DAVID M. WILLIAMS

CONTACT INFORMATION

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PERSONAL INFORMATION

Name: David Michael Williams
Gender: Male
Date of birth: 4/8/1986
Place of birth: Michigan
Citizenship: United States of America

OBJECTIVE

Seeking a challenging full-time position in the Aerospace Engineering, Mechanical Engineering, Mathematics, Physics, or Computer Science fields requiring analytical ability, design skill, and featuring opportunities for discovery.

EDUCATION

Stanford University — Stanford, CA
GPA: 4.07 — Graduation: June 2013
Major: Aeronautics and Astronautics
Degrees: Masters of Science and Doctorate of Philosophy
Research topic: High order modeling of viscous phenomena in vortex dominated flows

University of Michigan — Ann Arbor, MI
GPA: 3.98 — Graduation: May 2008
Major: Aerospace Engineering
Minors: Physics and Astronomy
Degree: Bachelors of Science and Engineering

EMPLOYMENT HISTORY

Pennsylvania State University — University Park, PA
Assistant Professor, Mechanical Engineering — Aug 16-Present

- Investigator of high-resolution methods for non-linear PDEs
- Analyzer of finite element methods and their numerical stability for fluids problems
- Researcher of solution-adaptive meshing technologies for fluids problems
- Developer of algorithms for treating moderate and high dimensional data
- Teacher of core fluid mechanics course in the Mechanical Engineering Department

Boeing — Everett, WA
Aerodynamics Engineer — Aug 13-June 16

- Developed finite element methods for modeling air flow around passenger aircraft
- Analyzed aero-structural feasibility for wing designs
- Implemented algorithms within object-oriented computational framework
- Investigated massively-parallel computing architectures and co-processor technologies
- Generated virtual geometry along with procedures for ensuring water-tightness of CAD models

Aerospace Computing Laboratory Stanford, CA
Academic Researcher May 10-June 13

- Worked on Computational Fluid Dynamics (CFD) algorithm design/application
- Developed high-order, viscous flow solver for unstructured meshes
- Proved stability of high-order formulation for viscous terms
- Programmed high-order algorithms onto Graphical Processing Units (GPUs)
- Applied high-order Discontinuous Galerkin (DG) method to vortical flows

Boeing Bellevue, WA
Mathematical Modeler June 12-Sept 12

- Worked on development of viscous, compressible, turbulent flow solver
- Identified convergence acceleration strategies for steady flows
- Developed more efficient physics-based preconditioners for linear systems
- Implemented resulting algorithms within object-oriented, templatized code

Environmental Protection Agency Ann Arbor, MI
Government Researcher May 08-Sept 08

- Analyzed high-fidelity models for turbulent fuel/air mixing
- Identified superior heat-transfer models (relative to industry standard)
- Implemented models within existing computational architecture
- Applied models to simulate phenomena in internal combustion (IC) engines

Texas A&M Research Experience for Undergraduates College Station, TX
Academic Researcher May 07-Aug 07

- Examined the fidelity of Lattice Boltzmann (LB) plasma simulations
- Incorporated gravitational effects into an LB scheme
- Modified LB scheme and applied to Poiseuille flow problem
- Identified a precise class of flows for which the modified scheme was useful

Ball Aerospace Boulder, CO
Structural Analyst May 06-Aug 06

- Performed CAD Stress/Strain simulations
- Created analytical model for validating results
- Identified failure modes for satellite components
- Networked with design team; recommended design modifications

Student Space Systems Fabrication Lab Ann Arbor, MI
Thermal Analyst May 05-Aug 05

- Created CAD model of satellite
- Networked with satellite subsystem managers; identified admissible thermal ranges
- Characterized the thermal environment for orbiting satellite
- Recommended thermal control systems to ensure preservation of components

General Motors: Auto Lab Ann Arbor, MI
Academic Researcher May 04-Sept 04

- Analyzed diesel engine data
- Examined the effects of fuel-injector nozzle geometry on fuel-efficiency
- Compared the performance of hydroground and non-hydroground nozzles
- Documented findings and presented results to GM representatives

COMPUTER SKILLS

Environments: Windows, Mac, Linux
Languages: C, C++, CUDA, MPI, FORTRAN, Latex, XHTML
Applications: Matlab, Mathematica, Tecplot, Microsoft Office

AWARDS

National Science Foundation (NSF) Fellowship	Fall 08-June 13
Stanford Graduate Fellowship	Fall 08-June 13
Malloure Scholar	Fall 04-Spring 08
Angell Scholar	Winter 06-Spring 08
U of M Honors	Fall 04-Spring 08
George Landes Technical Writing Award	Winter 07
Undergraduate Achievement Award	Fall 05-Spring 08
New Student Achievement Award	Fall 04
Congressional Bronze Medal	Winter 04

DISSERTATION

Williams, D. M. "Energy Stable High-Order Methods for Simulating Unsteady, Viscous, Compressible Flows on Unstructured Grids," Stanford University, (2013)

PUBLICATIONS

Williams, D. M., Castonguay, P., Vincent, P. E, and Jameson, A. "An Extension of Energy Stable Flux Reconstruction to Unsteady, Non-linear, Viscous Problems on Mixed Grids," AIAA Paper 2011-3405, 20th AIAA Computational Fluid Dynamics Conference, Honolulu, June, (2011).

Castonguay, P., Williams, D., Vincent, P. E., Lopez, M., and Jameson, A. "On the Development of a High-Order, Multi-GPU Enabled, Compressible Viscous Flow Solver for Mixed Grids," AIAA Paper 2011-3229, 20th AIAA Computational Fluid Dynamics Conference, Honolulu, June, (2011).

Williams, D. M. and Jameson, A. "Nodal Points and the Nonlinear Stability of High-Order Methods for Unsteady Flow Problems on Tetrahedral Meshes," AIAA Paper 2013-2830, 43rd AIAA Fluid Dynamics Conference, San Diego, CA, (2013).

Castonguay, P., Williams, D. M., Vincent, P. E., and Jameson, A. "Energy Stable Flux Reconstruction Schemes for Advection-Diffusion Problems," Computer Methods in Applied Mechanics and Engineering, 267 (2013) 400-417

Williams, D. M., Castonguay, P., Vincent, P. E., and Jameson, A. "Energy Stable Flux Reconstruction Schemes for Advection-Diffusion Problems on Triangles," Journal of Computational Physics, 250, (2013) 53-76

Williams, D. M. and Jameson, A. "Energy Stable Flux Reconstruction Schemes for Advection-Diffusion Problems on Tetrahedra," Journal of Scientific Computing, 59, (2014) 721-759

Williams, D. M., Shunn, L., and Jameson, A. "Symmetric Quadrature Rules for Simplexes Based on Sphere Close Packed Lattice Arrangements," Journal of Computational & Applied Mathematics, 266, (2014) 18-38

Williams, D. M., Kamenetskiy, D. S., and Spalart, P. R. "On Stagnation Pressure Increases in Calorically Perfect, Ideal Gases," International Journal of Heat and Fluid Flow, 58, (2016) 40-53

Williams, D. M. "An Entropy Stable, Hybridizable Discontinuous Galerkin Method for the Compressible Navier-Stokes Equations," Accepted by Mathematics of Computation, (2016)

CONFERENCE PRESENTATIONS

Castonguay, P., Williams, D., Vincent, P. E., and Jameson A. "Multi-GPU High-Order Unstructured Solver for Compressible Navier-Stokes Equations," GPU Technology Conference, San Jose, October 2010.

PROFESSIONAL MEMBERSHIPS

Society for Industrial and Applied Mathematics
American Institute of Aeronautics and Astronautics