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EDUCATION

University of Tennessee, Knoxville, Knoxville, TN

PhD, Engineering Science and Mechanics, 2000, GPA 3.8

Advisor: Dr. Joe Iannelli

Dissertation: "A Characteristics Finite Element Algorithm of Computational Open Channel Flow Analysis"

Rose-Hulman Institute of Technology, Terre Haute, IN

MS, Mechanical Engineering, 1996, GPA 3.9

Advisor: Dr. A.T. Roper

Thesis: "A Verification of the Finite Element Method for Use in Computational Fluid Dynamics"

BS, Mechanical Engineering, 1994 GPA 3.2

EMPLOYMENT

Rose-Hulman Institute of Technology, Terre Haute, IN

2000 – Present

Assistant Professor, Mechanical Engineering:

Taught Mechanical Systems (ES204), Thermodynamics II (ME301), Introductory and Advanced Finite Element Analysis (ME422/522), Viscous Flow Theory (ME503), Gas Dynamics (ME510), and undergraduate/graduate directed research (ME490/597).

Created new 4-credit course Computer Applications I (ME123).

University of Tennessee, Knoxville, Knoxville, TN

1999 – 2000

Senior Graduate Teaching Fellow, Engineering Fundamentals Division

Taught Autocad 14 / Mechanical Desktop, Matlab programming, Statics, and Dynamics in the UTK college-wide integrated freshman curriculum (EFD). Responsible for two 75 minute lectures. Actively developed curriculum material, homework, and exams and provided leadership for first year GTF's.

1998 – 1999

Graduate Teaching Fellow, Engineering Fundamentals Division

Taught above material in second pilot year of EFD. Developed entire Matlab programming curriculum. Provided evening tutoring.

1997 – 1998

Graduate Teaching Assistant, Engineering Graphics

Taught hand-drafting and Autocad 14 / Mechanical Desktop. Responsible for syllabus, homework, exams, and assignment of final grades.

1997 – 1999

Instructor, Tennessee Governor's School for Manufacturing

Created, taught, and refined the eight two-hour modules featuring MSOffice applications and web page design for the Internet Governor's School for Manufacturing (IGSM).

1996 – 1997

Graduate Teaching Assistant, Statics and Dynamics

Tutored five 30 student sections of Statics and Dynamics. Graded three 30 student sections of Dynamics homework.

RESEARCH EXPERIENCE

Numeric Stability and Accuracy of Hyperbolic Conservation Laws

1998 – Present Currently investigating the stabilization of finite element approximations to hyperbolic conservation laws via a non-linear, characteristics-biased dissipation operator. Accurate and stable solutions have been achieved for the open channel flow equations. This research has resulted in a full understanding of weighted residual finite element methodology and associated error mechanisms coupled with insight into the underlying physics of the problem statement and an appreciation of the pure mathematical issues involved in solving these equation systems.

Capitalization of Internet Education Potential

1997 – Present Investigating and utilizing leading edge web pedagogy for over five years has resulted in the deployment of the first fully Internet-based courses in the University of Tennessee College of Engineering and the development of a suite of on-line support material for ten courses in the RHIT Mechanical Engineering Department.

PUBLICATIONS

Baker A.J., Taylor M., and Chambers Z. “**Finite Elements for Problem Statements in Engineering,**” CFD Laboratory, 2000. *Textbook used at the University of Tennessee, MAES Graduate Program. Under review by McGraw Hill.*

Baker A.J., Taylor M., and Chambers Z. “**Finite Elements 1-2-3,**” Second Edition. *Textbook revisions currently in progress.*

CONFERENCE PAPERS

Wheeler, E., Grigg, C., Chambers, Z., and Layton, R. (2002), “**Effective Practices in the Electrical Systems Service Course.**” Presented via poster by Wheeler at the 2002 ASEE National Conference in Montreal, Canada.

Merkel, C., and Chambers Z. (2002), “**Use of Competitive Poster Projects in Freshman and Sophomore Classes.**” Presented via poster by Chambers at the 2002 ASEE National Conference in Montreal, Canada.

Chambers, Z., and Iannelli J. (2000), “**A Characteristics Biased Finite Element Algorithm for the One-Dimensional Open Channel Flow Equations.**” Formally presented by Chambers at the Finite Elements in Flow Problems 2000 in Austin, Texas.

Chambers, Z., Taylor, M.B., Iannelli, J., and Baker A.J. (1999), “**Production of Digital Internet Video for Streaming Applications.**” Formally presented by Chambers at the 1999 ASEE National Conference in Atlanta, Georgia.

Baker, A.J., Chambers, Z., and Taylor, M.B. (1999), “**Finite Element Analysis for the Engineering Sciences: A Web-Based, Video-Streamed Education Environment at a Distance.**” Formally presented by Baker at the 1999 ASEE National Conference in Atlanta, Georgia.

PRESENTATIONS AND SHORT COURSES / SEMINARS

Chambers, Z., Karnes, J., and Shirely, L. (2002), “**Thermal Circuit Analysis and FEA.**” Two hour seminar presented to Rose-Hulman Ventures in Terre Haute, IN.

Chambers, Z. (2000), “**How Distance Education Techniques Can Augment the Undergraduate Experience.**” One hour seminar given to the Rose-Hulman Chemical Engineering Department in Terre Haute, IN.

Chambers, Z. (1999), “**Status of Distance Education in the COE.**” One hour presentation made to the University of Tennessee, Knoxville College of Engineering Board of Advisors in Knoxville, TN.

Chambers, Z. (1999), “**Streaming Video – Your Continuing Education Solution.**” One hour seminar presented at the Maintenance and Reliability Center Yearly Conference in Pigeon Forge, TN.

Chambers, Z. (1999), “**How to Create Streaming Video.**” One hour seminar presented at the Innovative Technology Center Faculty Short Courses in Knoxville, TN.

Iannelli, J., and Chambers, Z. (1998) “**Tennessee Internet Governor’s School for Manufacturing.**” One hour presentation made to the Tennessee State Board of Education in Nashville, TN.

REVIEWED PROPOSALS, PAPERS, AND TEXTS

NSF CCLI Invited Reviewer (2002), Reviewed 13 NSF proposals. *Proposal information omitted for confidentiality.*

“**Retention 101: Where Robots Go, Students Follow**” (2002) Reviewed paper for Journal of Engineering Education. *Authors’ names omitted for confidentiality.*

“**Writing Styles and Standards in Undergraduate Reports,**” (2001) Reviewed text for College Publishing. *Author’s names omitted for confidentiality.*

WORKSHOPS / CONFERENCES ATTENDED

ASEE National Conference (1999, 2002). Attended multiple presentations focused on integrated freshman/sophomore curricula, freshman design experience, multimedia and Internet use, and undergraduate computational methods.

Share the Future III (*Succeed, Foundation, Gateway, Greenfield*, 2002). Attended educational pedagogy presentations entitled “Curriculum Integration: How and Why,” “Building a Freshman Engineering Program,” “A Unified Approach to Engineering Science,” “Classroom Culture - Dealing with Diversity,” “Curriculum Change, Resistance, and Leadership” in Gainesville, FL.

Sharing the Learning Spaces, IHETS, (2002). Attended day long seminar on using technology and the Internet to improve undergraduate education in Bloomington , IN.

OTHER PROFESSIONAL ACTIVITIES

THESIS ADVISOR

Ritter, M., “**A Parallel Interface for the FEM.PSE Environment.**” Expected completion in winter 2002/03.

Laser, J., “**A Particulate Containment Device for Industrial Paving Equipment.**” Expected completion in winter 2002.

Gilliat, B., “**Finite Element Analysis of a Semiconductor Gate.**” Expected completion in spring 2003.

Seneff, L., Thesis topic to be determined. Expected completion in spring 2004.

Price, M., Thesis topic to be determined. Expected completion in spring 2004.

THESIS COMMITTEE MEMBER

Arigapudi, A., “**A Mercury Based MEMS Accelerometer.**” Expected completion in spring 2003.

Hunt, A., Murtland, R., and Voi, T. “**New Product Development for a Common Rail Launcher.**” Expected completion in spring 2003

McKinley, B. and Land, D. “**Design and Analysis Inc. A Case Study.**” Expected completion in spring 2003.

Rong, J., “**Finite Element Analysis of Noise Attenuation in a Muffler.**” Expected completion in winter 2002/03.

Boozer, M. (2002), “**An Investigation of the Relationship Between Arch Height and Maximum Pronation Angle During Running on a Treadmill.**”

Mobley, P. (2002), “**The Design of a Rotary Valve Cylinder Head.**”

Naik, J. (2002), “**Base-Band, High-Band, and Low-Band Amplifier Test Software Development.**”

Schultze, S. (2002), “**Experimental Procedures for the Evaluation of Sound Quality for Customer Acceptance of Starter Motors During Manufacturing.**”

Franck, C. (2001), “**A Lumped Variable Model for Mitral Valve Aperture During Diastolic Filling.**”

Hayes, E. (2001), “**The Effect of Muffler Redesign on Engine Performance and Acoustic Characteristics of a Stihl 044 Chainsaw.**”

UNDERGRADUATE DIRECTED RESEARCH

Ketcham, M. (2002), “**An Exploration of the Method of Weighted Residuals for Heat Transfer.**”

Prince, R. (2002), “**Investigation of a Tire Pre-Heating Device.**”

CONSULTING WORK

Finite Element Thermal Analysis Specialist, *Rose-Hulman Ventures*, (2002). Performed two and three-dimensional finite element thermal analysis of proprietary electric motor design to predict temperature and flux distributions and suggest design modifications for improved cooling. Work was done in collaboration with Dr. Lee Shirely and Josh Karnes (RHIT student) and presented to Light Engineering.

Material Wear Analysis and Finite Element Kinematic Design, *Numerical Concepts Incorporated*, (2002). Project proposal was to develop a finite element model for predicting contact forces in a proprietary printing press design subject to various geometries. Unfortunately, the initial material wear predictions were unsatisfactory to the client and the project did not move to the FEA phase.

Finite Element Thermal-Stress Analysis Specialist, *Micronica Incorporated*, (2002), Asked to perform finite element analysis of thermal stress in circuit board laminates. Unfortunately, project has not moved forward and am still waiting for work to develop.

SERVICE ACTIVITIES

COMMITTEES AND OFFICES

Faculty Teller (2001-2003)
Student Affairs Committee, Secretary (2001-2002)
Parallel Computing Steering Committee (2001-Present)
Technology Enhanced Instruction Committee, Secretary (2001-2002)
Graduate Studies Committee (2000-2001)
Visual and Performing Arts Committee (2000-2001)

ADVISING

Academic Advisor, Mechanical Engineering Majors (2000-present)
Faculty Advisor, TeamRose Motorsports (2001-present)
Faculty Advisor, Breakdance Discovery Club (2000-present)

FRATERNAL

Faculty Co-Advisor, Kappa Chapter of Theta Xi Fraternity (2000-present)
Alumni Housing Chair, Kappa Chapter of Theta Xi Fraternity (2001-present)
Farrington Grove Historic District Association Liason, Kappa Chapter of Theta Xi Fraternity (2001-present)
Faculty Van Driver, Lambda Chi Alpha Run for Kids Sake (2002)

OTHER

Operation Catapult faculty member (2002)
Webmaster, Mechanical Engineering Department (2000-present)
Freshman Laptop Orientation (2002)
Last Supper Server (every quarter except one)
Campus Beautification Day (2001, 2002)
WalkAmerica participant (2002)

PROFESSIONAL ASSOCIATIONS

American Society for Engineering Education (ASEE), Member
American Society of Mechanical Engineers (ASME), Member

REFERENCES

Available upon request