

Dr. T. Everett Ellis

CONTACT INFORMATION

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SUMMARY OF QUALIFICATIONS

Ph.D. in computational science, engineering, and mathematics with a background in aerospace engineering and an emphasis on advanced numerical methods for fluid simulations. Familiarity with 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/C++ and Python) with experience in parallel programming paradigms. Excellent spoken and written communication skills with a keen interest in project management and team dynamics.

PROFESSIONAL EXPERIENCE

Member of the Technical Staff – *Scientific Software Development* 2018 to present
[Performance Modeling and Analysis Group](#),
[The Aerospace Corporation](#)

- Modernizing a parallel, C-based, multi-objective genetic algorithm optimization tool (GRIPS) with new features, bug fixes, and unit tests while assisting analysts with new trade study formulations.
- Validating high-fidelity propagation capabilities of a C-based satellite coverage analysis tool (RevisitC) along with bug fixes, new features, and documentation.
- Helping to rewrite legacy demand simulation tools in modern, parallel C++ (BLINE and PICS), design and implementation.
- Leading a small team in the development of a Python based post-processing tool for GRIPS (GAPPS) including a major refactoring of the code base.

Postdoctoral Scientist – *Computational Plasma Physics* 2016 to 2017
[Electromagnetic Theory Group](#),
[Sandia National Laboratories](#), operated by [Honeywell International](#)

- Developed a highly scalable plasma physics code using the [Trilinos Project](#).
- Performed electromagnetic simulations of radar cross-sections using commercial and research software as part of a code verification study.
- Automated a tool-chain to perform time-domain finite element electromagnetic simulations.
- Contributed to a test harness for stochastic simulation codes using a new theory of Richardson extrapolation implemented in Python.
- Performed experimental analysis of electromagnetic pulses via particle accelerator.
- Took leadership of project management roles including running code review meetings and developing a customized Kanban based agile development process.

Graduate Research Assistant – *Advanced FEM for Fluids* 2010 to 2016
[Institute for Computational Engineering and Sciences](#),
[University of Texas at Austin](#)

- Developed space-time discontinuous Petrov-Galerkin finite element methods for fluid flow applications.
- Designed and implemented a conservative DPG formulation through Lagrange multipliers.
- One of the primary developers of [Camellia](#), a parallel C++ library built on Trilinos for rapid development of DPG simulations.
- Contributed to open source [libMesh](#) finite element library.
- Organized and lead group meetings.

- Graduate Student Researcher** – *Shock Hydrocodes* 2008 to 2013
 Institute for Scientific Computing Research,
 Lawrence Livermore National Laboratory
- 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.
 - Implemented a smoothness indicator to isolate artificial viscosity to shocked and under-resolved flow regions.
 - Developed a Python-scriptable plotting tool to interface with *Blast*.
 - Contributed to open source *MFEM* finite element library.
 - Took initiative in developing new features and research directions.
- 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
- B.S. Aerospace Engineering, June 2010
- Aeronautics specialization
 - *Summa cum Laude*, With Highest Honors

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

Scientific Computing Libraries:

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

CFD / Engineering Software:

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

Project Management Software:

- JIRA, GitHub, GitLab, 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

- [Asking the Next Best Question](#) – Aerospace, 2019
- [Crucial Conversations: Tools for Talking When Stakes are High](#) – Aerospace, 2019
- [Barely Sufficient Project Management: A Few Techniques for Improving Your Scientific Software Development Efforts](#) – Sandia, 2017
- [How to Effectively Mentor as a PI/Team Lead](#) – Sandia, 2017
- [Agile for Research and Development](#) – 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, heat transfer, finite element methods, Lagrangian hydrocodes, computational plasma dynamics, magnetohydrodynamics, computational mechanics, genetic algorithms, satellite constellation design and optimization