Brian A. Lockwood

Professional Address
University of Wyoming
Dept. 3295
1000 E. University Ave.
Laramie, WY 82071
(307) 200-9516
blockwoo@uwyo.edu

Personal Address
1416 E. Custer St.
APT C
Laramie, WY 82070
(770) 891-0081
brian.lockwood@gmail.com

OBJECTIVE   Acquire a position performing fundamental research and development in the field of computational science with an emphasis on algorithm development, adjoint methods, optimization and uncertainty quantification.

EDUCATION   ◇ **University of Wyoming**, Laramie, WY.
Ph.D. in Mechanical Engineering. Expected May 2012.
Dissertation Advisor: Dr. Dimitri J. Mavriplis
Dissertation Topic: Sensitivity Analysis and Uncertainty Quantification for Hypersonic flows.
GPA: 4.0/4.0

◇ **Georgia Institute of Technology**, Atlanta, GA.
Master of Science in Nuclear Engineering. August 2007.
Thesis Advisor: Dr. Cassiano R. E. de Oliveira
Thesis Title: Two Dimensional Computational Fluid Dynamic Solver for use in Multiphysics Simulations of Gas Cooled Reactors
GPA: 4.0/4.0

◇ **Georgia Institute of Technology**, Atlanta, GA.
Bachelors of Science in Mechanical Engineering. May 2006.
GPA: 3.89/4.0

RESEARCH   Uncertainty Quantification, Sensitivity Analysis, Adjoint Methods, Optimization, Compu-
INTERESTS   tational Fluid Dynamics.

RELEVENT   ◇ **Graduate Research Assistant**,
EXPERIENCE **Department of Mechanical Engineering,**
University of Wyoming, Laramie, WY.
Aug 2007-present.
Developed in-house two dimensional finite volume solver with real gas effects suitable for re-entry flows. Implemented discrete adjoint and explored novel uses of gradients for sensitivity analysis and uncertainty quantification. Supported by Computational Science Graduate Fellowship from Sept. 2008 through present.
Advisors: Dr. Dimitri J. Mavriplis (Professor, University of Wyoming).

◇ **Visiting Researcher**,
Mathematics and Computer Science Division,
Argonne National Laboratory, Argonne, IL.
May 2010-Aug 2010.
Implemented gradient enhanced surrogate model (universal Kriging model) used for rapid

uncertainty quantification. Demonstrated viability of the surrogate on a variety of problems drawn from nuclear engineering. Work performed as part of Computational Science Graduate Fellowship Lab practicum.
Advisors: Dr. Mihai Anitescu (PhD, Argonne National Laboratory).

⋄ **Graduate Research Assistant**,
Department of Nuclear Engineering,
Georgia Institute of Technology, Atlanta, GA.
Aug. 2006-Aug. 2007.
Developed finite volume implementation of the Pressure-Corrected Implicit Continuous Eulerian (PCICE) algorithm for use in multiphysics simulations.
Advisors: Dr. Cassiano R. E. de Oliveira (Professor, Georgia Institute of Technology) and Dr. Richard C. Martineau (PhD, Idaho National Laboratory).

⋄ **Summer Internship**,
Idaho National Laboratory, Idaho Falls, Idaho.
May 2006-Aug 2006.
Used CUBIT software to develop finite element meshes for multiphysics applications. Developed software tools to interface CUBIT meshes with in-house simulation tools.
Supervisor: Dr. Richard C. Martineau (Ph.D., Idaho National Laboratory).

⋄ **Undergraduate Research Assistant**,
Department of Mechanical Engineering,
Georgia Institute of Technology, Atlanta, GA.
January 2005-May 2006.
Performed particle image velocimetry on simulated operating room to confirm computational fluid dynamic model. Performed hot wire anemometry toward same goal. Designed and constructed automated camera positioning system. Developed software to control positioning system.
Supervisor: Dr. Sheldon M. Jeter (Professor, Georgia Institute of Technology)

PUBLICATIONS ⋄ Lockwood, B.A., Anitescu, M. and Mavriplis, D.J., "Mixed Aleatory/Epistemic Uncertainty
AND TALKS   Quantication for Hypersonic Flows via Gradient-Based Optimization and Surrogate Models," Accepted to 50th AIAA Aerospace Sciences Meeting, Nashville, TN, January 2012.

⋄ Lockwood, B.A., Anitescu, M., "Gradient-Enhanced Universal Kriging for Uncertainty Propagation in Nuclear Engineering," American Nuclear Society Annual Meeting, Hollywood, FL, June 2011.

⋄ Lockwood, B.A., Anitescu, M., "Gradient Enhanced Universal Kriging Model for Inexpensive Uncertainty Quantification in Reactor Safety Simulations," SIAM Conference on Computational Science and Engineering, Reno, Nv, March 2011.

⋄ Lockwood, B.A., Rumpfkeil, M.P., Yamazaki, W., and Mavriplis, D.J., "Uncertainty Quantification in Viscous Hypersonic Flows using Gradient Information and Surrogate Modeling," 49th AIAA Aerospace Sciences Meeting, Orlando, Fl, January 2011.

⋄ Lockwood, B.A. and Mavriplis, D.J., "Parameter Sensitivity Analysis for Hypersonic Viscous Flow using a Discrete Adjoint Approach," 48th AIAA Aerospace Sciences Meeting, Orlando, Fl, January 2010.

⋄ Ibarra L, Lockwood B, and de Oliveira CRE, "A One and Two Dimensional PCICE-Based Multiphysics Algorithm for Use in Reactor Core Simulations," Joint International Topical Meeting on Mathematics and Computation and Supercomputing in Nuclear Applications, Monterey, CA, April 2007.

SKILLS
- ⋄ Extensive software development experience in FORTRAN 90.
- ⋄ Versed in automatic differentiation, particularly Tapenade.
- ⋄ Familiar with HPC environments and tools, including OpenMP and MPI.

AWARDS AND HONORS
- ⋄ Department of Energy Computational Science Graduate Fellow. Sept. 2008 - Present
- ⋄ Samuel P. Eschenbach Memorial Award, Georgia Institute of Techonology. 2006.
- ⋄ President's Undergraduate Research Award. Summer 2005.

ACTIVITIES AND INTERESTS
- ⋄ American Society of Heating, Refrigeration, and Air-Conditioning Engineers, President of Student Chapter-Georgia Tech, Fall 2005-Spring 2006
- ⋄ Georgia Tech Marine Robotics Group, Captian of Sonar Team, Spring 2005-Spring 2006
- ⋄ Member of Tau Beta Pi Honor Society
- ⋄ Member of Pi Tau Sigma Honor Society
- ⋄ Avid Snowboarder and Musician