# Truman E. Ellis

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| CONTACT INFORMATION | Institute for Computational Engineering and Sciences | |
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**SUMMARY OF QUALIFICATIONS**

Computational scientist with a background in aerospace engineering and an emphasis on fluid dynamics. Moderate exposure to computational solid mechanics, wave propagation, electrodynamics, and heat transfer. Experience running commercial CFD solvers as well as developing research codes. Expertise using Linux on high performance computing systems. Well developed programming and development skills. Comfortable with both spoken and written communication and interpersonal skills with experience working in a team environment as well as individually.

**RESEARCH INTERESTS**

Computational fluid dynamics, turbulence modeling, finite element methods, discontinuous Petrov-Galerkin, Lagrangian hydrocodes, computational plasma dynamics, magnetohydrodynamics, computational mechanics

**EDUCATION**

**The University of Texas at Austin**, Austin, Texas

Ph.D., Computational Science Engineering and Mathematics, May 2015
- Advisors: Leszek Demkowicz, Robert Moser
- Research: Space-time discontinuous Petrov-Galerkin finite elements for transient computational fluid dynamics

**California Polytechnic State University**, San Luis Obispo, California

M.S., Aerospace Engineering, June 2010
- *Summa cum Laude*, With Highest Honors in Engineering
- Thesis Topic: *High Order Finite Elements for Lagrangian Computational Fluid Dynamics*
- Advisors: Tzanio Kolev, Robert Rieben, Faysal Kolkailah

B.S., Aerospace Engineering, June 2010
- *Summa cum Laude*, With Highest Honors in Engineering
- Aeronautics specialization (emphasis on aerodynamics and numerical methods)

**PROFESSIONAL EXPERIENCE**

**Graduate Research Assistant**                                    2010 to present
Institute for Computational Engineering and Sciences,
University of Texas at Austin
- Developing the discontinuous Petrov-Galerkin finite element method for fluid flow applications.
- Actively contributing 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
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++ 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
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

REFEREED
JOURNAL
PUBLICATIONS

Truman Ellis, Leszek Demkowicz, Nathan Roberts, Jesse Chan, and Robert Moser (2014),
Space-Time DPG: Designing a Method for Massively Parallel CFD.
*Computers and Fluids* (submitted)

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

Veselin Dobrev, Truman Ellis, Tzanio Kolev and Robert Rieben (2011),
Curvilinear Finite Elements for Lagrangian Hydrodynamics.
*International Journal for Numerical Methods in Fluids*, doi:10.1002/fld.2366

Veselin Dobrev, Truman Ellis, Tzanio Kolev and Robert Rieben (2012),
High-order Curvilinear Finite Elements for Axisymmetric Lagrangian Hydrodynamics.
*Computers and 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
- 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

PROFESSIONAL
MEMBERSHIPS
- President – Sigma Gamma Tau Aerospace Honor Society – Cal Poly 2008-2009
- Member – SIAM