Curriculum Vitae

Thomas E. Schwartzentruber

Assistant Professor
University of Minnesota
Department of Aerospace Engineering & Mechanics
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EDUCATION

Ph.D.	Aerospace Engineering, University of Michigan, 2007
M.A.Sc.	Aerospace Engineering, University of Toronto, Canada, 2003
B.A.Sc.	Engineering Science, University of Toronto, Canada, 2001

PROFESSIONAL EXPERIENCE

Assistant Professor, Department of Aerospace Engineering and Mechanics, University of Minnesota, (2008-present)

Postdoctoral Research Associate, University of Michigan,
Supervised by Professor Iain D. Boyd (2007)

- Research into particle-continuum simulation methods for hypersonic non-equilibrium flows

Ph.D. candidate, University of Michigan, Non-Equilibrium Gas and Plasma Dynamics group, supervised by Professor Iain D. Boyd (2003-2007)

- Dissertation title: "A Modular Particle-Continuum Numerical Algorithm for Hypersonic Non-Equilibrium Flows"
- Particle (DSMC) simulation in non-equilibrium regions is coupled with continuum (CFD) modeling for the efficient solution of multi-scale hypersonic flows
- Code development of sophisticated DSMC and CFD computer codes capable of simulating atmospheric entry flows, shock-shock, and shock-boundary layer interaction flows

M.A.Sc. candidate, University of Toronto, High-Speed Vehicle Propulsion Systems group, supervised by Professor Jean P. Sislian (2001-2003)

- Thesis title: "Suppression of Premature Ignition in the Pre-Mixed Inlet Flow of a Shock-Induced Combustion Ramjet"
- CFD code development and application to three-dimensional, turbulent, chemically reacting, supersonic flow fields on large parallel architectures
- Grid generation and flow field analysis for flows typical of supersonic mixing and combustion

Teaching Assistant, University of Toronto, Satellite Design (2002)
Teaching Assistant, University of Toronto, Aerospace Propulsion (2001, 2002)

Research Assistant, University of Toronto Institute for Aerospace Studies,
supervised by Professor Jean P. Sislian (summers of 2000, 2001)

- Quasi 1D modeling of ramjets and scramjets in off-design conditions
- 2D CFD analysis of off-design inlet performance for incorporation into 1D analytical model

Design Engineer, BOMBARDIER AEROSPACE, Toronto, Canada (internship, 1998-1999)

- Used CATIA software to make design changes on Environmental Control, Hydraulic and Fuel Systems, as well as to aircraft Structures (products: Dash-8 S400 and Global Express)
- Accumulated over 1900 hours of CATIA experience and completed a 3 week CATIA software course given by L&H Consultants Inc.

AWARDS

June 2007	AIAA Orville & Wilbur Wright Graduate Award	(AIAA)
Oct 2006	Certificate - Engineering Academic Scholar	(Michigan)
Mar 2006	Distinguished Achievement in Aerospace Engineering	(Michigan)
Sept 2004	Post Graduate (Doctoral) Scholarship	(NSERC)
Sept 2003	Donald Matheson Springer Fellowship	(Toronto)
Sept 2002	Post Graduate (Masters) Scholarship	(NSERC)
Sept 2001	Ontario Graduate Scholarship	(Province of Ontario)
Sept 2001	Graduate Entrance Scholarship	(Toronto)
May 2001	Elvie L. Smith Award	(CASI, Pratt & Whitney)
May 2001	Best Student Paper Award	(CASI)
May 2000	Undergraduate Student Research Award	(NSERC)
May 1998	Certificate - Preventive Eng. and Social Development	(Toronto)

*AIAA – American Institute of Aeronautics and Astronautics
*NSERC – Natural Sciences and Engineering Research Council of Canada
*CASI – Canadian Aeronautics and Space Institute

PUBLICATIONS

Journal Articles

Schwartzentruber, T.E., Scalabrin, L.C., and Boyd, I.D., "Hybrid particle-continuum simulations of non-equilibrium hypersonic blunt body flow fields", to appear in the AIAA Journal of Thermophysics and Heat Transfer, Sept. 2007.

Schwartzentruber, T.E., Scalabrin, L.C., and Boyd, I.D., "A modular particle-continuum method for hypersonic non-equilibrium gas flows", Journal of Computational Physics, 2007, Vol. 225, No. 1, pp 1159-1174.

Sislian, J.P., Martens, R.P., Schwartzentruber, T.E., and Parent, B., "Numerical simulation of a real shcramjet flowfield", AIAA Journal of Propulsion and Power, 2006, Vol.22, No. 5, pp 1039-1048.

Schwartzentruber, T.E., and Boyd, I.D., "A hybrid particle-continuum method applied to shock waves", Journal of Computational Physics, 2006, Vol.215, No. 2, pp 402-416.

Schwartzentruber, T.E., Sislian, J.P., and Parent, B., "Suppression of premature ignition in the premixed inlet flow of a shcramjet", AIAA Journal of Propulsion and Power, 2005, Vol.21, No. 1, pp 87-94.

Conference Papers/Presentations

Schwartzentruber, T.E., Scalabrin, L.C., and Boyd, I.D., "Hybrid Particle-Continuum Simulations of Low Knudsen Number Hypersonic Flows", AIAA Paper 2007-3829, June 2007, presented at the 39th AIAA Thermophysics Conference, Miami, FL.

Schwartzentruber, T.E., Scalabrin, L.C., and Boyd, I.D., "Modular Implementation of a Hybrid DSMC-NS Solver for Hypersonic Non-Equilibrium Flows", AIAA Paper 2007-0613, Jan. 2007, presented at the 45th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV.

Schwartzentruber, T.E., Scalabrin, L.C., and Boyd, I.D., "Hybrid particle-continuum simulations of non-equilibrium hypersonic blunt body flow fields", AIAA Paper 2006-3602, presented at the 9th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, San Francisco, CA, June 2006.

Schwartzentruber, T.E. and Boyd, I.D., "Detailed analysis of a hybrid CFD-DSMC method for

hypersonic non-equilibrium flows", AIAA Paper 2005-4829, presented at the 38th AIAA Thermophysics Conference, Toronto, Canada, June 2005.
Schwartzentruber, T.E., Sislian, J.P., and Parent, B., "Suppression of premature ignition in the premixed inlet flow of a shcramjet", AIAA Paper 2003-5187, presented at the 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Huntsville, Alabama, July, 2003.

Technical Presentations

"Progress on a Modular Particle-Continuum Numerical Method for Multi-Scale Hypersonic Flows", presented at the DSMC Theory, Methods, and Applications Conference, Oct. 2007, Santa Fe, NM.
"Particle Simulation for the Multi-Scale Modeling of Gas Flows", Lawrence Livermore National Laboratory invited seminar presentation, April 18, 2007, Livermore, CA.
"Particle Simulation for the Multi-Scale Modeling of Gas Flows", University of Minnesota – Department of Aerospace Engineering and Mechanics invited seminar presentation, March 8, 2007, Minneapolis, MN.
"Hybrid Particle-Continuum Computation of Hypersonic Flows", presented at the AFOSR Joint Program Review for Fluid Mechanics programs, July 2006, Atlanta, GA.
"Detailed Analysis of a Hybrid CFD-DSMC Method for Hypersonic Non-Equilibrium Flows", presented at the DSMC Theory, Methods, and Applications Conference, Sept. 2005, Santa Fe, NM.
"Investigation of Maximum Air Flow Configurations in a RBCC Engine", presented at the Canadian Aeronautics and Space Institute (CASI) Annual Conference, May 2001, Toronto, Canada.