

DAVID L. DAMM

david.damm@gatech.edu

EDUCATION

- 2005–present **GEORGIA INSTITUTE OF TECHNOLOGY**, Atlanta, Georgia, USA
Doctor of Philosophy in Mechanical Engineering (PhD Candidate; graduation May 2008)
Thesis Title: “A forced, unsteady-state, dynamically controlled reactor for distributed hydrogen production with CO₂ capture”
Advisor: **Dr. Andrei G. Fedorov**, Associate Professor of Mechanical Engineering
Major Area: Thermal Science, Heat and Mass Transfer, Sustainability in Energy Systems
Minor Area: Environmental Physics and Chemistry
- 2003–2005 **GEORGIA INSTITUTE OF TECHNOLOGY**, Atlanta, Georgia
Master of Science in Mechanical Engineering GPA: 4.0/4.0
Thesis title: “Radiative and transient thermal modeling of solid oxide fuel cells”
Advisor: **Dr. Andrei G. Fedorov**, Associate Professor of Mechanical Engineering
- 1998–2003 **THE UNIVERSITY OF AKRON**, Akron, Ohio
Bachelor of Science in Mechanical Engineering (Math minor)
Summa cum Laude, Honors Scholar, GPA: 3.97/4.00

RESEARCH / WORK EXPERIENCE

- 2003–present **GEORGIA INSTITUTE OF TECHNOLOGY**
Multiscale Thermofluidics Research Lab, Graduate Research Assistant
- Development of novel fuel processing strategies for distributed hydrogen production with onsite or onboard CO₂ capture
 - Design, build, and test prototype fuel processors for small-scale catalytic hydrogen production from liquid hydrocarbon or alcohol fuels
 - Formulate and analyze mathematical models for optimization of novel, membrane-integrated, dynamically controlled reactor for purified hydrogen production
 - Responsible for thermal modeling portion of collaborative research project, “An Integrated Approach to Modeling and Mitigating SOFC (Solid Oxide Fuel Cell) Failure” sponsored by DOE through the SECA program
 - Perform CFD simulations of steady-state and transient operation of SOFCs via 3-D models of unit cell using commercial code FLUENT
 - Measurement of radiative properties of commonly used SOFC materials; development and implementation of simplified radiative transfer models; quantification of radiative heat transfer effects on overall flow, temperature, species, and current/voltage fields
 - Development and implementation of simplified analytical thermal models for transient startup and shutdown of SOFCs; identification of design rules for optimal heating/cooling of cell to avoid thermomechanical failure and thermal shock of cell components
- 2000–2003 **PARKER HANNIFIN SEAL GROUP, O-RING DIVISION**
Production Engineer, May–Aug 2003
Intern / Co-op, 2000–2002
- Design and manufacture of compression and injection molds; development of computer programs to automate design and manufacture of molds; programming in FADAL CNC G-Code language
 - Process engineer for compression and injection rubber molding—o-rings and molded seals
 - Installation and troubleshooting of new automation equipment; training of operators; development of work instructions and standards
 - Assist in development of a division-wide, product cost-estimate program
 - Oversee rapid prototype projects from initial mold design to finished product shipment

2002-2003

THE UNIVERSITY OF AKRON
Undergraduate Research Assistant

- Basic research on NSF sponsored project in area of Applied Mechanics (Advised by Dr. D. Dane Quinn, Associate Professor, Mechanical Engineering)
- Designed and ran computer simulations of impact collisions in order to study contact point mechanics of rigid body impact

JOURNAL AND CONFERENCE PUBLICATIONS

1. Damm, D.L. and Fedorov, A.G., "Conceptual study of CO₂ capture and the sustainable carbon economy", *Energy Conversion & Management*, in review, (submitted Dec. 2006)
2. Damm, D. L. and Fedorov, A.G., (2006) "Design and Analysis of Zero CO₂ Emissions Powerplants for the Transportation Sector", *Proceedings of International Mechanical Engineering Congress & Exposition IMECE'06*, ASME, Chicago, IL, November 5-10
3. Damm, D.L. and Fedorov, A.G., (2006) "Local thermal non-equilibrium effects in porous electrodes of the hydrogen-fueled SOFC", *Journal of Power Sources*, **159**, 1153-1157
4. Damm, D.L. and Fedorov, A.G., (2006) "Reduced-order transient thermal modeling for SOFC heating and cooling", *Journal of Power Sources*, **159**, 956-967
5. Damm, D. L. and Fedorov, A.G., (2005) "Simplified thermal analysis of the SOFC transients during startup/shutdown", *Proceedings of the ASME Summer Heat Transfer Conference*, San Francisco, CA, July 17-22
6. Damm, D. L. and Fedorov, A.G., (2005) "Spectral radiative heat transfer analysis of the planar SOFC", *Journal of Fuel Cell Science and Technology*, **2** (4), 258-262
7. Damm, D. L. and Fedorov, A.G., (2005) "Radiation heat transfer in SOFC materials and components", *Journal of Power Sources*, **143**, 158-165
8. Damm, D. L. and Fedorov, A.G., (2004) "Spectral radiative heat transfer analysis of the planar SOFC", *Proceedings of International Mechanical Engineering Congress & Exposition IMECE'04*, ASME, Anaheim, CA, November 13-19
9. Damm, D. L. and Fedorov, A.G., (2004) "Radiation heat transfer in SOFC materials and components", presentation at *ASM Symposium on Fuel Cells Materials, Processing, and Manufacturing Technologies*, ASM International, Columbus, OH, October 18-21

AWARDS/HONORS

- NSF Student and Teacher Enhancement Partnership (STEP) Fellowship 2007-2008
- Patent Application: Fedorov, A. G. and Damm, D. L., "Hydrogen-Generating Reactors and Methods", U.S. Patent App. 60/792,014 & 60/816,107, Filed on 02/21/2007.
- National Defense Science and Engineering Graduate (NDSEG) Fellowship 2004-2007
- Arthur L. Williston Award (ASME) for best student paper in area of civic service, 2003
- Griffin-Collins outstanding senior award in mechanical engineering, 2003
- Thomas M. Britain Award for outstanding scholastic achievement in mechanical engineering, 2003
- ASME outstanding student member (Akron section) award, 2003
- Passed the Fundamentals of Engineering (FE) Exam, 2003
- President, ASME student section, U. of Akron, 2002-2003
- Tau Beta Pi (OH Kappa) student officer, 2002-2003, (inducted 2000)
- Lyle M. Buckingham Scholarship in the U. of Akron Honors Program 1998-2003
- Formula SAE team (U. of Akron), 1999-2001;
- CRC Press Award for freshman academic achievement in chemistry, 1999

COMPUTER / HARDWARE SKILLS

- Knowledge of: Microsoft Office and related applications, AutoCAD, Matlab, MAPLE, FLUENT, ALGOR, Solid Works, EES, LabVIEW, FORTRAN, C
- Experience with: Fourier Transform Infrared (FTIR) spectrometer, Quadrapole mass spectrometer, CNC milling, DAQ systems