Truman E. Ellis

Contact Information

Institute for Computational Engineering and Sciences
The University of Texas at Austin
201 East 24th St, Stop C0200
Austin, TX 78712-1229

Phone: 512-814-8304
Email: ellis.truman@gmail.com
Web: www.trumanellis.com

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 with an affinity for clean, elegant solutions. 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, Austin

Ph.D., Computational Science Engineering and Mathematics, expected May 2015

- 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

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

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, Jesse Chan, and Robert Moser (2014),
Space-Time DPG: Designing a Method for Massively Parallel CFD.
Computers & 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 & 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