Graduate/Postgraduate SIAM Student Conference, Clemson, SC 08-09 February 2013
- Fall AMS West Section Conference, Special Session of Geophysical Fluid Dynamics, Tucson, AZ. 27 – 28 October 2012
- Southeastern-Atlantic Regional Conference on Differential Equations (SEARCDE), Wake Forest, NC. 19 – 20 October 2012
- Sandia Student Intern Program, Poster Presentation, Albuquerque, NM. 02 August 2012
- Clemson/Pitt/UTK/VT Graduate/Postgraduate SIAM Student Conference, Blacksburg, VA. 03 March 2012
- SIAM Student Chapter Colloquium, Blacksburg, VA. 06 October 2011.
- American Geophysical Union, Poster Presentation, AGU Fall Meeting, San Francisco, CA. 05 – 09 December 2005

Professional Experience

Virginia Polytechnic Institute and State University, Blacksburg, Virginia

Teaching Assistant **2009 – 2011, 2013**

- Math 1205: Calculus I — Fall 2010, Spring 2011
- Math 1224: Vector Geometry — Fall 2009, Spring 2010, Spring 2013

Research Assistant **2011 – 2012**

Developed a C^1 conforming FE formulation of the Pure Streamfunction form of the Quasigeostrophic Equations. Developed an optimal error estimate for a high order finite element discretization (Argyris Finite Element) of the Pure Streamfunction formulation of the Quasigeostrophic Equations.

Sandia National Labs, Albuquerque, New Mexico,

Graduate Student Intern **Summer 2012**

Developed a polygon clipping algorithm, which effectively dealt with degeneracies, for use in the Community Climate System Model (CCSM). The associated FORTRAN code was developed to take advantage of High Performance Computing/Parallel Computing.

Virginia Commonwealth University, Richmond, Virginia

Research Assistant **2008 – 2009**

Developed an agent based model to simulate the gene flow in *Cornus florida*.

Teaching Assistant **2008**

- Math 131: Introduction to Contemporary Mathematics — Spring 2008

Virginia Department of Environmental Quality, Richmond, Virginia

Groundwater Modeler **2006 – 2008**

Analyzed regional aquifer response to groundwater withdrawals, calculating areas of impact and the response of the seawater toe, along the Coastal Plane and Eastern Shore of Virginia using MODFLOW and SHARP (a sharp interface seawater intrusion model).

INTERA Inc., Las Vegas, Nevada

Groundwater Modeler **2005 – 2006**

Wrote scripts to parse out and collect data for pre and post processing of Monte Carlo simulations of large scale flow and transport models, for the DOE's Nevada Test Site, across multiple computer nodes.

University of Nevada Reno, Reno, Nevada

Research Assistant **2004 – 2005**
Developed code to solve the Henry's Problem of Seawater Intrusion.

Teaching Assistant **2003 – 2004**
- Math 128: Trig and Algebra Fall 2003, Spring 2004

United States Navy, Norfolk, Virginia

Nuclear Electrician's Mate **1996 – 1998**
Operated the electrical plant and propulsion system aboard a nuclear submarine; maintaining proper load balance, and preventing loss of power.

PROFESSIONAL SOCIETIES
Society for Industrial and Applied Mathematics (SIAM)
American Mathematical Society (AMS)
Mathematical Association of America (MAA)