

CURRICULUM VITAE

Jaydev Prataprai Desai

1. Personal Information

Title: Associate Professor
Director – Robotics, Automation, Manipulation, and Sensing (RAMS)
Laboratory

Office Address:	Phone: (301)-405-4427
0160 Glenn L. Martin Hall	Fax: (301)-314-9477
Department of Mechanical Engineering	Email: jaydev@umd.edu
University of Maryland	Web-page: http://rams.umd.edu
College Park, MD 20850	

EDUCATION

Post-Doctoral Fellow (1998-1999)
Harvard University, Cambridge, MA
Division of Engineering and Applied Sciences
Advisor: Dr. Robert Howe

Ph.D. Mechanical Engineering and Applied Mechanics
University of Pennsylvania
Philadelphia, PA 19104, USA
Dissertation title: Motion Planning and Control of Cooperative Robotic Systems
Degree Awarded: 12/1998
Dissertation Supervisor: Dr. Vijay Kumar
Dissertation Co-Supervisor: Dr. James P. Ostrowski

MA Mathematics
University of Pennsylvania
Philadelphia, PA 19104, USA
Degree Awarded: 12/1997

MSE Mechanical Engineering and Applied Mechanics
University of Pennsylvania
Philadelphia, PA 19104, USA
Degree Awarded: 05/1995

B. Tech Mechanical Engineering
Indian Institute of Technology
Bombay, India
Degree Awarded: 07/1993

PROFESSIONAL EXPERIENCE

Associate Professor
Department of Mechanical Engineering
University of Maryland, College Park, MD

2006-present

<i>Affiliate Faculty</i> Fischell Department of Bioengineering University of Maryland, College Park, MD	2007-present
<i>Associate Professor</i> Department of Mechanical Engineering and Mechanics Drexel University, Philadelphia, PA	2005-2006
<i>Affiliated Faculty appointment in the Department of Materials Science and Engineering</i> Drexel University, Philadelphia, PA	2005-2006
<i>Affiliated faculty appointment in Department of Surgery</i> Drexel University College of Medicine, Philadelphia, PA	2005-2006
<i>Affiliated faculty appointment in Department of Cardiothoracic Surgery</i> Drexel University College of Medicine, Philadelphia, PA	2002-2006
<i>Affiliated Faculty with College of Biomedical Engineering, Science and Health Systems</i> Drexel University, Philadelphia, PA	01/2000-2006
<i>Pei Chi Chou Assistant Professor of Mechanical Engineering and Mechanics</i> Department of Mechanical Engineering and Mechanics Drexel University, Philadelphia, PA	2004-2005
<i>Assistant Professor</i> Department of Mechanical Engineering and Mechanics Drexel University, Philadelphia, PA	09/1999 - 2005
<i>Assistant Professor</i> Department of Materials Engineering Drexel University, Philadelphia, PA	08/2002 – 08/2004

2. Research, Scholarly, and Creative Activities

a. Books.

- i. Books authored. – None.
- ii. Books edited. – None.
- iii. Chapters in books.

1. Jaydev P. Desai, “*D-H convention*”, Chapter 8 in *Robotics and Automation Handbook* edited by Dr. Thomas R. Kurfess, CRC Press, pp. 8-1 to 8-21, 2005.
2. Jaydev P. Desai, J. Yasha Kresh, Andrew S. Wechsler, Andres E. Castellanos, William S. Meyers, “*Robotic Surgery*”, Chapter in *Wiley Encyclopedia of Biomedical Engineering*, Wiley-Interscience, 2006.
3. Jaydev P. Desai and Anand Pillarisetti - Invited to write a chapter on “*Robotics for Life Science Automation*” in the Book: “*Life Science Automation: Fundamentals and Applications*”, 2006.

b. Articles in Refereed Journals.

Archival Publications (Published / Accepted for Publication)

1. Tie Hu, Alan C. W. Lau, and Jaydev P. Desai, “Instrumentation for Testing Soft-Tissue Undergoing Large Deformation: *ex vivo* and *in vivo* studies”, *ASME Journal of Medical Devices*, In-press, 2008.
2. Gregory Tholey and Jaydev P. Desai, “A Compact and Modular Laparoscopic Grasper with Tri-directional Force Measurement Capability”, *ASME Journal of Medical Devices*, In-press, 2008.
3. Jaydev P. Desai, Anand Pillarisetti, and Ari D. Brooks, “Engineering Approaches to Biomanipulation”, *Annual Review of Biomedical Engineering*, 2007.
4. Anand Pillarisetti, Maxim Pekarev, Ari D. Brooks, and Jaydev P. Desai, “Evaluating the Effect of Force Feedback in Cell Injection”, 4(3): pp. 322-331, *IEEE Transactions on Automation Science and Engineering*, 2007.
5. James T. Hing, Ari D. Brooks, and Jaydev P. Desai, “A Biplanar Fluoroscopic Approach for the Measurement, Modeling, and Simulation of Needle and Soft tissue Interaction”, *Medical Image Analysis*, pp. 62-78, Volume 11, Issue 1, February 2007.
6. Teeranut Chanthasopeephan, Jaydev P. Desai, and Alan C. W. Lau, “Modeling Soft-Tissue Deformation Prior to Cutting for Surgical Simulation: Finite Element Analysis and Study of Cutting Parameters”, *IEEE Transactions on Biomedical Engineering*, 54(3):349-59, 2007.
7. Gregory Tholey and Jaydev P. Desai, “A General Purpose 7 DOF Haptic Device: Applications towards Robot-Assisted Surgery”. Accepted for publication in *IEEE/ASME Transactions on Mechatronics*, 2006.
8. Christopher W. Kennedy and Jaydev P. Desai, “Modeling and Control of the Mitsubishi PA-10 Robot Arm Harmonic Drive System”, *IEEE/ASME Transactions on Mechatronics*, 10(3): 263-274, 2005.

9. Gregory Tholey, Jaydev P. Desai, and Andres E. Castellanos, “Force Feedback plays a significant role in Minimally Invasive Surgery – Results and Analysis”, *Annals of Surgery*, 241(1): 102-109, 2005.
10. C. W. Kennedy and J. P. Desai, “A vision-based approach for estimating contact forces: Applications to robot-assisted surgery”, *Applied Bionics and Biomechanics*, 2(1): 53-60, 2005.
11. Tie Hu, Gregory Tholey, Jaydev P. Desai, and Andres E. Castellanos, “Evaluation of a Laparoscopic Grasper with Force Feedback”, *Surgical Endoscopy*, 18(5): 863-867, 2004.
12. Gregory Tholey, Anand Pillarisetti, and Jaydev P. Desai, “On-Site Three Dimensional Force Sensing Capability in a Laparoscopic Grasper”, *Industrial Robot*, 31(6): 509-518, 2004.
13. Thomas Sugar and Jaydev P. Desai, “A Framework for Kinematic and Dynamic Motion Planning for a Formation of Mobile Robots”, *Intelligent Automation and Soft Computing: An International Journal*, 10(4): 307-322, 2004.
14. Teeranoot Chanthasopeephan, Jaydev P. Desai, and Alan C. W. Lau, “Measuring Forces in Liver Cutting: New Equipment and Experimental Results”, *Annals of Biomedical Engineering*, 31(11): 1372-1382, 2003.
15. Anthony R. Lanfranco, Andres E. Castellanos, Jaydev P. Desai, and William C. Meyers, “Robotic Surgery: A Current Perspective”, *Annals of Surgery*, 239(1): 14-21, 2004.
16. Christopher W. Kennedy, Tie Hu, Jaydev P. Desai, Andrew S. Wechsler, and J. Yasha Kresh, “A Novel approach to Robotic Cardiac Surgery using Haptics and Vision”, *Cardiovascular Engineering: An International Journal*, 2(1): 15-22, 2002.
17. Jaydev P. Desai, “A graph theoretic approach for modeling mobile robot team formations”, *Journal of Robotic Systems*, 19(11): 511-525, 2002.
18. Jaydev P. Desai, James P. Ostrowski, and Vijay Kumar, “Modeling and Control of Formations of Nonholonomic Mobile Robots”, *IEEE Transactions on Robotics and Automation*, 17(6): 905-908, 2001.
19. Adnan Ansar, Denilson Rodrigues, Jaydev P. Desai, Kostas Daniilidis, Vijay Kumar, and Mario F.M. Campos, “Visual and Haptic Collaborative Telepresence”, *Computers & Graphics*, 25(5): 789-798, 2001.
20. James P. Ostrowski, Jaydev P. Desai, and Vijay Kumar, “Optimal gait selection for nonholonomic locomotion systems”. *International Journal of Robotics Research*, 19(3): 225-237, 2000.
21. Jaydev P. Desai and Vijay Kumar, “Motion planning for cooperating mobile manipulators”. *Journal of Robotic Systems*, 16 (10): 557-579, 1999.
22. Jaydev P. Desai, Milos Zefran, and Vijay Kumar, “Two-arm manipulation tasks with friction-assisted grasping”. *Advanced Robotics*, 12 (5): 485-507 1999.

Journal Abstracts

1. Andres E. Castellanos, Jaydev P. Desai, Tie Hu, Ari Brooks, and William C. Meyers, “Force-sensing Laparoscopic Tool for Robotically Assisted Minimally Invasive Surgery”, *Journal of the Society of Laparoendoscopic Surgeons*, July-September 2002.

- c. Monographs, Reports, and Extension Publications. – None.
- d. Book Reviews, Other Articles, and Notes. – None.
- e. Talks, Abstracts, and Other Professional Papers Presented.
 - i. Invited talks, etc.
 1. *Robotics Research @ RAMS Laboratory*, Army Research Laboratory (ARL), June 2008.
 2. *Robotics Research @ RAMS Laboratory*, Metropolitan Washington DC Computer-Assisted Surgery Society (WashCAS), June 2008.
 3. *Haptic Feedback: From Macro Scale to Micro Scale*, Robotics: Science and Systems (RSS) Area Chair Workshop, Zurich, Switzerland, April 2008.
 4. *Mechanical Phenotyping of Transgenic Cells using Haptic Feedback*, Invited speaker for the *Intra-cellular Surgery: Extending the Surgeon’s reach to Genes and Molecules* session at Medicine Meets Virtual Reality Conference, January 2008.
 5. *Medical Robotics @ Robotics, Automation, Manipulation, and Sensing (RAMS) Laboratory*, NIH, November 2007.
 6. *Haptic feedback in Medical Robotics: From Micro to Macro Scale*, Applied Physics laboratory (APL), October 2007.
 7. *Haptic feedback system for Robot-assisted Surgery*, Invited speaker at Performance Metrics for Intelligent Systems Workshop (PerMIS), August 2007.
 8. *Medical Robotics @ Robotics, Automation, Manipulation, and Sensing (RAMS) Laboratory*, NIST, August 2007.
 9. *MEMS/Mechanical Effectors for Intra-cellular Surgery*, Invited speaker and Co-organizer for “Intra-Cellular Surgery: A New Frontier” session at the Medicine Meets Virtual Reality Conference, February 6-9, 2007.
 10. *Macro to Micro Scale Haptics: From Surgical Simulation to Cell Manipulation*, IIT Bombay, 2007.
 11. *Robotic Cellular Surgery using Haptic and Vision feedback* - Workshop organizer and Presenter for the 2006 IEEE Engineering in Medicine and Biology Society, August 31-September 3, 2006.
 12. Invited speaker for the ASME/IEEE-EMBS/BMES workshop on “*Modeling and measurement of mechanical properties of cells and proteins*”, Drexel University, September 14-16, 2006.
 13. *Macro to Micro Scale Haptics: From Surgical Simulation to Cell Manipulation* – Georgia Institute of Technology, 2006.
 14. *Reality-Based Haptic Feedback for Surgical Simulation and Robot-Assisted Surgery* – University of Maryland, 2006.
 15. *Macro to Micro Scale Haptics: From Surgical Simulation to Cell Manipulation* – Engineering Research Center for Computer-Integrated Surgical Systems and Technology, The Johns Hopkins University, 2006.
 16. *Reality-Based Haptic Feedback for Surgical Simulation and Robot-Assisted Surgery* – Vanderbilt University, 2006.

17. *Reality-Based Haptic Feedback for Surgical Simulation and Robot-Assisted Surgery* – Purdue University, 2006.
 18. *Reality-Based Haptic Feedback for Surgical Simulation and Robot-Assisted Surgery* – Georgia Institute of Technology, 2005.
 19. *Surgical Simulation Based on Reality-Based Soft-Tissue Models* -Workshop organizer and Presenter at Robotics: Science and Systems Conference at MIT, 2005.
 20. *Reality-Based Soft Tissue Modeling for Robot-Assisted Surgery* - Columbia University, 2004.
 21. *Reality-based modeling for soft tissue probing and cutting for surgical simulation* – Invited Speaker for Workshop on Biomedical Robotics & Biomechatronics at 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Francisco, CA, 2004.
 22. *Reality-Based Soft Tissue Modeling for Robot-Assisted Surgery* - Rutgers University, 2004.
 23. *Reality-Based Modeling of Tool-tissue Interaction for Robot-Assisted Surgery*- University of Pennsylvania, 2004.
 24. *Reality-Based Modeling of Tissues for Simulation and Robot-Assisted Surgery* – Workshop Organizer IEEE International Conference on Intelligent Robots and Systems, 2003.
 25. *Measuring Grasping and Cutting Forces for Reality-Based Haptic Modeling* - Computer Assisted Radiology and Surgery - 1st International Workshop on Haptic Devices in Medical Applications, London, UK, 2003.
 26. *Invited Speaker and Panelist for Medical Robotics and Minimally Invasive Surgery* - School of Medicine Alumni Reunion meeting, 2002
 27. *Haptics and Vision based control for robotic surgery* - Engineering Research Center for Computer-Integrated Surgical Systems and Technology, The Johns Hopkins University, 2001.
 28. *Telepresence and Motion Planning* - Department of Mechanical Engineering and Mechanics, Drexel University, 2001.
 29. *Motion planning for cooperative robotic systems* - Department of Mechanical Engineering, University of California, Riverside, 1998
 30. *Motion planning for cooperative robotic systems* - Department of Mechanical Engineering, The Johns Hopkins University, 1998
 31. *Motion planning using variational principles* - GRASP Laboratory, University of Pennsylvania, 1997
 32. *Nonholonomic motion planning* - Computer Science Department, Stanford University, 1996
- ii. Refereed conference proceedings.
1. Zhan Gao, Kevin Lister, Jaydev P. Desai, “Constitutive Modeling of Liver Tissue: Experiment and Theory, *Second biennial IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics – BioRob, October 2008.*
 2. Anand Pillarisetti, Carol Keefer, and Jaydev P. Desai, “Mechanical Characterization of Fixed Undifferentiated and Differentiating mESC, *Second biennial IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics – BioRob, October 2008.*

3. Nicholas Pappafotis, Wojciech Bejgerowski, Rao Gullapalli, Marc Simard, Satyandra K. Gupta, and Jaydev P. Desai, “Towards Design and Fabrication of a miniature MRI-compatible Robot for Applications in Neurosurgery”, *Proceedings of the ASME 2008 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2008*.
4. Anand Pillarisetti, Carol Keefer, and Jaydev P. Desai, “Mechanical Response of Embryonic Stem Cells using Haptics-enabled Atomic Force Microscopy”, *11th International Symposium on Experimental Robotics*, Athens, Greece, 2008.
5. Kevin Lister, Rebecca Kokes, Bao Zhang, Rao Gullapalli, Jaydev P. Desai, “MRI Compatible Robotic System with Haptic Feedback for RF Ablation/Biopsy under Continuous MRI”, *The International Society for Magnetic Resonance in Medicine (ISMRM)*, Toronto, Canada, 2008.
6. Rebecca Kokes, Kevin Lister, Rao Gullapalli, Bao Zhang, Howard Richard, Jaydev P. Desai “Towards a Needle Driver Robot for Radiofrequency Ablation of Tumors under Continuous MRI”, *IEEE International Conference on Robotics and Automation*, Pasadena, CA, USA, 2008.
7. Jaydev P. Desai, Gregory Tholey, and Christopher W. Kennedy, “Haptic Feedback system for Robot-Assisted Surgery”, *Performance Metrics for Intelligent Systems Workshop (PerMIS)*, August 2007.
8. Gregory Tholey and Jaydev P. Desai, “A Modular, Automated Laparoscopic Grasper with Three-Dimensional Force Measurement Capability”, *IEEE International Conference on Robotics and Automation*, pp. 250-255, Roma, Italy, 2007.
9. Kevin Lister and Jaydev P. Desai, “Soft-Tissue Characterization during Monopolar Electrocautery Procedures”, *The 16th Annual Medicine Meets Virtual Reality Conference*, Long Beach, CA, 2007.
10. Anand Pillarisetti, Edward Steager, Maxim Pekarev, Ari D. Brooks, Jaydev P. Desai, “Micro Robotic Gripper for Cell Manipulation”, *10th International Symposium on Experimental Robotics (ISER)*, 2006, Brazil.
11. James Hing, Ari Brooks, and Jaydev P. Desai, “Reality Based Needle Insertion Simulation for Haptic Feedback in Prostate Brachytherapy”, *IEEE International Conference on Robotics and Automation*, May 15-19, 2006, Orlando, Florida.
12. Gregory Tholey and Jaydev P. Desai, “Performance of a 7 DOF General Purpose Haptic Device”, Video presentation at the *IEEE International Conference on Robotics and Automation*, May 15-19, 2006, Orlando, Florida.
13. Teeranoot Chanthasopeephan, Jaydev P. Desai and Alan Lau, "Determining Fracture Resistance in Scalpel Cutting of Soft Tissue", *BioRob2006 - The first IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics*, February 20-22, 2006, Pisa, Italy.
14. Tie Hu, Jaydev P. Desai, Andres E. Castellanos and Alan Lau, "Modeling In vivo Soft Tissue Probing", *BioRob2006 - The first IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics*, February 20-22, 2006, Pisa, Italy.
15. Anand Pillarisetti, Maxim Pekarev, Ari D. Brooks, Jaydev P. Desai, “Evaluating the Role of Force Feedback for Biomanipulation Tasks”, *14th*

- Symposium on Haptic Interfaces for Virtual environment and Teleoperator Systems*, March 25-26, 2006, Washington D.C.
16. Gregory Tholey and Jaydev P. Desai, “Design and Development of a General Purpose 7 DOF Haptic Device”, *14th Symposium on Haptic Interfaces for Virtual environment and Teleoperator Systems*, March 25-26, 2006, Washington D.C.
 17. James T. Hing, Ari D. Brooks, Jaydev P. Desai, “Reality-based Estimation of Needle and Soft-tissue Interaction for Accurate Haptic Feedback in Prostate Brachytherapy Simulation”, *International Symposium of Robotics Research*, San Francisco, CA, October 2005.
 18. Anand Pillarisetti, Waqas Anjum, Jaydev P. Desai, Gary Friedman, and Ari D. Brooks, "Force feedback Interface for Cell Injection", *First Joint EuroHaptics Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, pp. 391-400, 2005.
 19. Gregory Tholey and Jaydev P. Desai, "A General Purpose 7 DOF Haptic Interface", *First Joint EuroHaptics Conference and Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, pp. 582-583, 2005.
 20. Teeranoot Chanthasopephan, Jaydev P. Desai and Alan Lau, "3D and 2D Finite Element Analysis in Soft Tissue Cutting for Haptic Display", *International Conference on Advanced Robotics*, pp. 360-367, 2005.
 21. Tie Hu, Jaydev P. Desai, and Alan Lau, "Direct and Inverse Problem Models for Large Soft-Tissue Deformation: Application to Haptic Feedback in Surgical Simulation", *International Conference on Advanced Robotics*, 2005.
 22. Christopher W. Kennedy and Jaydev P. Desai, "Enabling Technologies for Robotically-Assisted Sutureless Coronary Anastomosis", *IEEE International Conference on Robotics and Automation*, Spain, 2005.
 23. Teeranoot Chanthasopephan, Jaydev P. Desai, and Alan Lau, “Determining Deformation Resistance in Cutting Soft Tissue with Non-Uniform Thickness”, *26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, pp. 2754-2757, San Francisco, CA, 2004.
 24. Tie Hu, Jaydev P. Desai, “Soft-Tissue Material Properties under Large Deformation: Strain Rate Effect”, *26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society*, pp. 2758-2761, 2004, San Francisco, USA.
 25. Gregory Tholey, Anand Pillarisetti, William Green, and Jaydev P. Desai, “Design, Development, and Testing of an Automated Laparoscopic Grasper with 3-D Force Measurement Capability”, *Medical Simulation: International Symposium*, pp. 38-48, ISMS 2004, Cambridge, MA, USA.
 26. Tie Hu, Jaydev P. Desai, “Characterization of Soft-Tissue Material Properties: Large Deformation Analysis”, *Medical Simulation: International Symposium*, pp. 28-37, ISMS 2004, Cambridge, MA, USA.
 27. Gregory Tholey, Anand Pillarisetti, William Green, and Jaydev P. Desai, “Direct 3-D Force Measurement Capability in an Automated Laparoscopic Grasper”, *Eurohaptics*, Munich, Germany, 2004.
 28. Tie Hu, Jaydev P. Desai, “Modeling Large Deformation in Soft-tissues: Experimental results and Analysis”, *EuroHaptics*, Munich, Germany, 2004.
 29. Christopher Kennedy and Jaydev P. Desai, “Model-Based Control of the Mitsubishi PA-10 Robot Arm: Application to Robot-Assisted Surgery”, *IEEE*

- International Conference on Robotics and Automation*, pp. 2523-2528, New Orleans, LA, 2004.
30. Teeranoot Chanthasopeephan, Jaydev P. Desai, and Alan Lau, “Deformation Resistance in Soft Tissue Cutting: A Parametric Study”, *12th International Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems (HAPTICS'04)*, pp. 323-330, Chicago, Illinois, 2004.
 31. Teeranoot Chanthasopeephan, Jaydev P. Desai, Alan C.W. Lau, “Study of Soft Tissue Cutting Forces and Cutting Speeds”, *The 12th Annual Medicine Meets Virtual Reality Conference*, pp. 56-62, 2004.
 32. Teeranoot Chanthasopeephan, Jaydev P. Desai, and Alan Lau, “Measuring Forces in Liver Cutting for Reality-Based Haptic Display”, *IEEE/RSJ International Conference on Intelligent Robots and Systems*, vol.3 pp. 3083-3088, Las Vegas, NV, 2003.
 33. Christopher Kennedy and Jaydev P. Desai, “Estimation and modeling of the harmonic drive transmission in the Mitsubishi PA-10 robot arm”, *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 3331-3336, Las Vegas, NV, 2003.
 34. Gregory Tholey, Jaydev P. Desai, and Andres E. Castellanos, “Evaluating the Role of Vision and Force Feedback in Minimally Invasive Surgery: New Automated Laparoscopic Grasper and A Case Study”, *2003 Medical Image Computing and Computer Assisted Intervention conference*, part 1, pp. 198-205, Montreal, Canada, 2003.
 35. Tie Hu and Jaydev P. Desai, “A Biomechanical Model of the Liver for Reality-Based Haptic Feedback”, *2003 Medical Image Computing and Computer Assisted Intervention conference*, Montreal, Canada, pp. 75-82, 2003.
 36. Christopher Kennedy and Jaydev P. Desai, “Force feedback using Vision”, *International Conference on Advanced Robotics*, pp.179-184, Coimbra, Portugal, 2003.
 37. Gregory Tholey, Teeranoot Chanthasopeephan, Tie Hu, Jaydev P. Desai, and Alan Lau, “Measuring Grasping and Cutting Forces for Reality-Based Haptic Modeling”, *Computer Assisted Radiology and Surgery - 1st International Workshop on Haptic Devices in Medical Applications*, pp. 794-800, London, UK, 2003.
 38. Tie Hu, Andres E. Castellanos, Gregory Tholey, and Jaydev P. Desai, “Real-Time Haptic feedback in Laparoscopic tools for use in Gastro-intestinal Surgery”, *Fifth International Conference on Medical Image Computing and Computer Assisted Intervention*, part 1, pp. 66 – 74, 2002.
 39. Christopher W. Kennedy, Tie Hu, and Jaydev P. Desai, “Combining Haptic and Visual Servoing for Cardiothoracic Surgery”, *IEEE International Conference on Robotics and Automation*, pp. 2106-2111, Washington D.C., 2002.
 40. Jaydev P. Desai, “Modeling Multiple Teams of Mobile Robots: A Graph Theoretic Approach”, *IEEE/RSJ International Conference on Intelligent Robots and Systems*, pp. 381-386, vol. 1, 2001.
 41. Rafael Fierro, Calin Belta, Jaydev P. Desai, and Vijay Kumar, “On Controlling Aircraft Formations”, *The 40th IEEE Conference on Decision and Control*, pp. 1065-1070, vol. 2, 2001.

42. Thomas Sugar, Jaydev P. Desai, Vijay Kumar, and James P. Ostrowski, "Coordination of Multiple Mobile manipulators". *IEEE International Conference on Robotics and Automation*, vol. 3, pp. 3022 -3027, May 2001.
43. Jaydev P. Desai and Robert D. Howe, "Towards the development of a humanoid arm by minimizing interaction forces through minimum impedance control". *IEEE International Conference on Robotics and Automation*, vol. 4, pp. 4214 -4219, May 2001.
44. ¹Jaydev P. Desai, Vijay Kumar, and James P. Ostrowski, "Control of changes in formation for a team of mobile robots". *IEEE International Conference on Robotics and Automation*, Detroit, vol.2, pp. 1556 -1561, May 1999.
45. Jaydev P. Desai, Milos Zefran and Vijay Kumar, "A geometric approach to second order kinematic analysis". *The Sixth International Symposium on Advances in Robot Kinematics*, June 29th-July 4th, 1998, Strobl, Austria.
46. Jaydev P. Desai, Jim Ostrowski and Vijay Kumar, "Controlling formations of multiple mobile robots". *IEEE International Conference on Robotics and Automation*, vol. 4, 2864 –2869, May 1998, Belgium.
47. Jaydev P. Desai and Vijay Kumar, "Experimental investigation of planar two-arm friction assisted grasping tasks". *The Sixth Annual Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems*, pp. 29-36, November 1997, Dallas, TX.
48. Jaydev P. Desai, Milos Zefran and Vijay Kumar, "Two arm manipulation tasks with friction assisted grasping". *IEEE-RSJ International Conference on Intelligent Robots and Systems*, vol.1, pp. 189-195, September 1997, Grenoble, France.
49. Jaydev P. Desai and Vijay Kumar, "Nonholonomic motion planning for multiple mobile manipulators". *IEEE International Conference on Robotics and Automation*, vol. 4, pp.3409-3414, April 20 - 25, 1997, Albuquerque, NM.
50. James Ostrowski, Jaydev P. Desai and Vijay Kumar, "Optimal gait selection for nonholonomic locomotion systems". *IEEE International Conference on Robotics and Automation*, vol. 1, pp. 786-791, April 20 - 25, 1997, Albuquerque, NM.
51. M. Zefran, Jaydev P. Desai and Vijay Kumar, "Continuous motion plans for robotic systems with changing dynamic behavior". *Workshop on Algorithmic Foundations of Robotics (WAFR)*, pp. 113-127, July 3-5, 1996, Toulouse, France.
52. Jaydev P. Desai, C. C. Wang, M. Zefran and Vijay Kumar, "Motion Planning for multiple mobile manipulators". *IEEE International Conference on Robotics and Automation*, vol. 3, pp. 2073-2078, April 1996, Minneapolis, MN.
53. M. Zefran, Vijay Kumar, Gregory Garvin and Jaydev P. Desai, "Experimental investigation of human two-arm manipulation". *International Conference on Mechanics in Medicine and Biology*, 1996.
54. M. Zefran, Vijay Kumar, Jaydev P. Desai and E. A. Henis, "Two-arm manipulation: What can we learn by studying humans?" *IEEE-RSJ International Conference on Intelligent Robots and Systems*, vol. 1, pp. 70-75, August 1995, Pittsburgh, PA.

¹ Nominated for the Anton Philips Best Student paper award.

- iii. Unrefereed conference proceedings. – None.

- f. Films, CDs, Photographs, etc. – None.

- g. Exhibits, Performances, Demonstrations, and Other Creative Activities – None.

- h. Original Designs, Plans, Inventions, Software, and/or Patents.
 - 1. *Haptic Interface for Force Reflection in Manipulation Tasks*
Inventors – Jaydev P. Desai
Gregory Tholey
U.S. Patent Application Number – 11/271,115, filed on 11/10/2005

 - 2. *Minimally Invasive Neurosurgical Intracranial Robot*
Inventors – Jaydev P. Desai, J. Marc Simard, Satyandra K. Gupta, Rao
Gullapalli, Nicholas Pappafotis, Wojciech Bejgerowski
Provisional Patent Filed – 2007

 - 3. *Teleoperated Robotic System for Image Guided Radiofrequency ablation and
Biopsy*
Inventors – Jaydev P. Desai, Rao Gullapalli, Rebecca Kokes, Kevin Lister,
Howard M. Richard III, Bao Zhang
Provisional Patent Filed – 2007

i. Contracts and Grants.

Title: MINIR: Minimally Invasive Neurosurgical Intracranial Robot
PI: Jaydev P. Desai
Co-I's: Satyandra K. Gupta – University of Maryland, College Park
Rao Gullapalli – University of Maryland School of Medicine
J. Marc Simard - University of Maryland School of Medicine
Sponsor: National Institutes of Health
Amount: \$397,542
Duration: 8/10/08-7/31/10

Title: Mechanical Phenotyping of Cells: Haptics-enabled Atomic Force
Microscopy
PI: Jaydev P. Desai
Co-PI's: Nikhil Chopra and Carol Keefer
Sponsor: National Science Foundation
Amount: \$215,000
Duration: 8/01/08-8/31/11

Title: Mechanical Phenotyping of Embryonic Stem Cell Differentiation
PI: Carol Keefer
Co-PI's: Jaydev P. Desai
Sponsor: Maryland Technology Development Corporation
Amount: \$230,000

Duration: 6/30/08-6/29/10

Title: Data-driven Real-Time Surgical Simulation from Reality-based Soft-Tissue Models

PI: Jaydev P. Desai

Co-I's: Alan Lau - Drexel University
Andres Castellanos (Department of Surgery) – Drexel University College of Medicine
Doug James - Cornell University

Sponsor: National Institutes of Health

Amount: Approximately \$1.1 Million

Duration: 9/1/06-6/30/10

Title: CompBio: Reality-based Data-driven Computer Models for Surgical Simulation

PI: Jaydev P. Desai

Co-PI: Doug James – Cornell University

Sponsor: National Science Foundation

Amount: \$275,000

Duration: 9/1/06-8/31/09

Title: Research Experiences for Teachers in Areas of Innovative and Novel Technologies in Philadelphia

PI: Mun Young Choi

Co-PIs: Jaydev P. Desai, Yury Gogotsi, Athina Petropulu, and Fredricka Reisman

Sponsor: National Science Foundation

Amount: \$449,904

Duration: 3/1/2006-2/28/2009

Title: Force Feedback and MEMS based Cellular Surgery

PI: Jaydev P. Desai

Co-PIs: Ari Brooks and Gennady Friedman

Sponsor: Defense Advanced Research Projects Agency (DARPA)

Amount: \$65,000

Duration: 3/13/2006-3/12/2007

Title: CAREER: Minimally Invasive Surgery using Haptics and Vision

PI: Jaydev P. Desai

Co-PIs: None

Sponsor: The National Science Foundation

Amount: \$349,850

Duration: 7/1/02-6/30/08

Title: ITR: Collaborative Research: Modeling and Display of Haptic Information for Enhanced Performance of Computer-Integrated Surgery

PI: Jaydev P. Desai

Co-PI: Alan Lau

Sponsor: The National Science Foundation
Amount: \$228,817
Duration: 8/15/03-7/31/07

Title: (Research Experiences for Undergraduates (REU) Supplement)
ITR: Collaborative Research: Modeling and Display of Haptic Information for Enhanced Performance of Computer-Integrated Surgery

PI: Jaydev P. Desai
Co-PI: Alan Lau
Sponsor: The National Science Foundation
Amount: \$6,000
Duration: 8/15/03-7/31/07

Title: RET Site: Research Experience for Teachers in Areas of Innovative and Novel Technologies in Philadelphia [RETAIN Technologies in Philadelphia]

PI: Mun Young Choi
Co-PIs: Jaydev P. Desai, Anthony Lowman, Fredericka Reisman, and Yury Gogotsi
Sponsor: The National Science Foundation
Amount: \$471,220
Duration: 3/15/2003 – 2/28/2006

Title: Maximizing Transgenic Yield using Microfabrication Array and Force Feedback for Cell Manipulation

PI: Jaydev P. Desai
Co-PI: Gennady Friedman, Adam Fontecchio, and Ari Brooks
Sponsor: Drexel University (Synergy Grant)
Amount: \$10,000
Duration: 6/1/04-5/31/05

Title: Drexel University GAANN Fellowships in Emerging Areas of Research: Nanotechnology, Information Technology, and Biotechnology

PI: Mun Young Choi
Co-PIs: Jaydev P. Desai, Steven Wrenn, Fredericka Reisman, Stephen Cox, Yury Gogotsi
Sponsor: Department of Education
Amount: \$576,940

Title: Computer Assisted Robotic Cardiac Surgery

PI: Jaydev P. Desai
Co-PIs: None (Co-PIs not allowed on this grant. Collaborating Investigators were Dr. J. Yasha Kresh and Dr. Andrew Wechsler)

Sponsor: American Heart Association (Beginning Grant-in-Aid Award)
Amount: \$100,000
Duration: 7/1/01-6/30/03

- Title: Research Experiences for Undergraduates (REU) Supplement:
Acquisition of a Complete Whole Arm Manipulator (WAM) Robot
system
- PI: Jaydev P. Desai
- Co-PIs: Bor-Chin Chang, Harry Kwatny, Ali Shokoufandeh, and Cato
Laurencin
- Sponsor: The National Science Foundation
- Amount: \$24,000
- Duration: 9/1/2000-8/31/2003
-
- Title: Acquisition of a Complete Whole Arm Manipulator (WAM) Robot
system
- PI: Jaydev P. Desai
- Co-PIs: Bor-Chin Chang, Harry Kwatny, Ali Shokoufandeh, and Cato
Laurencin
- Sponsor: The National Science Foundation
- Amount: \$158,177
- Duration: 9/1/2000-8/31/2003
-
- Title: Development of a Robotic System for Relative Stabilization of a
soft tissue using tactile feedback for cardiothoracic procedures
- PI: Jaydev P. Desai
- Co-PIs: Dr. J. Yasha Kresh and Dr. Andrew Wechsler
- Sponsor: Drexel University (Synergy Grant)
- Amount: \$19,900
- Duration: 7/1/2000-12/31/2001

Donation

1. Equipment donation (in-kind) from Tektronix for the development of my Program for Robotics, Intelligent Sensing, and Mechatronics (PRISM) Laboratory. Donated value of the equipment was \$14,357.35.
- j. Fellowships, Prizes, and Awards.
1. Outstanding Invention of 2007 in *Physical Science Category*, University of Maryland, College Park: MINIR: Minimally Invasive Neurosurgical Intracranial Robot – Lead Inventor.
 2. Invited to attend *NSF / CCC workshop on Healthcare and Medical Robotics*, 2008.
 3. Promoted to *Senior Member, IEEE*, 2007
 4. Honored at Research Leaders Luncheon, University of Maryland, College Park, 2007
 5. Ralph R. Teetor Educational Award (2004) - Society of Automotive Engineers (SAE)
 6. College of Engineering Outstanding Teaching Award (2004) - Drexel University, Philadelphia, PA
 7. Outstanding Contribution to Graduate Teaching (2004) - Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA

8. National Science Foundation CAREER Award – “CAREER: Minimally Invasive Surgery using Haptics and Vision” (2002)
 9. Nominated for the Anton Philips Best Student paper award (1999) - IEEE International Conference on Robotics and Automation, Detroit, MI
 10. Graduate Student Fellow (1996-1998) - Institute for Research in Cognitive Science, University of Pennsylvania, Philadelphia, PA
 11. Received 10th Rank in the Bombay Center for Talent Search Examination, India (1986)
- k. Editorships, Editorial Boards, and Reviewing Activities for Journals and Other Learned Publications.
1. Program Chair of Second biennial IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics – BioRob, October 2008.
 2. Program Co-Chair of IEEE/ASME International Conference on Advanced Intelligent Mechatronics, July 2008.
 3. Co-editor for the Special Issue on Medical Robotics in International Journal of Robotics Research (2008).
 4. Area Chair – Robotics Science and Systems (RSS), 2008.
 5. Member of the Conference Editorial Board of IEEE International Conference on Robotics and Automation, 2007.
 6. Associate Editor - IEEE Transactions on Information Technology in Biomedicine (TITB), 2007 – present.
 7. Associate Editor - ASME Journal of Medical Devices, 2007-present
 8. Invited to be the Awards Chair for the 14th Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, 2006.
 9. Invited to write a chapter on *Robotics for Life Science Automation* in the Book: “Life Science Automation: Fundamentals and Applications”, 2006.
 10. Editorial Board of IEEE/ASME Transactions on Mechatronics, 2005.
 11. Invited to write an article on *Engineering Approaches to Biomanipulation* for Annual Review of Biomedical Engineering, 2005.
 12. Co-Chair of the IEEE Robotics and Automation Society Technical Committee on Surgical Robotics, 2005.
 13. Elected to be on the Advisory Board for BioRob 2006 Conference, 2005.
 14. Technical Committee on BioRobotics for IEEE Engineering in Medicine and Biology Society, 2005.
 15. Elected to the Program Committee of Haptics Symposium (3 year term: 2005-2008) – Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, 2005.
 16. Invited Theme Co-Chair for "Biomechanics, Bio-Robotics, and Surgical Planning" at IEEE 2006 International Conference of the Engineering in Medicine and Biology Society, New York, New York, 2005.
- l. Other.
1. In the News:
 - i. Article in “Between the Columns” about Outstanding Invention of 2007 in *Physical Science Category*, University of Maryland, College

- Park: MINIR: Minimally Invasive Neurosurgical Intracranial Robot – Lead Inventor.
- ii. Article in “Gazette.net” about Outstanding Invention of 2007 in *Physical Science Category*, University of Maryland, College Park: MINIR: Minimally Invasive Neurosurgical Intracranial Robot – Lead Inventor.

Student Commendations

1. Tie Hu is currently in a Post-Doctoral position at Columbia University.
2. Christopher Kennedy, my first Ph.D. student, joined in a Post-Doctoral position in the area of Medical Robotics in 2004 at the Engineering Research Center for Computer-Integrated Surgical Systems and Technology at The Johns Hopkins University.
3. Ms. Teeranoot Chanthasopeephan is the recipient of the 2005-2006 Link Foundation Fellowship for pursuing Ph.D. studies in the area of Minimally Invasive Surgery. She is also the recipient of the scholarship from the Government of Thailand. She is currently a faculty at King Mongkut University, Thailand.
4. Gregory Tholey received the 2003 National Science Foundation Graduate Research Fellowship for pursuing graduate studies with me in the area of Medical Robotics. He has also been the recipient of the Dean’s Fellowship at Drexel University.
5. James Hing, my previous graduate student, received the GAANN Fellowship and also the Gates Millennium Scholarship to pursue graduate studies. He has also been the recipient of the Dean’s Fellowship at Drexel University.
6. Christopher Kennedy has received the Koerner Fellowship for excellence in graduate studies in the Department of Mechanical Engineering and Mechanics. He has also been the recipient of the Dean’s Fellowship at Drexel University.
7. *Title: An Enhanced Tissue-Joining Device for Delivery of Bioactive Closures (2002)* – My role was as one of the project advisors for the students who won second place in the Baiada Center Business Plan competition and received \$10,000.
8. *Title: The Development of Factor-Containing Biodegradable Closures for Use in Bile Duct Anastomosis (2002)* – My role was as one of the project advisors for this Best Undergraduate Senior Design Project in the School of Biomedical Engineering, Science, and Health Systems.

3. Teaching, Mentoring, and Advising

a. Courses taught.

Course #	Title	Term
Taught at University of Maryland, College Park		
ENME 603	Advanced Mechanisms and Robot Manipulators	Spring 2007
ENME 489R/808M	Medical Robotics	Fall 2007
ENME 489C/808C	Kinematics and Dynamics of Robot Manipulators	Spring 2008
ENME 472	Integrated Product and Process Development	Spring 2008
ENME 472	Integrated Product and Process Development	Fall 2008
Taught at Drexel University		
MEM 423	Mechanics of Vibration	Fall 1999-2000
MEM 800/571	Kinematics of Robots	Winter 1999-2000
MEM 423	Mechanics of Vibration	Spring 1999-2000
MEM 423	Mechanics of Vibration	Fall 2000-2001
MEM 380/571	Kinematics of Robots	Winter 2000-2001
MEM 423	Mechanics of Vibration	Spring 2000-2001
TDEC180-002	Emerging Engineering Technologies (Medical Robotics module)	Spring 2000-2001
MEM 423	Mechanics of Vibration	Fall 2001-2002
MEM 380/571; 800/571; 380/771	Robotics	Winter 2001-2002
MEM 335	Theory of Machines	Winter 2001-2002
MEM 423	Mechanics of Vibration	Spring 2001-2002
MEM 800/501; 380/501	Medical Robotics – I	Fall 2002-2003
MEM 800/502; 380/502	Haptics for Medical Robotics	Winter 2002-2003
MEM 800/505; 380/505	Medical Robotics – II	Spring 2002-2003
MEM 800/001; 380/002	Haptics for Medical Robotics	Fall 2003-2004
MEM 800/002; 380/002	Medical Robotics - I	Winter 2003-2004
MEM 423	Mechanics of Vibration	Spring 2003-2004
TDEC 211	Materials - I	Fall 2004-2005
MEM 492	Senior Design coordinator	Winter 2004-2005
MEM 423	Mechanics of Vibration	Spring 2004-2005
MEM 255	Introduction to Control Systems	Fall 2005-2006
MEM 455	Introduction to Robotics	Winter 2005-2006
MEM 238	Dynamics	Spring 2005-2006
MEM 423	Mechanics of Vibration	Spring 2005-2006

b. Course or Curriculum Development.

Courses Developed

- Kinematics and Dynamics of Robot Manipulators
- Haptics for Medical Robotics
- Medical Robotics-I
- Medical Robotics-II

Laboratories Developed

- After moving to University of Maryland, College Park, in October 2006, I have developed the Robotics, Automation, Manipulation, and Sensing (RAMS) laboratory which focuses primarily on research in the areas of Medical Robotics at the macro and micro scale. Specifically, RAMS lab research is targeted towards: 1) Image-guided robotic systems for surgery, 2) Haptic (sense of touch) interfaces for Robot-assisted Surgery, 3) Reality-based soft-tissue modeling for Surgical Simulation, 4) Model-based teleoperation in Robot-assisted surgery, and 5) Force feedback interface for Cellular surgery.
 - I developed the Medical Robotics Laboratory at Drexel University. The laboratory was built in early 2001 and was called the Program for Robotics, Intelligent Sensing, and Mechatronics (PRISM) Laboratory.
- c. Manuals, Notes, Software, Webpages, and Other Contributions to Teaching. – None.
- d. Teaching Awards and Other Special Recognition.
1. Ralph R. Teetor Educational Award (2004) - Society of Automotive Engineers (SAE)
 2. College of Engineering Outstanding Teaching Award (2004) - Drexel University, Philadelphia, PA
 3. Outstanding Contribution to Graduate Teaching (2004) - Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA
- e. Advising: Other than Research Direction.
- i. Undergraduate.

Drexel University

Senior Design Projects

I have supervised six senior design projects. Below is the list of senior design projects that I have served as an advisor.

1. Human Augmentation System for Prenatal Diagnostic Procedures
2. Design and Development of a Novel Stereoendoscope
3. Design and development of a surgical stapler
4. Motion Planning for a Mobile Robot
5. Path Planning for a Lead Robot
6. Electrical Vehicle Conversion

Freshmen Design Projects

I have supervised /am supervising freshmen design projects. Below is the list of freshmen design projects that I have been involved as an advisor.

1. Design of a Robotic Swing for Infants
2. Design of a Wall Climbing Robot
3. Satellite Sushi
4. SmartPark
5. Biometrics: An effective solution to car security
6. S.A.F.E. Safety Allows for Excellence Blind Spot Detection System
7. Smart Laser Lawnmower
8. Spherical Wrist

ii. Graduate.

Independent Study

Drexel University

1. Edward Steager (Winter 2006) – Kinematics of Robots.

iii. Other advising activities – None.

f. Advising: Research Direction.

i. Undergraduate.

Independent Study

I have supervised the following students for independent study.

1. *Socheth Bith* (Summer 2004) – Worked on data analysis for modeling soft-tissue cutting.
2. *Jake, Justin, and John* – Programming experience for developing virtual interfaces for surgery.
3. *Christopher Kennedy* (Fall, Winter, Spring, and summer 2000-2001 term) – Worked on robot vision, understanding image processing, familiarizing with vision hardware, and understanding motion planning for a mobile robot.
4. *Brian Schmidt* (Summer 2001) – Worked on the design of the robotic hand.

Research Experiences for Undergraduates (REU) – NSF sponsored

I have been successful in involving undergraduate students in research through the REU program of the National Science Foundation.

University of Maryland, College Park

1. Ms. Dara Scher – Summer 2008.
2. Mr. Jonathan Chung – Design and development of an MRI compatible device for soft-tissue property measurement – University of Maryland, College Park.

Drexel University

3. Mr. Theodore A. Bieniosek – Hardware development for robot-assisted surgery system with Haptic feedback.
4. Mr. James Hing – Developed soft-tissue property estimation apparatus.
5. Ms. Angelina Schulz – Developed soft-tissue property estimation apparatus.
6. Mr. Greg Tholey – Development of the experimental testbed for tissue property estimation and the servomotor housing assembly for controlling the laparoscopic grasper movement.
7. Ms. Mary Emig - Design of the robotic hand.
8. Ms. Roseanne Crockett – Design of the robotic hand.
9. Mr. Griffin Harold – Design of the robotic hand.
10. Mr. Christopher Kennedy – Vision algorithms for tracking deformable membrane.

ii. Master's.

Name	Start Date	Successfully Defended	Research Area
Matthew Para	Spring 2008		Image-guided Surgery

iii. Doctoral.

Name	Start Date	Successfully Defended	Research Area
Christopher Kennedy	Fall 2001	August 2004	Medical Robotics (Combining Vision and Haptic Feedback with application to Cardiothoracic Surgery)
Tie Hu	Fall 2001	May 2006	Medical Robotics (Modeling soft-tissue probing)
Teeranoot Chanthasopeephan	Fall 2002	May 2006	Medical Robotics (Modeling soft-tissue cutting)
Gregory Tholey	Fall 2002	2007	Medical Robotics (Haptic Interface)
Anand Pillarisetti	Fall 2003		Cell Manipulation and Characterization
Kevin Lister	Spring 2007		Soft-tissue modeling for Surgical simulation
Rajarshi Roy	Fall 2008		Cell Characterization
Bo Yang	Fall 2008		Image-guided Robotics for RFA and Biopsy
Mingyen Ho	Fall 2008		Image-guided Robotics for Neurosurgery
Chad Kessens	Fall 2008		Robotic Manipulation

- f. Extension Activities.
 - a. Chair - Ph.D Qualifying Exam committee:
 - i. Mr. Peyman Karimian (2008)
 - ii. Mr. Ashis Banerjee (2007)
 - iii. Mr. Atul Thakur (2007)
 - iv. Mr. Dennis Leber (2007)

4. Service

a. Professional.

i. Offices and committee memberships held in professional organizations.

1. Program Chair of Second biennial IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics – BioRob, October 2008.
2. Program Co-Chair of IEEE/ASME International Conference on Advanced Intelligent Mechatronics, July 2008.
3. Co-editor for the Special Issue on Medical Robotics in International Journal of Robotics Research (2008).
4. Area Chair – Robotics Science and Systems (RSS), 2008.
5. Member of the Conference Editorial Board of IEEE International Conference on Robotics and Automation, 2007.
6. Associate Editor - IEEE Transactions on Information Technology in Biomedicine (TITB), 2007 – present.
7. Associate Editor - ASME Journal of Medical Devices, 2007-present
8. Invited to be a member of the Awards Committee for the Best Conference Paper award for IEEE International Conference on Robotics and Automation, 2007.
9. Invited to be the Area Chair for Robotics: Science and Systems Conference, 2007.
10. Member of the Conference Editorial Board for IEEE International Conference on Robotics and Automation, 2006.
11. Elected to be on the Advisory Board for BioRob 2006 Conference
12. Invited to be the Co-Chair of the IEEE Robotics and Automation Society Technical Committee on Surgical Robotics, 2005.
13. Invited to join the Technical Committee on BioRobotics for IEEE Engineering in Medicine and Biology Society, 2005.
14. Elected to be a member of the Program Committee for Symposium on Haptic Interfaces for Virtual Environment and Teleoperator systems. This is a 3-year appointment (2005-2008).
15. Theme Co-Chair for "Biomechanics, Bio-Robotics, and Surgical Planning" at IEEE 2006 International Conference of the Engineering in Medicine and Biology Society, New York, NY.
16. Member of the 2006 IEEE International Conference on Robotics and Automation Program Committee, Orlando, Florida.
17. Member of the 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems Program Committee, Alberta, Canada.
18. Invited to be a Member of the Program Committee for International Conference on Advanced Robotics, Seattle, WA, July 17-20, 2005.
19. Member of the International Program Committee for Solid and Physical Modeling 2005, MIT, Cambridge, MA, June 13-15, 2005.
20. Track chair for Surgical and Rehabilitative Robotics Theme at the 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Francisco, CA, September 1-5, 2004.
21. Member of the Program committee for EuroHaptics, 2004.

22. Member of the International Program Committee for the Tenth IASTED International Conference on Robotics and Applications, Honolulu, Hawaii, USA, August 23-25, 2004.
 23. Member of the Program committee for International Conference on Intelligent Robots and Systems, Las Vegas, 2003.
 24. Chair of the session at International Conference on Advanced Robotics, Coimbra, Portugal, 2003.
 25. Member of the Program committee for Sixth International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2003, Montreal, Canada.
 26. Member of the Program committee for International Conference on Advanced Robotics, Coimbra, Portugal, 2003.
 27. Member of the Program committee for Fifth International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2002, Tokyo, Japan.
 28. Member of the Program committee for 2002 IEEE International Conference on Robotics and Automation, Washington D.C.
 29. Session Chair for 2002 IEEE International Conference on Robotics and Automation, Washington D.C.
 30. Member of the program committee of the 2001 IEEE – Robotics Society of Japan (RSJ) International Conference on Intelligent Robots and Systems held in Maui, Hawaii from October 29 – November 3, 2001.
 31. Session Chair for the 2001 IEEE – Robotics Society of Japan (RSJ) International Conference on Intelligent Robots and Systems held in Maui, Hawaii from October 29 – November 3, 2001.
 32. Member of the Program committee for 2001 IEEE International Conference on Robotics and Automation, Seoul, Korea.
 33. I was invited to be the chair of the session on “Humanoid Robots” for 2001 IEEE International Conference on Robotics and Automation held in Seoul, Korea. However, I was unable to attend the conference due to personal reasons and had to decline the invitation.
- ii. Reviewing activities for agencies.
1. NSF IGERT Pre-Proposal Panel (2008)
 2. NSF RI Panel (2008)
 3. NIH Study Sections in March, June, and October - 2007
 4. NSF IGERT pre-proposal panel (2007)
 5. NSF CMMI Panel (2007)
 6. NSF RI Panel (2007)
 7. NSF IGERT pre-proposal panel (2006)
 8. Invited to serve on the NIH grant application review meeting in June 2006.
 9. NIH Study Section (2006).
 10. NSF: Panelist for proposals submitted to: 1) Robotics and Computer Vision Program (2004), 2) ITR program (2002), and 3) Research Resources (2002).
 11. NIH Study Section (2005)
 12. NIH Study Section (2004)

13. NASA: Research proposals in the area of Intelligent Systems Program, Automated Reasoning program element.
 - iii. Other unpaid services to local, state, and federal agencies.
 1. Program Committee Member of the *1st NSF PI workshop on Robotics and Computer Vision* (2003).
 - iv. Other non-University committees, commissions, panels, etc. – None.
 - v. International activities not listed above. – None.
 - vi. Paid consultancies. – None.
- b. Campus.
- i. Departmental.

University of Maryland, College Park

1. ASME Faculty Advisor (2007-present)
2. Fellowship Workshop for Graduate Students (2008)
3. Fellowship Workshop for Graduate Students (2007)

Drexel University

1. Member of the committee to select the Pei Chi Chou Assistant Professor (Fall 2005).
2. Member of the Undergraduate Affairs Committee (2005-2006)
3. Member of the Graduate Affairs Committee (2005-2006)
4. Member of Faculty Recruitment committee for the Department of Mechanical Engineering and Mechanics (2004-2005 academic year).
5. Departmental Seminar Coordinator (2003-2004 academic year)
6. Graduate Affairs Committee (2003-2004 academic year).
7. Departmental Seminar Coordinator (2002-2003 academic year)
8. Departmental Seminar Coordinator (2001-2002 academic year)
9. Graduate Affairs Committee (2000-2001 academic year)
10. American Society of Mechanical Engineers, Faculty advisor (1999-2000 academic year and 2000-2001 academic year)
11. Departmental Laboratory curriculum development committee (Spring 2000)
12. Departmental Faculty Computers and Networking Contact (1999-2000 academic year).

- ii. College.

Drexel University

1. Gateway-Drexel “Engineering Horizons” initiative (Summer 2000 – Summer 2001) - I was the member of the Interdisciplinary course development committee.

- iii. University.

Drexel University

1. Reviewer for the *GRID*: Grants for Research Impact at Drexel (A Distribution of Synergy and Tobacco Funds) proposals – 2005.
- iv. Special administrative assignments. – None.
- v. Other.

Paper Reviewership

- Medical Image Analysis
 - IEEE Transactions on Robotics
 - IEEE Transactions on Automation Science and Engineering
 - Autonomous Robots
 - International Symposium of Robotics Research (ISRR)
 - Haptic Interfaces for Virtual Environment and Teleoperator Systems (Haptics Symposium)
 - Medical Image Computing and Computer-Assisted Intervention (MICCAI)
 - International Conference on Advanced Robotics, IEEE Transactions on Robotics and Automation
 - IEEE/RSJ Conference on Intelligent Robots and Systems
 - ASME Journal of Mechanical Design
 - Journal of Dynamic Systems, Measurement, and Control
 - IEEE Transactions on Rehabilitation Engineering.
- c. Community, State, National.

Served as one of the faculty advisors for the Research Experiences for Teachers (RET) site program at Drexel University sponsored by the National Science Foundation. The goal of this project is to involve teachers from the Philadelphia area to technologically educate them through a summer internship in the laboratory of participating faculty at Drexel University. Involvement of teachers in these activities will hopefully lead to dissemination of technology at the grass root level, with teachers demonstrating their work to their high-school and middle-school students.
 - d. Service Awards and Honors. – None.