Dr. T. Everett Ellis

CONTACT INFORMATION

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SUMMARY OF QUALIFICATIONS

Computational scientist with a background in aerospace engineering and an emphasis on advanced numerical methods. Exposure to a variety of simulation domains including solid mechanics, electromagnetics, heat transfer, and plasma physics. Experience running commercial CFD/CAE solvers as well as developing research codes for a wide range of applications. Well developed programming and development skills (C++ and Python) with an affinity for clean, elegant solutions. Excellent spoken and written communication skills with a keen interest in project management and team dynamics.

PROFESSIONAL EXPERIENCE

Postdoctoral Scientist – *Plasma Physics* 2016 to present
Electromagnetic Theory Group,
Sandia National Laboratory

- Took leadership of project management roles including running code review meetings and developing a hybrid Scrum/Kanban agile development process.
- Attended seminars, workshops, and classes on leadership, project management, and communication.
- Performed electromagnetic simulations of radar cross-sections using commercial and research software as part of a code verification study.
- Developed a highly scalable plasma physics code using the Trilinos Project.
- Contributed to a test harness for stochastic simulation codes using a new theory of stochastic Richardson extrapolation implemented in Python.
- Involvement with experimental analysis of electromagnetic pulses.

Graduate Research Assistant – *Stabilized Finite Elements* 2010 to 2016
Institute for Computational Engineering and Sciences,
University of Texas at Austin

- Organized and lead group meetings.
- Frequently presented research at national and international meetings.
- Developed space-time discontinuous Petrov-Galerkin finite element methods for fluid flow applications.
- Implemented a conservative formulation of DPG through Lagrange multipliers.
- Contributed significantly to Camellia, a parallel C++ library built on Trilinos for rapid development of DPG formulations.

Graduate Student Researcher – *Shock Hydrocodes* 2008 to 2013
Institute for Scientific Computing Research,
Lawrence Livermore National Laboratory

- Took initiative in developing new features and research directions.
- Worked in a small research group developing advanced finite element discretization methods for Lagrangian hydrodynamics.
- Improved staggered grid hydro algorithms in multi-material Arbitrary Lagrangian Eulerian codes.
- Prototyped code in Matlab to explore the benefits of high order finite elements.
- Extended the C++ shock physics code Blast to axisymmetric problems.
- Developed a Python-scriptable plotting tool to interface with Blast.
- Implemented a smoothness indicator to isolate artificial viscosity to shocked and under-resolved flow regions.
- Contributed to open source MFEM finite element library.

Undergraduate Student Researcher – *Shock Tube Experiments* Summer 2007
Research Experience for Undergraduates, Aerospace Engineering,
University of Illinois at Urbana-Champaign

- Designed a series of experiments and set up a lab to study the Mount St. Helens lateral blast.
- Developed CAD designs of experimental apparatus and assisted with assembly.
- Performed numerical predictions of experimental results.

Education

The University of Texas, Austin **GPA:** 3.92

Ph.D. Computational Science Engineering and Mathematics, April 2016

- Thesis Topic: *Space-time Discontinuous Petrov-Galerkin Finite Elements for Transient Computational Fluid Dynamics*
- Advisors: Leszek Demkowicz, Robert Moser

California Polytechnic State University, San Luis Obispo **GPA:** 3.93

M.S. Aerospace Engineering, June 2010

- Thesis Topic: *High Order Finite Elements for Lagrangian Computational Fluid Dynamics*
- Advisors: Tzanio Kolev, Robert Rieben, Faysal Kolkailah
- *Summa cum Laude*, With Highest Honors in Engineering

B.S. Aerospace Engineering, June 2010

- Aeronautics specialization
- *Summa cum Laude*, With Highest Honors in Engineering

Refereed Journal Publications

T.E. Ellis, J. Chan, and L. Demkowicz (2016),
Robust DPG Methods for Transient Convection-Diffusion.
Lecture Notes in Computational Science and Engineering,
doi:10.1007/978-3-319-41640-3_6

T.E. Ellis, and L. Demkowicz (2014),
Locally Conservative Discontinuous Petrov-Galerkin Finite Elements for Fluid Problems.
Computers & Mathematics with Applications, doi:10.1016/j.camwa.2014.07.005

V. Dobrev, T.E. Ellis, Tz. Kolev and R. Rieben (2012),
High-order Curvilinear Finite Elements for Axisymmetric Lagrangian Hydrodynamics.
Computers & Fluids, doi:10.1016/j.compfluid.2012.06.004

V. Dobrev, T.E. Ellis, Tz. Kolev and R. Rieben (2011),
Curvilinear Finite Elements for Lagrangian Hydrodynamics.
International Journal for Numerical Methods in Fluids, doi:10.1002/fld.2366

Software Skills

Computer Programming:

- C++, Python, Lua, MATLAB, Mathematica, and others

Scientific Computing Libraries:

- Trilinos, FEniCS, libMesh, MFEM, NumPy, SciPy, and others

CFD / Engineering Software:

- Fluent, Gambit, SolidWorks, Pro/ENGINEER, and others

Selected Conferences and Workshops

- New Mexico EPSCoR Post-Doc Leadership Workshop, January 2017 – La Joya, NM
- Minimum Residual and Least Squares Finite Element Methods Workshop, November 2015 – Delft, The Netherlands
- Minimum Residual and Least Squares Finite Element Methods Workshop, November 2013 – Austin, TX
- Advanced Numerical Methods in the Mathematical Sciences, May 2015 – College Station, TX
- Parallel CFD, May 2014 – Trondheim, Norway
- MultiMaterial Hydrodynamics Conference, September 2013 – San Francisco, CA
- U.S. National Congress on Computational Mechanics, July 2015 – San Diego, CA
- U.S. National Congress on Computational Mechanics, July 2013 – Raleigh, NC
- U.S. National Congress on Computational Mechanics, July 2011 – Minneapolis, MN
- Finite Element Rodeo, February 2016 – College Station, TX
- Finite Element Rodeo, February 2015 – Dallas, TX
- Finite Element Rodeo, February 2014 – Austin, TX
- Finite Element Rodeo, February 2013 – Baton Rouge, LA
- Conference on Analysis of Partial Differential Equations, December 2013 – Lake Buena Vista, FL

Professional Development

- How to Effectively Mentor as a PI/Team Lead – Sandia, 2017
- Life of an Idea – Sandia, 2017
- New Mexico EPSCoR Post-Doc Leadership Workshop – Sandia, 2017

Awards and Honors

- Awarded Computational Applied Math Fellowship – UT Austin, 2010 - 2014
- Graduated *Summa cum Laude* – Cal Poly, 2010
- Elected to President's Honors List – Cal Poly, 2005 - 2007
- Elected to Dean's List – Cal Poly, 2005 - 2008
- Litton Industries in Engineering Scholarship – Cal Poly, 2007 - 2008
- Accenture Outstanding AERO Award – Cal Poly, 2007
- Reinhold Aerospace Engineering Scholarship – Cal Poly, 2007
- Elected to Dean's List – Ventura College, 2002 - 2005
- Howe Heywood Mathematics Prize – Ventura College, 2005
- James and Ida Iliff Memorial Scholarship – Ventura College, 2005
- Alexis Dember Scholarship – Ventura College, 2005
- Alpha Gamma Sigma Scholastic and Service Award – Ventura College, 2003

Research Interests

Computational fluid dynamics, shock physics, multi-phase flows, turbulence modeling, finite element methods, Lagrangian hydrocodes, computational plasma dynamics, magnetohydrodynamics, computational mechanics