

PERSONAL DATA

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EDUCATION

- **Doctor of Philosophy (Ph.D.) in Mechanical Engineering**
University of Maryland, College Park, MD
September 2008 – May 2011 (anticipated)
Research Topic: Robotic Manipulation
Research Advisor: Dr. Jaydev Desai
- **Master of Science (M.S.) in Mechanical Engineering**
Washington University, St. Louis, MO
July 2003 – June 2005
GPA: 4.0/4.0
Research Topic: Dynamic Brain Deformation
Research Advisor: Dr. Philip Bayly
- **Bachelor of Science (B.S.) in Mechanical Engineering**
California Institute of Technology, Pasadena, CA
September 1999 – June 2003
GPA: 3.3/4.0
Research Topic: Ultra-thin Pressure Barriers
Research Advisor: Dr. Bradley Filippone

RESEARCH EXPERIENCE

- **Graduate Researcher**
Department of Mechanical Engineering, University of Maryland, College Park, MD
Motile Robotics, Inc.
RAMS Laboratory, Dr. Jaydev Desai Research Group
September 2008 – present
 - Develop autonomous robotic manipulation of doors
- **Graduate Research Assistant**

Department of Mechanical Engineering, Washington University, St. Louis, MO
Dr. Philip Bayly Research Group
June 2003 – June 2005

- Designed, manufactured, constructed, and tested prototype for biological tissue impacter
- Engineered, tested, and analyzed software algorithms for calibration and operation of impacter
- Constructed and analyzed theoretical viscoelastic models of brain impact through finite element analysis

- **Summer Undergraduate Research Fellow**

Jet Propulsion Laboratory (JPL), Telerobotics Department
Mr. Daniel Helmick Research Group, AXEL Project
June 2002 – September 2002

- Designed, manufactured, and constructed prototype for Mars Robotic Explorer
- Designed, manufactured, and constructed caster for explorer, minimizing drag and optimizing lateral force for turning and climbing
- Analyzed effect of normal force, foil number, foil spacing, and other parameters on caster's lateral force in dry, loose sand

- **Undergraduate Research Assistant**

California Institute of Technology (Caltech), Nuclear Physics Department
Dr. Bradley Filippone Research Group, Ultra-Cold Neutron Project
June 2002 – September 2002

- Designed and constructed a vacuum chamber and valve system for analyzing and evaluating ultra-thin pressure barriers
- Solved barrier bulging problems by designing a uniform tension mesh to decrease electron backscattering

TEACHING EXPERIENCE

- **Teaching Assistant**

Department of Mechanical Engineering
Washington University, St. Louis, MO

- Fall 2003: MAE 320A Thermodynamics (for Professor Eliot Fried)
- Spring 2004, 2005: JME 3221/ME322A Mechanical Design and Machine Elements (for Professor Mark Jakiela)
- Spring 2005: ME 424 Manufacturing Processes (for Professor Ken Jerina)

WORK EXPERIENCE

- **Motile Robotics Inc.**
Robotics Manipulation Researcher
January 2008 – present
 - Managed program for the advanced research and development of complex robotic manipulators
 - Analyzed electrical and operational characteristics of replacement computer hardware for the ATRV Jr.
- **Battelle Memorial Institute**
Engineering Researcher
January 2007 – January 2008
 - Managed the design and installation of a prototypical modular mail screening facility to identify chemical, biological, radiological, and explosive threats
 - Designed and developed control logic, P&IDs, mechanical drawings, and assembly drawings for a chemical demilitarization plant
- **Battelle Memorial Institute**
Engineering Research Associate
July 2005 – December 2006
 - Improved data processing time from hours to seconds by teaching self and others to write complex Excel macros
 - Wrote technical manuals, training packages, threat assessments, test plans, test reports, and an integrated assessment handbook
 - Led testing of the radiation detector within the MSA Safesite; wrote test plan & report

PUBLICATIONS

A Stereotaxic Accessory for Reproducible Neurotrauma, Master's Thesis, Washington University, May 2005

Brody, MacDonald, Kessens, Bayly, et. al. *Electromagnetic Controlled Cortical Impact Device for Precise, Graded Experimental Traumatic Brain Injury*, Journal of Neurotrauma, 2007, 24(4): 657-673.

CONFERENCE/SYMPOSIUM PUBLICATIONS

Effect of Velocity on Depth Error in Controlled Cortical Impact Studies, presented
23rd annual National Neurotrauma Symposium, Wash DC

*Measurement of Lagrangian Strain in the Human Brain During Mild Head
Acceleration*, presented by Philip Bayly at IX International Conference on Recent
Advances in Structural Dynamics, Southampton, UK, July 2006

RELEVANT COURSE WORK

Robotics Design
Dynamic Feedback Analysis and Control
Statics and Kinematics of Mechanical Systems
Vibration Analysis
Finite Element Analysis
Computer Aided Design
Continuum Mechanics
Image Understanding
Smart Structures and Materials

COMPUTER SKILLS

Language Experience: Visual Basic, MatLab, C, C++, Assembly
Software Experience: MatLab, Mathematica, Maple, SolidWorks, AutoCAD,
ABAQUS, FEMLab, Stress Check, MS Office Suite

PROFESSIONAL MEMBERSHIPS/HONORS

IEEE Student Member (2008 – present)
ASME Student Member (2008 – present)
Two time recipient of the Henry L. Guenther Scholarship for continued academic
excellence in Mechanical Engineering at Caltech
Two time winner of the Colonel E. C. Goldsworthy Track Award for exemplary
sportsmanship, team spirit, and proficiency at Caltech
Valedictorian of Blue Springs High School class of 463 students
Eagle Scout Award

LEADERSHIP / EXTRACURRICULAR ACTIVITIES

- Volunteer at Aberdeen High School
Track: Hurdles and Distance Coach (2006 - present)
Cross country: Strength and Conditioning Coach (2006 - present)
FIRST Robotics: Mechanisms Team Leader (2007 – present)
- Caltech Track Team Captain (2001-2003)

- Head Upper Class Counselor (UCC) for Lloyd House (2002-2003)
- Athletics Manager for Lloyd House (2001)
- Actor in L-Men (2000)

Additional interests include volleyball, ultimate frisbee, and other recreational sports, travel, reading, philosophy/metaphysics, poetry writing, and learning piano, ballroom dancing, and painting