Dr. Truman Everett Ellis

Contact Information	1109 Lead Ave SW Albuquerque, NM 87102	*Phone:* +1-512-814-8304 *Email:* teellis@sandia.gov

Summary of Qualifications

Computational scientist with a background in aerospace engineering and an emphasis on fluid dynamics and shock physics. Exposure to a variety of simulation domains including solid mechanics, wave propagation, electromagnetics, heat transfer, and plasma physics. Experience running commercial CFD solvers as well as developing research codes. Well developed programming and development skills with an affinity for clean, elegant solutions. Comfortable with both spoken and written communication skills with experience working in a team environment as well as individually.

Professional Experience

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

- Developing highly scalable plasma physics simulations using the Trilinos Project.
- Contributing to a test harness for stochastic simulation codes using a new theory of stochastic Richardson extrapolation implemented in Python.
- Involvement with experimental studies of electro-magnetic pulses and analysis of data collected.

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

- Developed discontinuous Petrov-Galerkin finite element methods for fluid flow applications.
- Actively contributed to Camellia, a parallel C++ library built on Trilinos for rapid development of DPG problem formulations.
- Wrote bridge code to enable output in VTK and HDF5 formats.
- Added support for space-time parabolic problems.
- Implemented an exactly conservative formulation of DPG through Lagrange multipliers.
- Contributed to open source libMesh finite element library.

Graduate Student Researcher – *Shock Hydrocodes* 2008 to 2010, 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.
- Goal was to improve the current staggered grid hydro algorithms in multi-material Arbitrary Lagrangian Eulerian codes.
- Wrote a prototype code in Matlab to explore the benefits of using high order finite element pairs.
- Extended Blast, the next iteration object oriented C++ shock physics code to axisymmetric problems.
- Implemented a smoothness indicator to isolate artificial viscosity to shocked and underresolved flow regions.
- Developed a Python-scriptable 2D plotting tool to interface with the research code.
- 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

- *Compressible Flows in Geological Applications* - Designed a series of experiments and set up a lab to study the Mount St. Helens lateral blast.

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 (2011),
Curvilinear Finite Elements for Lagrangian Hydrodynamics.
International Journal for Numerical Methods in Fluids, doi:10.1002/fld.2366

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

Software Skills

Computer Programming:

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

CFD / Engineering Software:

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

Awards

- Computational Applied Math Fellow – University of Texas
- Graduated *Summa cum Laude* – Cal Poly
- President's Honors List – Cal Poly 2005 - 2007
- 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