Truman E. Ellis

Contact Information

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Summary of Qualifications

Computational engineer with a solid grasp of the Navier-Stokes, Reynolds Averaged Navier-Stokes, and Euler equations, and practiced with the numerical methods used to solve them. Experience running commercial CFD solvers as well as writing my own. Expertise with Linux with time 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

- Adviser: Professor Leszek F. Demkowicz
- Area of Study: Discontinuous Petrov-Galerkin for Turbulence Modeling

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*
- Advisers: Dr. Tzanio V. Kolev, Dr. Robert N. Rieben, Professor Faysal A. Kolkailah
- Area of Study: Computational Fluid Dynamics

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 C++ library for rapid development of DPG problem formulations.
- Added an interface to VTK output for visualization via Paraview.
- Studying an exactly conservative formulation of DPG through Lagrange multipliers.
- Contributed to open source libMesh finite element library.

Graduate Student Researcher 2008 to 2010

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
- Developed a Python-scriptable 2D plotting tool to interface with the research code
- Contributed to open source MFEM finite element library
- Research presented at the 2009 international conference on Numerical Methods for Multi-Material Fluids and Structures in Pavia, Italy

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

Dobrev, V. A., Ellis, T. E., Kolev, T. V. and Rieben, R. N. (2011), Curvilinear finite elements for Lagrangian hydrodynamics. *International Journal for Numerical Methods in Fluids*, doi:10.1002/fld.2366

Dobrev, V. A., Ellis, T. E., Kolev, T. V. and Rieben, R. N. (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

Version Control and Software Configuration Management:

- Git, SVN

Productivity Applications:

- LaTeX, Vim, OpenOffice/LibreOffice/Microsoft Office, and others

Operating Systems:

- Linux, Apple OS X, Microsoft Windows family

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