

Ashish Deshpande

Computer Science & Engineering

University of Washington

Box 352350, Seattle, WA 98195-2350

E-mail: add@cs.washington.edu; Webpage: www.cs.washington.edu/homes/add

Phone: 734-846-8979 (C), 206-685-3134 (O)

EDUCATION

Postdoctoral Fellowship, Computer Science and Engineering, 2007-present

University of Washington, Seattle

Advisor: Dr. Yoky Matusuoka

PhD, Mechanical Engineering, 2007

University of Michigan, Ann Arbor

Thesis Advisor: Dr. Jonathan Luntz

MS, Mechanical Engineering, 2002

University of Massachusetts, Amherst, USA

Thesis Advisor: Dr. James R. Rinderle

BE, Mechanical Engineering, 1999

Visveswaraya National Institute of Technology (VNIT), Nagpur, India

First Class with Distinction, overall standing: 2nd in class, total of 85

RESEARCH INTERESTS

- **Neuromuscular controls:** study of neuro-muscular controls in humans to implement human-like motion and force controls in anatomical robotic systems
- **Prosthetics and Rehabilitation robotics:** development of robot technologies based on biomechanical analyses to assist in rehabilitation and to improve prostheses design
- **Brain machine interfaces (BMI):** development of software and hardware technologies to build an interface between robotic prostheses and neural signals
- **Robot dynamics and controls:** study of the dynamics and controls of multi-body robotic systems to develop advanced robotic assistive devices, search and rescue robots, and modular robots

TEACHING INTERESTS

- Undergraduate and graduate classes in dynamics, controls, robotics and biomechanics
- Graduate level classes on topics related to neuromuscular controls, brain machine interfaces (BMI) and human motion graphics

WORK EXPERIENCE

- **University of Washington, Seattle (March 07- current), postdoctoral researcher:** worked on the design and assembly of an Anatomically Correct Test-bed (ACT) robotic hand. Conducted

system identification of nonlinear musculoskeletal system of the ACT hand. Currently, developing control algorithms for the ACT Hand based on the neural control of muscles in order to achieve anthropomorphic motion and manipulation abilities.

- **University of Michigan**, Ann Arbor (Jan 02-Jan 07), graduate student researcher: developed a team of mobile robots for search and rescue missions. Collaborated with US Army researchers to design cooperative maneuvers for robots to improve mobility on unknown terrain. Also developed a methodology for modeling the dynamics of multi-body robot interactions.
- **Intel Research Labs**, Pittsburgh, PA (June 06-Sept 06), research intern: carried out collaborative research to develop models of dynamics and distributed control algorithms for micro-scale modular robots.
- **University of Massachusetts**, Amherst, MA (Aug 99-Sept 01), graduate student researcher: developed a design methodology based on the analysis of relations between constraints to provide insights for engineering design. Applied methods for design improvements for submarine sensor assembly.
- **Kollmorgen Technologies**, Northampton, MA (June 00-Aug 00), researcher: conducted a study to design an electro-mechanical actuator for submarine sensor systems.

AWARDS AND SCHOLARSHIPS

Outstanding Graduate Mentor Award, Univ. of Michigan, 2006

Nomination for Outstanding Graduate Student Instructor Award, Univ. of Michigan, 2006

ME Departmental Fellowship, Univ. of Michigan, 2001

Top honors at VNIT, Nagpur, India, 1995-1999

SELECTED PUBLICATIONS

Journal Articles

- **Deshpande, A. D.**, Balasubramanian R., Ko J., and Matsuoka Y., "Investigation of variable moment arms for the index finger through the ACT hand". Submitted to *Journal of Biomechanics*, 2008.
- **Deshpande, A. D.**, and Luntz, J. E., "Behaviors for Physical Cooperation Between Robots for Mobility Improvement", *Autonomous Robots*, Vol. 23, Issue 4, Nov 2007.
- **Deshpande, A. D.**, and Luntz, J. E., "A Methodology for Design and Analysis of Physically Cooperating Mobile Robots", Submitted to *Autonomous Robots*, 2008.
- **Deshpande, A. D.**, and Rinderle, J. R., "Intelligent Strategies for the Application of the Constraint Dominance Methods: Demonstration with Linear Motor Design Problem", *Artificial Intelligence for Engineering Design, Analysis and Manufacturing (AIEDAM), Special Issue on Constraints and Design*, Vol.20, No.4, Nov 2006.
- Rinderle, J. R., and **Deshpande, A. D.**, "Constraint Dominance Identification Methods", Submitted to *Research in Engineering Design*, 2008.

Conference Papers

- **Deshpande, A. D.**, Balasubramanian R., Lin R., Dellon B. and Matsuoka Y., "Understanding human hand's variable moment arms through the anatomically correct test-bed (ACT) robotic hand", *IEEE BioRob*, 2008.

- **Deshpande, A. D.**, and Luntz, J. E., “A Method to Characterize and Exploit Actuation Redundancy in Mobility and Manipulation”, In *Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2007.
- **Deshpande, A. D.**, and Srinivasa, S. S., and Pillai, S., “Control Strategies and Design Guidelines for Planar Latch-less Metamorphic Robots Based on Analysis of Dynamics”, In *Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2007.
- **Deshpande, A. D.**, and Luntz, J. E., “Development of Methodologies for Design and Analysis of Physically Cooperating Robots and Applications to Other Robotic Systems”, In *Proceedings of Robotics: Science and Systems*, 2006.
- **Deshpande, A. D.**, and Luntz, J. E., “Behaviors for Physical Cooperation Between Mobile Robots for Mobility Improvement”, In *Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2006.
- **Deshpande, A. D.**, and Luntz, J. E., “Enhancing mobility of a group of mobile robots via physical co-operation among the robots”, In *Proceedings of SPIE Conference on Unmanned Ground Vehicle Technology V*, 2003.
- **Deshpande, A. D.**, and Luntz, J. E., “Decentralized control for a team of physically cooperating robots”, In *Proceedings of IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2003.
- **Deshpande, A. D.**, and Rinderle, J. R., “Constraint Dominance Methods Applied to the Design of a Linear Synchronous Motor”, In *International Design Engineering Technical Conference*, 2003.
- Rinderle, J. R., and **Deshpande, A. D.**, “Constraint Dominance Determination Methods”, In *ASME Design Theory and Methodology Conference*, 2003.

TEACHING EXPERIENCE

Teaching Assistant, University of Michigan, Ann Arbor

ME 395: Mechanical Engineering Labs, Winter 2005
 ME 540: Intermediate Dynamics, Fall 2004

Teaching Assistant, University of Massachusetts, Amherst

Intro to Math, Fall 2000 & Spring 2001
 ME 402: Mechanical Engineering Labs II, Fall 1999 & Spring 2000

PROFESSIONAL ACTIVITIES

- **Affiliations:** Institute of Electrical and Electronic Engineers (IEEE),
 American Society of Mechanical Engineers (ASME)
- **Reviewer:** IEEE Transactions on Robotics (IEEE-TRO)
 Transactions on Automation Science and Engineering (IEEE-ASE)
 International Conference on Intelligent and Robotic Systems (IROS)
 IEEE Conference on BioRobotics (IEEE BioRob)
 ASME Conference on Dynamics and Controls Systems

OTHER INTERESTS

Indian Classical Music, Swimming, Triathlons