Table of Contents

JAYDEV PRATAPRAI DESAI
PROFESSOR
WALLACE H. COULTER DEPARTMENT OF BIOMEDICAL ENGINEERING

I. Earned Degrees

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

1997 MA - Mathematics
University of Pennsylvania
Philadelphia, PA 19104, USA

1995 MSE - Mechanical Engineering and Applied Mechanics
University of Pennsylvania
Philadelphia, PA 19104, USA

1993 B. Tech - Mechanical Engineering
Indian Institute of Technology
Bombay, India

II. Employment History

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

1999 – 2005 Assistant Professor
Department of Mechanical Engineering and Mechanics
Drexel University, Philadelphia, PA

2002 – 2004 Assistant Professor
Department of Materials Engineering
Drexel University, Philadelphia, PA

2000 – 2006 Affiliated Faculty
College of Biomedical Engineering, Science and Health Systems
Drexel University, Philadelphia, PA

2002 – 2006 Affiliated faculty appointment

Department of Cardiothoracic Surgery
Drexel University College of Medicine, Philadelphia, PA

2005 – 2006 Affiliated faculty appointment
Department of Surgery
Drexel University College of Medicine, Philadelphia, PA

2005 – 2006 Affiliated Faculty appointment
Department of Materials Science and Engineering
Drexel University, Philadelphia, PA

2005 – 2006 Associate Professor
Department of Mechanical Engineering and Mechanics
Drexel University, Philadelphia, PA

2006 – 2013 Associate Professor
Department of Mechanical Engineering
University of Maryland, College Park, MD

2007 – 2016 Affiliate Faculty
Fischell Department of Bioengineering
University of Maryland, College Park, MD

2009 – 2016 Member of University of Maryland Marlene and Stewart Greenebaum Cancer Center, University of Maryland School of Medicine, Baltimore, MD

2010 – 2016 Affiliate Faculty Member
Institute for Systems Research, University of Maryland, College Park, MD

2010 – 2016 Faculty Member
Applied Mathematics & Statistics, and Scientific Computation (AMSC) Program
University of Maryland, College Park, MD

2014 – 2016 Affiliate Professor
Department of Electrical and Computer Engineering
University of Maryland, College Park, MD

2013 – 2016 Professor
Department of Mechanical Engineering
University of Maryland, College Park, MD

2016 – Present Professor
Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory, Georgia Institute of Technology, Atlanta, GA

2016 – Present Adjunct Professor
Emory University School of Medicine, Atlanta, GA

2016 – 2019 BME Distinguished Faculty Fellow
Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory, Georgia Institute of Technology, Atlanta, GA

2017 – Present Adjunct Professor
Radiology and Imaging Sciences
Emory University School of Medicine, Atlanta, GA

2017 – Present Founding Director, Georgia Center for Medical Robotics (GCMR)
Georgia Institute of Technology, Atlanta, GA

2017 – Present Associate Director, Institute for Robotics and Intelligent Machines (IRIM)
Georgia Institute of Technology, Atlanta, GA

2017 – Present Professor (Courtesy appointment)
The George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology, Atlanta, GA

2020 – Present Adjunct Professor
School of Electrical and Computer Engineering
Georgia Institute of Technology, Atlanta, GA

III. Honors and Awards

** indicates publications from work performed entirely or in part at Georgia Tech. Student, Post-Doc, or trainee co-authors are in **boldface**.*

A. International or National Awards

1. Nominated for the Anton Philips Best Student Paper Award - J. P. Desai, V. Kumar, and J. P. Ostrowski, "Control of changes in formation for a team of mobile robots," in *Proceedings 1999 IEEE International Conference on Robotics and Automation*, 10-15 May 1999 1999, vol. 2, pp. 1556-1561 vol.2, doi: 10.1109/ROBOT.1999.772581.

2. National Science Foundation CAREER Award – "CAREER: Minimally Invasive Surgery using Haptics and Vision", 2002.

3. Invited to attend National Academy of Engineering's 2011 U.S. Frontiers of Engineering Symposium at Google Headquarters in Mountain View, CA, September 18 - September 21, 2011.

4. Fellow, American Society of Mechanical Engineers (ASME), 2015.

5. Cover image on July 2016 issue of IEEE Transactions on Biomedical Engineering for our journal article titled: "Towards a portable cancer diagnostic tool using a disposable MEMS-based biochip", 2016.

6. Best Student Paper Award: ***K. Park** and J. P. Desai, "Machine learning approach for breast cancer localization," in *2017 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS)*, 2017, pp. 1-6, doi: 10.1109/MARSS.2017.8001925.

7. Fellow, American Institute for Medical and Biological Engineering (AIMBE), 2017.

8. Fellow, Institute of Electrical and Electronics Engineers "for contributions to medical and swarm robotics", 2018.

9. Finalist at the 2018 ICRA for the "IEEE RAS Award for the Most Influential Paper from ICRA 1998" for the paper: J. P. Desai, J. Ostrowski, and V. Kumar, "Controlling formations of multiple mobile robots," in *Proceedings. 1998 IEEE International Conference on Robotics and Automation*, 1998, vol. 4, pp. 2864-2869 vol.4, doi: 10.1109/ROBOT.1998.680621.

10. Best Symposium Paper Award: ***X. Wang, P. Tran,** S. M. Callahan, S. L. Wolf, and J. P. Desai, "Towards the development of a voice-controlled exoskeleton system for restoring hand function," in *2019 International Symposium on Medical Robotics (ISMR)*, 2019, pp. 1-7, doi: 10.1109/ISMR.2019.8710195.

11. 2021 Recipient of the "IEEE RAS Distinguished Service Award" from the IEEE Robotics and Automation Society (RAS) - To be presented at IEEE International Conference on Robotics and Automation (ICRA), 2021.

B. Institute or School Awards

1. Ralph R. Teetor Educational Award - Society of Automotive Engineers (SAE), 2004.

2. College of Engineering Outstanding Teaching Award - Drexel University, Philadelphia, PA, 2004.

3. Outstanding Contribution to Graduate Teaching - Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA, 2004.

4. Pei Chi Chou Assistant Professor *of Mechanical Engineering and Mechanics*, Department of Mechanical Engineering and Mechanics, Drexel University, Philadelphia, PA, 2004-2005.

5. Invited to Research Leaders Luncheon, University of Maryland, College Park, 2007.

6. Outstanding Invention in *Physical Science Category*, University of Maryland, College Park: MINIR: Minimally Invasive Neurosurgical Intracranial Robot – Lead Inventor, 2007.

7. Invited to Research Leaders Luncheon, University of Maryland, College Park, 2009.

8. Invited to Research Leaders Luncheon, University of Maryland, College Park, 2010.

9. Invited to Research Leaders Luncheon, University of Maryland, College Park, 2011.

10. Invited to Research Leaders Luncheon, University of Maryland, College Park, 2013.

11. Invited to Research Leaders Luncheon, University of Maryland, College Park, 2014.

12. One of Five Faculty chosen from University of Maryland, College Park, for Committee on Institutional Cooperation (CIC) Academic Leadership Program (ALP) Fellow, 2014-2015.

13. Invited to Research Leaders Luncheon, University of Maryland, College Park, 2015.

14. BME Distinguished Faculty Fellow, Wallace H. Coulter Department of Biomedical Engineering at Georgia Tech and Emory, Georgia Institute of Technology, Atlanta, GA, 2016-2019.

15. Selected to join the cohort of the Office of Provost's Emerging Leaders Program (ELP), Georgia Institute of Technology, 2019-2020.

IV. Research, Scholarship, and Creative Activities

** indicates publications from work performed entirely or in part at Georgia Tech. Student, Post-Doc, or trainee co-authors are in **boldface**.*

A. Published Books, Book Chapters, and Edited Volumes

A1. Edited Volumes

1. *R. Patel, Ed. *Minimally Invasive Surgical Robotics* (The Encyclopedia of Medical Robotics). World Scientific Publishing Co Pte Ltd, 2019. Editor-in-Chief: Jaydev P. Desai.

2. *A. Ferreira, Ed. *Micro and Nano Robotics in Medicine* (The Encyclopedia of Medical Robotics). World Scientific Publishing Co Pte Ltd, 2019. Editor-in-Chief: Jaydev P. Desai.

3. *J. P. Desai, Ed. *Image-guided Surgical Procedures and Interventions* (The Encyclopedia of Medical Robotics). World Scientific Publishing Co Pte Ltd, 2019. Editor-in-Chief: Jaydev P. Desai.

4. *S. Agrawal, Ed. *Rehabilitation Robotics* (The Encyclopedia of Medical Robotics). World Scientific Publishing Co Pte Ltd, 2019. Editor-in-Chief: Jaydev P. Desai.

A2. Other Parts of Books

1. J. P. Desai, "D-H Convention," in *Robotics and Automation Handbook*, T. R. Kurfess Ed.: CRC Press, 2005, pp. 8-1 to 8-21.

2. J. P. Desai, J. Yasha Kresh, A. S. Wechsler, A. E. Castellanos, and W. C. Meyers, "Robotic Surgery," *Wiley Encyclopedia of Biomedical Engineering,* 2006, doi: 10.1002/9780471740360.ebs1050.

3. J. P. Desai and A. Pillarisetti, "Robotics for Life Science Automation," in *Life Science Automation Fundamentals and Applications*, B. N. Mingjun Zhang, and Robin Felder Ed., 2007, pp. 197-218.

4. *Y. Kim, **S. S. Cheng, J. Sheng**, and J. P. Desai, "Flexible Meso-Scale Robots for Surgery," in *The Encyclopedia of Medical Robotics*: World Scientific Publishing Co Pte Ltd, 2018, pp. 245-280.

5. *H. J. Pandya, R. Roy, **K. Park**, and J. P. Desai, "Microscale Sensors for Breast Cancer Diagnosis," in *The Encyclopedia of Medical Robotics*: World Scientific Publishing Co Pte Ltd, 2018, pp. 275-310.

6. ***J. Sheng, S. S. Cheng**, Y. Kim, and J. P. Desai, "Mesao-Scale Robotic Systems for Neurosurgery," in *The Encyclopedia of Medical Robotics*: World Scientific Publishing Co Pte Ltd, 2018, pp. 287-328.

B. Refereed Publications and Submitted Articles

B1. Published and Accepted Journal Articles

1. J. P. Desai, M. Zefran, and V. Kumar, "Two-arm manipulation tasks with friction-assisted grasping," *Advanced Robotics,* vol. 12, no. 5, pp. 485-507, 1997, doi: 10.1163/156855397X00425.

2. J. P. Desai and V. Kumar, "Motion planning for cooperating mobile manipulators," *Journal of Robotic Systems,* vol. 16, no. 10, pp. 557-579, 1999, doi: 10.1002/(SICI)1097-4563(199910)16:10<557::AID-ROB3>3.0.CO;2-H.

3. J. P. Ostrowski, J. P. Desai, and V. Kumar, "Optimal Gait Selection for Nonholonomic Locomotion Systems," *The International Journal of Robotics Research,* vol. 19, no. 3, pp. 225-237, 2000, doi: 10.1177/02783640022066833.

4. A. Ansar, D. Rodrigues, J. P. Desai, K. Daniilidis, V. Kumar, and M. F. M. Campos, "Visual and haptic collaborative tele-presence," *Computers & Graphics,* vol. 25, no. 5, pp. 789-798, 2001, doi: https://doi.org/10.1016/S0097-8493(01)00121-2.

5. J. P. Desai, J. P. Ostrowski, and V. Kumar, "Modeling and control of formations of nonholonomic mobile robots," *IEEE Transactions on Robotics and Automation,* vol. 17, no. 6, pp. 905-908, 2001, doi: 10.1109/70.976023.

6. J. P. Desai, "A Graph Theoretic Approach for Modeling Mobile Robot Team Formations," *Journal of Robotic Systems,* vol. 19, no. 11, pp. 511-525, 2002, doi: 10.1002/rob.10057.

7. C. W. Kennedy, T. Hu, J. P. Desai, A. S. Wechsler, and J. Y. Kresh, "A Novel Approach to Robotic Cardiac Surgery Using Haptics and Vision," *Cardiovascular Engineering: An International Journal,* vol. 2, no. 1, pp. 15-22, 2002, doi: 10.1023/A:1019926620096.

8. T. Chanthasopeephan, J. P. Desai, and A. C. W. Lau, "Measuring Forces in Liver Cutting: New Equipment and Experimental Results," *Annals of Biomedical Engineering,* vol. 31, no. 11, pp. 1372-1382, 2003, doi: 10.1114/1.1624601.

9. T. Hu, G. Tholey, J. Desai, and A. Castellanos, "Evaluation of a laparoscopic grasper with force feedback," *Surgical endoscopy,* vol. 18 5, pp. 863-7, 2004.

10. A. R. Lanfranco, A. E. Castellanos, J. P. Desai, and W. C. Meyers, "Robotic Surgery: A Current Perspective," *Annals of Surgery,* vol. 239, no. 1, 2004.

11. T. Sugar and J. P. Desai, "A Framework for Kinematic and Dynamic Motion Planning for a Formation of Mobile Robots," *Intelligent Automation & Soft Computing,* vol. 10, no. 4, pp. 307-322, 2004, doi: 10.1080/10798587.2004.10642885.

12. G. Tholey, A. Pillarisetti, and P. Desai Jaydev, "On-site three dimensional force sensing capability in a laparoscopic grasper," *Industrial Robot: An International Journal,* vol. 31, no. 6, pp. 509-518, 2004, doi: 10.1108/01439910410566380.

13. C. W. Kennedy and J. P. Desai, "A vision-based approach for estimating contact forces: Applications to robot-assisted surgery," *Applied Bionics and Biomechanics,* vol. 2, no. 1, pp. 53-60, 2005, doi: 10.1533/abbi.2004.0006.

14. C. W. Kennedy and J. P. Desai, "Modeling and control of the Mitsubishi PA-10 robot arm harmonic drive system," *IEEE/ASME Transactions on Mechatronics,* vol. 10, no. 3, pp. 263-274, 2005, doi: 10.1109/TMECH.2005.848290.

15. G. Tholey, J. P. Desai, and A. E. Castellanos, "Force Feedback Plays a Significant Role in Minimally Invasive Surgery: Results and Analysis," *Annals of Surgery,* vol. 241, no. 1, 2005.

16. T. Chanthasopeephan, J. P. Desai, and A. 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,* vol. 54, no. 3, pp. 349-359, 2007, doi: 10.1109/TBME.2006.886937.

17. J. P. Desai, A. Pillarisetti, and A. D. Brooks, "Engineering Approaches to Biomanipulation," *Annual Review of Biomedical Engineering,* vol. 9, no. 1, pp. 35-53, 2007, doi: 10.1146/annurev.bioeng.9.060906.151940.

18. J. T. Hing, A. D. Brooks, and J. P. Desai, "A biplanar fluoroscopic approach for the measurement, modeling, and simulation of needle and soft-tissue interaction," *Medical Image Analysis,* vol. 11, no. 1, pp. 62-78, 2007, doi: https://doi.org/10.1016/j.media.2006.09.005.

19. A. Pillarisetti, M. Pekarev, A. D. Brooks, and J. P. Desai, "Evaluating the Effect of Force Feedback in Cell Injection," *IEEE Transactions on Automation Science and Engineering,* vol. 4, no. 3, pp. 322-331, 2007, doi: 10.1109/TASE.2006.888051.

20. G. Tholey and J. P. Desai, "A General-Purpose 7 DOF Haptic Device: Applications Toward Robot-Assisted Surgery," *IEEE/ASME Transactions on Mechatronics,* vol. 12, no. 6, pp. 662-669, 2007, doi: 10.1109/TMECH.2007.910105.

21. T. Hu, A. C. W. Lau, and J. P. Desai, "Instrumentation for Testing Soft Tissue Undergoing Large Deformation: Ex Vivo and In Vivo Studies," *Journal of Medical Devices,* vol. 2, no. 4, 2008, doi: 10.1115/1.2996594.

22. G. Tholey and J. P. Desai, "A Compact and Modular Laparoscopic Grasper With Tridirectional Force Measurement Capability," *Journal of Medical Devices,* vol. 2, no. 3, 2008, doi: 10.1115/1.2952817.

23. R. Kokes, K. Lister, R. Gullapalli, B. Zhang, A. MacMillan, H. Richard, and J. P. Desai, "Towards a teleoperated needle driver robot with haptic feedback for RFA of breast tumors under continuous MRI," *Medical Image Analysis,* vol. 13, no. 3, pp. 445-455, 2009, doi: https://doi.org/10.1016/j.media.2009.02.001.

24. Z. Gao and J. P. Desai, "Estimating zero-strain states of very soft tissue under gravity loading using digital image correlation," *Medical Image Analysis,* vol. 14, no. 2, pp. 126-137, 2010, doi: https://doi.org/10.1016/j.media.2009.11.002.

25. Z. Gao, K. Lister, and J. P. Desai, "Constitutive Modeling of Liver Tissue: Experiment and Theory," *Annals of Biomedical Engineering,* vol. 38, no. 2, pp. 505-516, 2010, doi: 10.1007/s10439-009-9812-0.

26. A. Ananthanarayanan, L. Ehrlich, J. P. Desai, and S. K. Gupta, "Design of Revolute Joints for In-Mold Assembly Using Insert Molding," *Journal of Mechanical Design,* vol. 133, no. 12, 2011, doi: 10.1115/1.4005327.

27. C. L. Keefer and J. P. Desai, "Mechanical phenotyping of stem cells," *Theriogenology,* vol. 75, no. 8, pp. 1426-1430, 2011, doi: https://doi.org/10.1016/j.theriogenology.2010.11.032.

28. C. C. Kessens and J. P. Desai, "A Self-Sealing Suction Cup Array for Grasping," *Journal of Mechanisms and Robotics,* vol. 3, no. 4, 2011, doi: 10.1115/1.4004893.

29. K. Lister, Z. Gao, and J. P. Desai, "Development of In Vivo Constitutive Models for Liver: Application to Surgical Simulation," *Annals of Biomedical Engineering,* vol. 39, no. 3, pp. 1060-1073, 2011, doi: 10.1007/s10439-010-0227-8.

30. A. Pillarisetti, J. P. Desai, H. Ladjal, A. Schiffmacher, A. Ferreira, and C. L. Keefer, "Mechanical Phenotyping of Mouse Embryonic Stem Cells: Increase in Stiffness with Differentiation," *Cellular Reprogramming,* vol. 13, no. 4, pp. 371-380, 2011, doi: 10.1089/cell.2011.0028.

31. U. Tan, B. Yang, R. Gullapalli, and J. P. Desai, "Triaxial MRI-Compatible Fiber-optic Force Sensor," *IEEE Transactions on Robotics,* vol. 27, no. 1, pp. 65-74, 2011, doi: 10.1109/TRO.2010.2090061.

32. B. Yang, U. Tan, A. B. McMillan, R. Gullapalli, and J. P. Desai, "Design and Control of a 1-DOF MRI-Compatible Pneumatically Actuated Robot With Long Transmission Lines," *IEEE/ASME Transactions on Mechatronics,* vol. 16, no. 6, pp. 1040-1048, 2011, doi: 10.1109/TMECH.2010.2071393.

33. E. Ayvali, C.-P. Liang, M. Ho, Y. Chen, and J. P. Desai, "Towards a discretely actuated steerable cannula for diagnostic and therapeutic procedures," *The International Journal of Robotics Research,* vol. 31, no. 5, pp. 588-603, 2012, doi: 10.1177/0278364912442429.

34. A. R. Baheti, R. Hafey, S. Pai, J. Gomez, Y. Millo, and J. P. Desai, "Real-Time Fiber-Optic Intubation Simulator With Force Feedback," *IEEE/ASME Transactions on Mechatronics,* vol. 17, no. 1, pp. 98-106, 2012, doi: 10.1109/TMECH.2010.2090666.

35. L. Chia-Pin, C. Chao-Wei, W. Jeremiah, D. Jaydev, G. Rao, M. Reuben, T. Cha-Min, and C. Yu, "Endoscopic Microscopy Using Optical Coherence Tomography," *Current Medical Imaging,* vol. 8, no. 3, pp. 174-193, 2012, doi: http://dx.doi.org/10.2174/157340512803759910.

36. M. Ho, A. B. McMillan, J. M. Simard, R. Gullapalli, and J. P. Desai, "Toward a Meso-Scale SMA-Actuated MRI-Compatible Neurosurgical Robot," *IEEE Transactions on Robotics,* vol. 28, no. 1, pp. 213-222, 2012, doi: 10.1109/TRO.2011.2165371.

37. H. Ladjal, J. Hanus, A. Pillarisetti, C. Keefer, A. Ferreira, and J. P. Desai, "Reality-Based Real-Time Cell Indentation Simulator," *IEEE/ASME Transactions on Mechatronics,* vol. 17, no. 2, pp. 239-250, 2012, doi: 10.1109/TMECH.2010.2091010.

38. E. Ayvali and J. P. Desai, "Pulse width modulation–based temperature tracking for feedback control of a shape memory alloy actuator," *Journal of Intelligent Material Systems and Structures,* vol. 25, no. 6, pp. 720-730, 2013, doi: 10.1177/1045389X13502576.

39. L. Chia-Pin, Y. Bo, K. Il Kyoon, M. George, D. Jaydev, L. G. Rao, and C. Yu, "Concurrent multiscale imaging with magnetic resonance imaging and optical coherence tomography," *Journal of Biomedical Optics,* vol. 18, no. 4, pp. 1-5, 2013, doi: 10.1117/1.JBO.18.4.046015.

40. R. Roy, W. Chen, L. Cong, L. A. Goodell, D. J. Foran, and J. P. Desai, "A Semi-Automated Positioning System for Contact-Mode Atomic Force Microscopy (AFM)," *IEEE Transactions on Automation Science and Engineering,* vol. 10, no. 2, pp. 462-465, 2013, doi: 10.1109/TASE.2012.2226154.

41. B. Yang, S. Roys, U. X. Tan, M. Philip, H. Richard, R. P. Gullapalli, and J. P. Desai, "Design, development, and evaluation of a master–slave surgical system for breast biopsy under continuous MRI," *The International Journal of Robotics Research,* vol. 33, no. 4, pp. 616-630, 2013, doi: 10.1177/0278364913500365.

42. H. J. Pandya, W. Chen, L. A. Goodell, D. J. Foran, and J. P. Desai, "Mechanical phenotyping of breast cancer using MEMS: a method to demarcate benign and

cancerous breast tissues," *Lab on a Chip,* 10.1039/C4LC00594E vol. 14, no. 23, pp. 4523-4532, 2014, doi: 10.1039/C4LC00594E.

43. H. J. Pandya, H. T. Kim, R. Roy, W. Chen, L. Cong, H. Zhong, D. J. Foran, and J. P. Desai, "Towards an automated MEMS-based characterization of benign and cancerous breast tissue using bioimpedance measurements," *Sensors and Actuators B: Chemical,* vol. 199, pp. 259-268, 2014, doi: https://doi.org/10.1016/j.snb.2014.03.065.

44. H. J. Pandya, H. T. Kim, R. Roy, and J. P. Desai, "MEMS based low cost piezoresistive microcantilever force sensor and sensor module," *Materials Science in Semiconductor Processing,* vol. 19, pp. 163-173, 2014, doi: https://doi.org/10.1016/j.mssp.2013.12.016.

45. R. Roy, W. Chen, L. Cong, L. A. Goodell, D. J. Foran, and J. P. Desai, "Probabilistic Estimation of Mechanical Properties of Biomaterials Using Atomic Force Microscopy," *IEEE Transactions on Biomedical Engineering,* vol. 61, no. 2, pp. 547-556, 2014, doi: 10.1109/TBME.2013.2283597.

46. R. Roy and J. P. Desai, "Determination of Mechanical Properties of Spatially Heterogeneous Breast Tissue Specimens Using Contact Mode Atomic Force Microscopy (AFM)," *Annals of Biomedical Engineering,* vol. 42, no. 9, pp. 1806-1822, 2014, doi: 10.1007/s10439-014-1057-x.

47. E. Ayvali and J. P. Desai, "Optical Flow-Based Tracking of Needles and Needle-Tip Localization Using Circular Hough Transform in Ultrasound Images," *Annals of Biomedical Engineering,* vol. 43, no. 8, pp. 1828-1840, 2015, doi: 10.1007/s10439-014-1208-0.

48. W. Chen, Z. Brandes, R. Roy, M. Chekmareva, H. J. Pandya, J. P. Desai, and D. J. Foran, "Robot-Guided Atomic Force Microscopy for Mechano-Visual Phenotyping of Cancer Specimens," *Microscopy and Microanalysis,* vol. 21, no. 5, pp. 1224-1235, 2015, doi: 10.1017/S1431927615015007.

49. M. Ho, Y. Kim, S. S. Cheng, R. Gullapalli, and J. P. Desai, "Design, development, and evaluation of an MRI-guided SMA spring-actuated neurosurgical robot," *The International Journal of Robotics Research,* vol. 34, no. 8, pp. 1147-1163, 2015, doi: 10.1177/0278364915579069.

50. H. J. Pandya, K. Park, W. Chen, M. A. Chekmareva, D. J. Foran, and J. P. Desai, "Simultaneous MEMS-based electro-mechanical phenotyping of breast cancer," *Lab on a Chip,* 10.1039/C5LC00491H vol. 15, no. 18, pp. 3695-3706, 2015, doi: 10.1039/C5LC00491H.

51. H. J. Pandya, K. Park, and J. P. Desai, "Design and fabrication of a flexible MEMS-based electro-mechanical sensor array for breast cancer diagnosis," *Journal of Micromechanics and Microengineering,* vol. 25, no. 7, p. 075025, 2015, doi: 10.1088/0960-1317/25/7/075025.

52. H. J. Pandya, R. Roy, W. Chen, M. A. Chekmareva, D. J. Foran, and J. P. Desai, "Accurate characterization of benign and cancerous breast tissues: Aspecific patient studies using

piezoresistive microcantilevers," *Biosensors and Bioelectronics,* vol. 63, pp. 414-424, 2015, doi: https://doi.org/10.1016/j.bios.2014.08.002.

53. J. Sheng and J. P. Desai, "Design, modeling and characterization of a novel meso-scale SMA-actuated torsion actuator," *Smart Materials and Structures,* vol. 24, no. 10, p. 105005, 2015, doi: 10.1088/0964-1726/24/10/105005.

54. C. C. Kessens and J. P. Desai, "Versatile Passive Grasping for Manipulation," *IEEE/ASME Transactions on Mechatronics,* vol. 21, no. 3, pp. 1293-1302, 2016, doi: 10.1109/TMECH.2016.2520306.

55. H. J. Pandya, K. Park, W. Chen, L. A. Goodell, D. J. Foran, and J. P. Desai, "Toward a Portable Cancer Diagnostic Tool Using a Disposable MEMS-Based Biochip," *IEEE Transactions on Biomedical Engineering,* vol. 63, no. 7, pp. 1347-1353, 2016, doi: 10.1109/TBME.2016.2535364.

56. ***K. Park** and J. P. Desai, "Micropositioning and Control of an Underactuated Platform for Microscopic Applications," *IEEE/ASME Transactions on Mechatronics,* vol. 21, no. 6, pp. 2635-2646, 2016, doi: 10.1109/TMECH.2016.2579620.

57. ***S. S. Cheng**, Y. Kim, and J. P. Desai, "Modeling and characterization of shape memory alloy springs with water cooling strategy in a neurosurgical robot," *Journal of Intelligent Material Systems and Structures,* vol. 28, no. 16, pp. 2167-2183, 2017, doi: 10.1177/1045389X16685443.

58. ***S. S. Cheng**, Y. Kim, and J. P. Desai, "New Actuation Mechanism for Actively Cooled SMA Springs in a Neurosurgical Robot," *IEEE Transactions on Robotics,* vol. 33, no. 4, pp. 986-993, 2017, doi: 10.1109/TRO.2017.2679199.

59. *Y. Kim, **S. S. Cheng**, M. Diakite, R. P. Gullapalli, J. M. Simard, and J. P. Desai, "Toward the Development of a Flexible Mesoscale MRI-Compatible Neurosurgical Continuum Robot," *IEEE Transactions on Robotics,* vol. 33, no. 6, pp. 1386-1397, 2017, doi: 10.1109/TRO.2017.2719035.

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76. A. Ananthanarayanan, F. Bussemer, S. K. Gupta, and J. P. Desai, "Fabrication of Highly Articulated Miniature Snake Robot Structures Using In-Mold Assembly of Compliant Joints," in *Experimental Robotics: The 12th International Symposium on Experimental Robotics (2010)*, O. Khatib, V. Kumar, and G. Sukhatme Eds. Berlin, Heidelberg: Springer Berlin Heidelberg, 2014, pp. 799-809.
77. E. Ayvali and J. P. Desai, "Accurate in-plane and out-of-plane ultrasound-based tracking of the discretely actuated steerable cannula," in *2014 IEEE International Conference on Robotics and Automation (ICRA)*, 2014, pp. 5896-5901, doi: 10.1109/ICRA.2014.6907727.
78. E. Ayvali, M. Ho, and J. P. Desai, "A Novel Discretely Actuated Steerable Probe for Percutaneous Procedures," in *Experimental Robotics: The 12th International Symposium on Experimental Robotics (2010)*, O. Khatib, V. Kumar, and G. Sukhatme Eds. Berlin, Heidelberg: Springer Berlin Heidelberg, 2014, pp. 115-123.
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81. W. Zhao and J. P. Desai, "Towards the Development of a New Tendon-Driven Minimally Invasive Neurosurgical Intracranial Robot," in *ASME 2014 Dynamic Systems and Control Conference*, 2014, p. V001T17A006 (8 pages), doi: 10.1115/DSCC2014-6328.
82. C. M. Davis, K. Park, and J. P. Desai, "Design and analysis of an under-actuated XYθ stage for automated tissue indentation," in *2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2015, pp. 4331-4336, doi: 10.1109/IROS.2015.7353991.
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85. J. Sheng and J. P. Desai, "Towards a SMA-actuated Neurosurgical Intracerebral Hemorrhage Evacuation (NICHE) robot," in *2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2015, pp. 3805-3810, doi: 10.1109/IROS.2015.7353911.
86. J. Sheng and J. P. Desai, "A novel meso-scale SMA-actuated torsion actuator," in *2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2015, pp. 4718-4723, doi: 10.1109/IROS.2015.7354049.
87. C. Shing Shin and J. P. Desai, "Towards high frequency actuation of SMA spring for the neurosurgical robot - MINIR-II," in *2015 IEEE International Conference on Robotics and Automation (ICRA)*, 2015, pp. 2580-2585, doi: 10.1109/ICRA.2015.7139546.
88. C. C. Kessens and J. P. Desai, "Compact Hand with Passive Grasping," in *Experimental Robotics: The 14th International Symposium on Experimental Robotics (2014)*, M. A. Hsieh, O. Khatib, and V. Kumar Eds. Cham: Springer International Publishing, 2016, pp. 117-132.
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91. ***K. Park** and J. P. Desai, "Machine learning approach for breast cancer localization," in *2017 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS)*, 2017, pp. 1-6, doi: 10.1109/MARSS.2017.8001925.
92. ***J. Sheng** and J. P. Desai, "A skull-mounted robotic headframe for a neurosurgical robot," in *2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2017, pp. 2511-2516, doi: 10.1109/IROS.2017.8206070.
93. S. S. Cheng, Y. Kim, and J. Desai, "Towards Real-Time SMA Control for a Neurosurgical Robot: MINIR-II," in *2015 International Symposium of Robotics Research (ISRR)*, 2018, doi: 10.1007/978-3-319-51532-8_12.
94. ***Y. Chitalia, X. Wang**, and J. P. Desai, "Design, Modeling and Control of a 2-DoF Robotic Guidewire," in *2018 IEEE International Conference on Robotics and Automation (ICRA)*, 2018, pp. 32-37, doi: 10.1109/ICRA.2018.8462694.
95. ***Y. Chitalia, S. Jeong, J. Bok, V. Nguyen**, S. Melkote, J. J. Chern, and J. P. Desai, "Towards the Design and Development of a Pediatric Neuroendoscope Tool," in *2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019, pp. 2998-3004, doi: 10.1109/IROS40897.2019.8968186.
96. ***K. Park, P. Tran, N. Deaton,** and J. P. Desai, "Multi-walled Carbon Nanotube (MWCNT)/PDMS-based Flexible Sensor for Medical Applications," in *2019 International Symposium on Medical Robotics (ISMR)*, 2019, pp. 1-8, doi: 10.1109/ISMR.2019.8710193.
97. ***J. Sheng, N. J. Deaton,** and J. P. Desai, "A Large-Deflection FBG Bending Sensor for SMA Bending Modules for Steerable Surgical Robots," in *2019 International Conference on Robotics and Automation (ICRA)*, 2019, pp. 900-906, doi: 10.1109/ICRA.2019.8794302.
98. ***P. Tran, S. Jeong,** and J. P. Desai, "Voice-Controlled Flexible Exotendon (FLEXotendon) Glove For Hand Rehabilitation," in *2019 IEEE/RSJ International Conference on Intelligent*

Robots and Systems (IROS), 2019, pp. 4834-4839, doi: 10.1109/IROS40897.2019.8967669.

99. *__X. Wang, P. Tran__, S. M. Callahan, S. L. Wolf, and J. P. Desai, "Towards the development of a voice-controlled exoskeleton system for restoring hand function," in *2019 International Symposium on Medical Robotics (ISMR)*, 2019, pp. 1-7, doi: 10.1109/ISMR.2019.8710195.
100. *__Y. Chitalia, X. Wang, V. Nguyen__, S. Melkote, J. Chern, and J. P. Desai, "Design and Analysis of a Bidirectional Notch Joint for a Robotic Pediatric Neuroendoscope," in *Proceedings of the 2018 International Symposium on Experimental Robotics*, Cham, J. Xiao, T. Kröger, and O. Khatib, Eds., 2020: Springer International Publishing, pp. 24-33.
101. ***F. Heemeyer, A. Choudhary,** and J. P. Desai, "Pose-aware C-Arm Calibration and Image Distortion Correction for Guidewire Tracking and Image Reconstruction," in *2020 International Symposium on Medical Robotics (ISMR)*, 2020, pp. 181-187, doi: 10.1109/ISMR48331.2020.9312944.
102. *__N. U. Nayar, S. Jeong__, and J. P. Desai, "Towards the Development of a Robotic Transcatheter Delivery System for Mitral Valve Implant," in *2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020.
103. ***K. Park** and J. P. Desai, "Capacitive Two-dimensional Force Sensing Microcantilever with a Conductive Tip for Characterization of Biological Samples," in *2020 International Symposium on Medical Robotics (ISMR)*, 2020, pp. 62-68, doi: 10.1109/ISMR48331.2020.9312938.
104. ***A. Sarma, G. C. Collins, N. Nayar, Y. Chitalia, S. Jeong,** B. D. Lindsey, and J. P. Desai, "Towards the Development of an Ultrasound-Guided Robotically Steerable Guidewire," in *2020 International Symposium on Medical Robotics (ISMR)*, 2020, pp. 173-180, doi: 10.1109/ISMR48331.2020.9312925
105. *__N. J. Deaton, Y. Chitalia,__ P. Patel, and J. P. Desai, "Towards a Robotically Steerable System for High Dose Rate Brachytherapy," in *International Symposium on Experimental Robotics (ISER)*, 2020, p. Accepted.
106. ***K. Park**, P. Harrison, and J. P. Desai, "Micro-scale Viscoelastic Characterization of Human Skin Tissues as a Biomarker for Melanoma," in *2020 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS)*, 2020, pp. 1-6, doi: 10.1109/MARSS49294.2020.9307858.

C. Other Publications and Creative Products

C1. Non-refereed Conference Presentations with Proceedings

1. *__G. C. Collins, A. Sarma,__ Z. L. Bercu, J. P. Desai, and B. D. Lindsey, "Forward-viewing, robotically-steerable guidewire system for peripheral chronic total occlusions: Transducer and imaging system development," in *2020 IEEE International Ultrasonics Symposium (IUS)*, 2020, pp. 1-4, doi: 10.1109/IUS46767.2020.9251777.

C2. Patents

C2.a. Patents Awarded

1. *System, Method, and Apparatus for Suction Gripping*
   Inventors: Jaydev P. Desai, Chad Kessens

Patent No.: US 8,382,174
Date of Patent: Feb. 26, 2013; Filed: Oct. 8, 2010.

2. *Real-Time Tracking and Navigation System and Method for Minimally Invasive Surgical Procedures*
   Inventors: Alan B. McMillan, Rao Gullapalli, Howard M. Richard, III, Steven Roys, Jaydev P. Desai
   Patent No.: US 9,326,823
   Date of Patent: May 3, 2016; Filed: May 2, 2013

3. *Actuated Steerable Probe and Systems and Methods of Using Same*
   Inventors: Jaydev P. Desai, Elif Ayvali
   Patent No.: US 9,655,679
   Date of Patent: May 23, 2017; Filed: May 1, 2013

4. *System and Method for Multi-Parameter Characterization of Biological Tissues*
   Inventors: Jaydev P. Desai, Hardik Jeetendra Pandya, Kihan Park
   Patent No.: US 10,791,992
   Date of Patent: October 6, 2020; Filed: June 23, 2017

C2.b. Provisional Patents, Applications, and Invention Disclosures

Note: Only those listed since joining Georgia Tech

1. *Systems and Methods for Steering guidewires*
   Inventors: Jaydev P. Desai, Yash Chetan Chitalia
   U.S. Patent Application No.: 16/491,680
   Filing Date: September 6, 2019

2. *Voice-Activated, Compact, And Portable Robotic System*
   Inventors: Jaydev P. Desai, Seokhwan Jeong, Phillip Tran, Xuefeng Wang
   International Application No.: PCT/US20/20954
   Filing Date: March 4, 2020

3. *Steerable and Flexible Robotic Endoscopic Tools for Minimally Invasive Procedures*
   Inventors: Jaydev P. Desai, Yash Chetan Chitalia, Seokhwan Jeong, Joshua J. Chern
   International Application No.: PCT/US20/20942
   Filing Date: March 4, 2020

4. *System, Method, and Apparatus for The Control of Multiple Degrees of Freedom Bending and the Bending Length of A Coaxially Aligned Robotically Steerable Guidewire*
   Inventors: Jaydev P. Desai, Yash Chetan Chitalia, and Seokhwan Jeong
   U.S. Patent Application No. 63/013,425
   Filing Date: April 21, 2020

5. *MEMS-Based Portable Cancer Diagnostic Device for Simultaneous Multi-Parameter Characterization of Biological Tissues*
   Inventors: Jaydev P. Desai, Hardik Jeetendra Pandya, Kihan Park

Non-provisional Patent Application No.: 17/011,642 (Continuation application)
Filing Date: September 3, 2020

C3. Other Creative Products

1. R. Alterovitz and J. P. Desai, "Surgical Robotics [TC Spotlight]," *IEEE Robotics & Automation Magazine,* vol. 16, no. 2, pp. 16-17, 2009, doi: 10.1109/MRA.2009.932616.

2. J. P. Desai and N. Ayache, "Editorial: Special Issue on Medical Robotics," *The International Journal of Robotics Research,* vol. 28, no. 9, pp. 1099-1100, 2009, doi: 10.1177/0278364909338986.

3. J. P. Desai and R. Gullapalli, "Image-Guided Robotic Interventions for Breast Biopsy and Ablative Therapies: Challenges and Opportunities," *Women's Health,* vol. 5, no. 3, pp. 229-233, 2009, doi: 10.2217/WHE.09.1.

4. J. P. Desai, A. Menciassi, and A. Ijspeert, "Guest Editorial to the Special Letters Issue on Biomedical Robotics and Biomechatronics—BioRob," *IEEE Transactions on Biomedical Engineering,* vol. 56, no. 9, pp. 2293-2294, 2009, doi: 10.1109/TBME.2009.2029817.

5. G. T. Chiu, J. P. Desai, J. Gu, and G. Morel, "Guest Editorial: Introduction to the Focused Section on Healthcare Mechatronics," *IEEE/ASME Transactions on Mechatronics,* vol. 15, no. 2, pp. 165-169, 2010, doi: 10.1109/TMECH.2010.2044063.

6. J. P. Desai, G. Dudek, O. Khatib, and V. Kumar, "Special Issue of the Thirteenth International Symposium on Experimental Robotics, 2012," *The International Journal of Robotics Research,* vol. 33, no. 4, pp. 487-488, 2014, doi: 10.1177/0278364913518697.

D. Presentations

D1. Keynote Addresses and Plenary Lectures

1. Desai, Jaydev P. “MRI-guided Robotic Surgery: Challenges and Opportunities.” Presentation at: CRAS – Joint Workshop on New Technologies for Computer/Robot Assisted Surgery, Brussels, Belgium, September 2015. [Keynote talk]

2. Desai, Jaydev P. “Meso-scale Continuum Robots for Surgery.” Presentation at: 2017 Design of Medical Devices Conference, Minnesota, MN, April 2017. [Featured speaker]

3. Desai, Jaydev P. “Meso-to-Miniature-Scale Robotic Systems for Surgical Interventions.” Presentation at: 3rd International Conference on Manipulation,

Automation and Robotics at Small Scales - MARSS 2018, Nagoya, Japan, July 2018. [Keynote talk]

4. Desai, Jaydev P. "Flexible, 3D-printed Robotic Systems for Surgical Interventions." Presentation at: 7th IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechatronics (BIOROB), The Netherlands, August 2018. [Keynote talk]

5. Desai, Jaydev P. "The Future of Robotic Surgical Systems." Presentation at: Workshop on Robotic Cardiac Surgery - The Society of Thoracic Surgeons, March 2019, Atlanta, GA. [Keynote talk]

6. Desai, Jaydev P. "Flexible, 3D-printed Robotic Systems for Surgical Interventions." Presentation at: 3rd Cyber-Physical Systems Symposium (CyPhySS), Indian Institute of Science, Bangalore, India, July 2019. [Keynote talk]

7. Desai, Jaydev P. "Steerable Robotic Systems for Surgical Interventions." Presentation at: Workshop on "Intelligent Robot Interactions with the Anatomy", 2019 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Macau, November 2019. [Keynote speech]

8. Desai, Jaydev P. "Flexible, Patient-Specific Robotic Systems for Surgical Interventions." Presentation at: Open Problems for Robots in Surgery and Healthcare, Organized by Stanford Research Institute (SRI), the UC Center for Information Technology in the Interest of the Public (CITRIS) People and Robots Initiative, and Silicon Valley Robotics, May 2020. [Keynote]

D2. Invited Conference and Workshop Presentations

1. Desai, Jaydev P., "Measuring Grasping and Cutting Forces for Reality-Based Haptic Modeling." Presentation at: Computer Assisted Radiology and Surgery - 1st International Workshop on Haptic Devices in Medical Applications, London, UK, 2003.

2. Desai, Jaydev P., "Reality-based modeling for soft tissue probing and cutting for surgical simulation." Presentation at: Workshop at 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Francisco, CA, 2004.

3. Desai, Jaydev P., "Haptic Feedback: From Macro Scale to Micro Scale." Presentation at: Robotics: Science and Systems (RSS) Area Chair Workshop, Zurich, Switzerland, 2008.

4. Desai, Jaydev P., Invited Speaker at 1st International Symposium of Global Center of Excellence for Mechanical Systems Innovation, University of Tokyo, Japan, 2009.

5. Desai, Jaydev P., Presentation at Mini-symposia titled: "Frontiers of microrobotics in endo-and transluminal therapy" at 31st Annual International IEEE EMBS Conference,

Minneapolis, MN, 2009.

6. Desai, Jaydev P., “Robotic MRI-guided Interventions – Position Control and Force Sensing.” Presentation at: IEEE International Conference on Robotics and Automation workshop titled: Medical Cyber-Physical Systems, Anchorage, AK, 2010.

7. Desai, Jaydev P., “Mechanical Characterization of Biological Samples: From Cells to Tissues.” Presentation at: IEEE International Conference on Robotics and Automation workshop titled: Micromanipulation and Characterization on Biological Cells, Anchorage, AK, 2010.

8. Desai, Jaydev P., “Challenges in Robotic MRI-guided Interventions: From Macro-scale to Meso-scale.” Presentation at: The IDEAS Project - Innovation, Design, and Emerging Alliances in Surgery: Opportunities and Challenges in Surgical Robotics, Beth Israel Deaconess Medical Center, Boston, MA, 2011.

9. Desai, Jaydev P., “Discretely Actuated Steerable Cannula.” Presentation at: ICRA 2012 workshop on “Pathways to Clinical Needle Steering: Recent Advances and Future Applications”, St. Paul, MN, 2012.

10. Desai, Jaydev P., “Towards Robot-Assisted Neurosurgery Under Continuous MRI.” Presentation at: 3rd North American Summer School on Image-Guided Interventions, Surgical Robotics & Simulation, London, Ontario, Canada, 2012.

11. Desai, Jaydev P., “Towards Robot-Assisted Neurosurgery Under Continuous MRI.” Presentation at: 6th Image Guided Therapy Workshop, Arlington, VA, 2013.

12. Desai, Jaydev P., “MEMS-based Breast Cancer Diagnosis.” Presentation at: 2014 IEEE International Conference on Robotics and Automation Workshop on “Future Challenges in Nanorobotics”, Hong Kong, China, 2014.

13. Desai, Jaydev P., “Towards Robot-Assisted MRI-Guided Neurosurgery.” Presentation at: 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems Workshop on “Community Consensus Benchmarks and Systems for Clinical Translation of Medical Robots”, Chicago, IL, 2014.

14. Desai, Jaydev P., “Towards an SMA-Actuated Robotic Hand Rehabilitation Exoskeleton
For Stroke Therapy.” Presentation at: 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2014) Workshop on “Rehabilitation and Assistive Robotics: Bridging the Gap Between Clinicians and Roboticists”, Chicago, IL, 2014.

15. Desai, Jaydev P., “Challenges in Image-guided Theranostic Interventions.” Presentation at: 2014 Frontiers of Medical Devices Conference (FMD2014), Buffalo, NY, 2014.

16. Desai, Jaydev P., “Towards Robot-Assisted Neurosurgery Under Continuous MRI.” Presentation at: 2014 IEEE International Conference on Robotics and Automation Workshop on “Advances in Flexible Access Robots for Surgical Interventions”, Hong Kong, China, 2014.

17. Desai, Jaydev P., “Image-guided Neurosurgical Interventions.” Presentation at: Workshop on Advanced Robotics PLUS, Technical University of Munich (TUM), Munich, Germany, 2014.

18. Desai, Jaydev P., “Flexible Meso-scale Robotic Systems for Image-guided Neurosurgery.” Presentation at: 7th Summer School on Surgical Robotics, Montpellier, France, 2015.

19. Desai, Jaydev P., “Flexible Meso-scale Robotic Systems for Image-guided Neurosurgery.” Presentation at: 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2015) Workshop on “Navigation and Actuation of Flexible Instruments in Medical Applications (NAFIMA)”, Hamburg, Germany, 2015.

20. Desai, Jaydev P., “Continuum & Cognitive - Flexible robots for minimally invasive surgical procedures.” Presentation at: Invited Speaker at the ICRA 2017 workshop on C4 Surgical Robots: Compliant, Continuum, Cognitive, and Collaborative, Singapore, 2017.

21. Desai, Jaydev P., “Flexible Meso-scale Robotic Systems for Surgical Interventions.” Presentation at: 8th Summer School on Surgical Robotics, Montpellier, France, 2017.

22. Desai, Jaydev P., “Flexible, 3D-printed Robotic Systems for Surgical Interventions.” Presentation at: ASU South-West Robotics Symposium, Tempe, AZ, 2019.

23. Desai, Jaydev P., “Flexible, Patient-Specific Robotic Systems for Surgical Interventions.” Presentation at: Summer School on Surgical Robotics, 9th edition, Montpellier, France, 2019.

24. Desai, Jaydev P., “3D-printed, Patient-Specific Robotic Systems for Surgical Interventions.” Presentation at: BME/MPS Joint Forum on Medical Device Development, Annual 2019 US-Korea Conference (UKC), Chicago, IL, 2019.

25. Desai, Jaydev P., “Flexible, Patient-Specific Robotic Systems for Surgical Interventions.” Presentation at: 2020 IROS Workshop on: “Autonomous System in Medicine: Current Challenges in Design, Modeling, Perception, Control and Applications”, Virtual Format due to COVID-19 (Originally Las Vegas, NV), 2020.

D3. Invited Seminar Presentations

1. Desai, Jaydev P., “Nonholonomic motion planning.” Stanford University, 1996.

2. Desai, Jaydev P., “Motion planning for cooperative robotic systems.” Department of Mechanical Engineering, The Johns Hopkins University, 1998.

3. Desai, Jaydev P., “Motion planning for cooperative robotic systems.” Department of Mechanical Engineering, University of California, Riverside, 1998.

4. Desai, Jaydev P., “Reality-Based Modeling of Tool-tissue Interaction for Robot-Assisted Surgery.” University of Pennsylvania, 2004.

5. Desai, Jaydev P., “Reality-Based Soft-Tissue Modeling for Robot-Assisted Surgery.” Rutgers University, 2004.

6. Desai, Jaydev P., “Reality-Based Soft Tissue Modeling for Robot-Assisted Surgery.” Columbia University, 2004.

7. Desai, Jaydev P., “Reality-Based Haptic Feedback for Surgical Simulation and Robot-Assisted Surgery.” Georgia Institute of Technology, 2005.

8. Desai, Jaydev P., “Macro to Micro Scale Haptics: From Surgical Simulation to Cell Manipulation.” Georgia Institute of Technology, 2006.

9. Desai, Jaydev P., “Macro to Micro Scale Haptics: From Surgical Simulation to Cell Manipulation.” The Johns Hopkins University, 2006.

10. Desai, Jaydev P., “Reality-Based Haptic Feedback for Surgical Simulation and Robot-Assisted Surgery.” Vanderbilt University, 2006.

11. Desai, Jaydev P., “Reality-Based Haptic Feedback for Surgical Simulation and Robot-Assisted Surgery.” Purdue University, 2006.

12. Desai, Jaydev P., “Macro to Micro Scale Haptics: From Surgical Simulation to Cell Manipulation.” IIT Bombay, 2007.

13. Desai, Jaydev P., “Medical Robotics @ Robotics, Automation, Manipulation, and Sensing (RAMS) Laboratory.” National Institute of Standards and Technology (NIST), 2007.

14. Desai, Jaydev P., “Haptic feedback in Medical Robotics: From Micro to Macro Scale.” Applied Physics laboratory (APL), 2007.

15. Desai, Jaydev P., “Robotics Research @ RAMS Laboratory.” Army Research Laboratory (ARL), 2008.

16. Desai, Jaydev P., “Image-guided Surgical Robotics: From Macro-scale to Meso-scale.” University of Pennsylvania, 2009.

17. Desai, Jaydev P., “Challenges in Robotic MRI-guided Interventions: From Macro-scale to Meso-scale.” University of Maryland Marlene and Stewart Greenebaum

Cancer Center, University of Maryland School of Medicine, 2010.

18. Desai, Jaydev P., “Challenges in Robotic MRI-guided Interventions: From Macro-scale to Meso-scale.” Georgia Institute of Technology, 2010.

19. Desai, Jaydev P., “Robot-Assisted Neurosurgery.” National Academy of Sciences “Distinctive Voices” seminar series, Beckman Center, Irvine, California, 2011.

20. Desai, Jaydev P., “Medical Robotics Research @ Robotics, Automation, and Medical Systems (RAMS) Laboratory.” Applied Physics Laboratory (APL), 2011.

21. Desai, Jaydev P., “Challenges in Robotic MRI-guided Interventions: From Macro-scale to Meso-scale.” Università Campus Bio-Medico, Rome, 2012.

22. Desai, Jaydev P., “Towards Robot-Assisted Neurosurgery Under Continuous MRI.” The Robotics Institute, Carnegie Mellon University, 2012.

23. Desai, Jaydev P., “MRI-guided Robotic Interventions: Challenges and Opportunities.” Department of Mechanical Engineering, University of Colorado, Boulder, 2014.

24. Desai, Jaydev P., “Image-guided Neurosurgical Interventions.” Department of Mechanical Engineering, Vanderbilt University, 2014.

25. Desai, Jaydev P., “Flexible Meso-scale Robotic Systems for Image-guided Neurosurgery.” Department of Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 2015.

26. Desai, Jaydev P., “Flexible Meso-scale Robotic Systems for Image-guided Neurosurgery.” Wallace H. Coulter Department of Biomedical Engineering, Georgia Institute of Technology & Emory University School of Medicine, 2015.

27. Desai, Jaydev P., “Image-guided Robotic Neurosurgical Procedures.” Department of Neurosurgery, The Hospital of the University of Pennsylvania, 2015.

28. Desai, Jaydev P., “Flexible, 3D-printed, Meso-scale Robotic Systems for Image-guided Neurosurgery.” Duke MEMS Seminar Series, Duke University, 2017.

29. Desai, Jaydev P., “Meso-scale robotic systems for surgical interventions.” Heart & Vascular Grand Rounds Seminar Series, Division of Cardiology, Emory University, 2017.

30. Desai, Jaydev P., “Meso-scale robotic systems for surgical interventions.” Emory Radiology Research In Progress (RIPS), Department of Radiology and Imaging Sciences, Emory University, 2017.

31. Desai, Jaydev P., “Meso-scale robotic systems for surgical interventions.” Department of Otolaryngology, Emory University, 2018.

32. Desai, Jaydev P., “Flexible, 3D-printed Robotic Systems for Surgical Intervention.” Texas A&M University, September 2019.

E. Grants and Contracts

E1. As Principal Investigator

1. Title of Project: Development of a Robotic System for Relative Stabilization of a soft tissue using tactile feedback for cardiothoracic procedures
   Role: PI
   Collaborators: J. Yasha Kresh (Co-PI) and Andrew Wechsler (Co-PI
   Agency/Company: Drexel University (Synergy Grant)
   Period of Contract: 7/1/2000-12/31/2001

2. Title of Project: Acquisition of a Complete Whole Arm Manipulator (WAM) Robot system
   Role: PI
   Collaborators: Bor-Chin Chang (Co-PI), Harry Kwatny (Co-PI), Ali Shokoufandeh (Co-PI), and Cato Laurencin (Co-PI)
   Agency/Company: The National Science Foundation
   Period of Contract: 9/1/2000-8/31/2003

3. Title of Project: Research Experiences for Undergraduates (REU) Supplement: Acquisition of a Complete Whole Arm Manipulator (WAM) Robot system
   Role: PI
   Collaborators: Bor-Chin Chang (Co-PI), Harry Kwatny (Co-PI), Ali Shokoufandeh (Co-PI), and Cato Laurencin (Co-PI)
   Agency/Company: The National Science Foundation
   Period of Contract: 9/1/2000-8/31/2003

4. Title of Project: Computer Assisted Robotic Cardiac Surgery
   Role: PI
   Collaborators: J. Yasha Kresh (Collaborating Investigator) and Dr. Andrew Wechsler (Collaborating Investigator)
   Agency/Company: American Heart Association (Beginning Grant-in-Aid Award)
   Period of Contract: 7/1/01-6/30/03

5. Title of Project: (Research Experiences for Undergraduates (REU) Supplement) ITR: Collaborative Research: Modeling and Display of Haptic Information for Enhanced Performance of Computer-Integrated Surgery
   Role: PI
   Collaborators: Alan Lau (Co-PI)
   Agency/Company: The National Science Foundation
   Period of Contract: 8/15/03-7/31/07

6. Title of Project: ITR: Collaborative Research: Modeling and Display of Haptic Information for Enhanced Performance of Computer-Integrated Surgery
   Role: PI

Collaborators: Alan Lau (Co-PI)
Agency/Company: The National Science Foundation
Period of Contract: 8/15/03-7/31/07

7. Title of Project: CAREER: Minimally Invasive Surgery using Haptics and Vision
   Role: PI
   Collaborators: None
   Agency/Company: The National Science Foundation
   Period of Contract: 7/1/02-12/31/08

8. Title of Project: Maximizing Transgenic Yield using Microfabrication Array and Force Feedback for Cell Manipulation
   Role: PI
   Collaborators: Gennady Friedman (Co-PI), Adam Fontecchio (Co-PI), and Ari Brooks (Co-PI)
   Agency/Company: Drexel University (Synergy Grant)
   Period of Contract: 6/1/04-5/31/05

9. Title of Project: Force Feedback and MEMS based Cellular Surgery
   Role: PI
   Collaborators: Ari Brooks (Co-PI) and Gennady Friedman (Co-PI)
   Agency/Company: Defense Advanced Research Projects Agency (DARPA)
   Period of Contract: 3/13/2006-3/12/2007

10. Title of Project: CompBio: Reality-based Data-driven Computer Models for Surgical Simulation
    Role: PI
    Collaborators: Doug James (Co-PI)
    Agency/Company: National Science Foundation
    Period of Contract: 9/1/06-8/31/11

11. Title of Project: Data-driven Real-Time Surgical Simulation from Reality-based Soft-Tissue Models
    Role: PI
    Collaborators: Alan C. W. Lau (Co-I), Andres Castellanos (Co-I), Doug James (Co-I)
    Agency/Company: National Institutes of Health
    Period of Contract: 9/1/06-6/30/11

12. Title of Project: MINIR: Minimally Invasive Neurosurgical Intracranial Robot
    Role: PI
    Collaborators: Satyandra K. Gupta (Co-I), Rao Gullapalli (Co-I), J. Marc Simard (Co-I)
    Agency/Company: National Institutes of Health
    Period of Contract: 8/10/08-7/31/11

13. Title of Project: Mechanical Phenotyping of Cells: Haptics-enabled Atomic Force Microscopy
    Role: PI
    Collaborators: Nikhil Chopra (Co-I) and Carol Keefer (Co-I)
    Agency/Company: National Science Foundation
    Period of Contract: 8/01/08-8/31/2012

14. Title of Project: Robotic Haptic Feedback System for Bx/RFA of Breast Tumor under Continuous MRI
    Role: PI
    Collaborators: Rao Gullapalli (Co-I), Howard Richard (Co-I), Deirdre Coll (Co-I)
    Agency/Company: National Institutes of Health
    Period of Contract: 9/15/08-6/30/14

15. Title of Project: Accurate Robotic *in-situ* Diagnosis of Ablation Targets for Atrial Fibrillation
    Role: PI
    Collaborators: Timm-Michael L. Dickfeld (PI) and Yu Chen (Co-I)
    Agency/Company: UMCP-UMB Seed Grant
    Period of Contract: 6/1/2011-12/31/2012

16. Title of Project: Development of a Reality-Based, Haptics-Enabled Simulator for Tool-Tissue Interactions
    Role: PI
    Collaborators: Jaydev P. Desai (PI) – Note: This was a fellowship for my graduate student, Mr. Kevin Lister. Since I was his Ph.D. advisor, I was assigned as the PI on this fellowship by the University of Maryland, College Park.
    Agency/Company: The Link Foundation
    Period of Contract: 7/1/2011-9/30/2012

17. Title of Project: Semantic Active Vision and Manipulation
    Role: PI
    Collaborators: Cornelia Fermüller (PI), Yiannis Aloimonos (PI), and Hal Daumé (PI)
    Agency/Company: UMIACS Seed Grant
    Period of Contract: 10/1/11-9/30/13

18. Title of Project: A Robotic Grasping and Vision (GraspVis) System for Stroke Rehabilitation
    Role: PI
    Collaborators: Kelly Westlake (PI)
    Agency/Company: UMCP-UMB Research and Innovation Seed Grant Program
    Period of Contract: 8/1/13-7/31/14

19. Title of Project: MINIR-II: Minimally Invasive Neurosurgical Intracranial Robot
    Role: Contact-PI
    Collaborators: Rao P. Gullapalli (PI), J. Marc Simard (PI), Satyandra K. Gupta (Co-I), Jiachen Zhuo (Co-I), and Taehoon Shin (Co-I)
    Agency/Company: National Institutes of Health
    Period of Contract: 09/30/2012-08/31/2018

20. Title of Project: Neurosurgical Intracerebral Hemorrhage Evacuation (NICHE) Robot
    Role: PI
    Collaborators: Dheeraj Gandhi (Co-I), Rao Gullapalli (Co-I), and J. Marc Simard (Co-I)
    Agency/Company: National Institutes of Health
    Period of Contract: 6/1/14-5/31/18

21. Title of Project: Identification of AF Ablation Targets via a Steerable Actuated Catheter
    Role: PI
    Collaborators: Yu Chen (Co-I), Don DeVoe (Co-I), and Timm-Michael Dickfeld (Co-I)
    Agency/Company: National Institutes of Health
    Period of Contract: 05/01/15-02/28/18

22. Title of Project: Mechano-Visual Phenotyping of Cancer: From Onset Through Disease Progression
    Role: Contact-PI
    Collaborators: David J. Foran (PI), Wenjin Chen (Investigator), and Lauri Goodell (Investigator)
    Agency/Company: National Institutes of Health
    Period of Contract: 3/12/2012-2/28/2019

23. Title of Project: Towards the development of an *in situ* breast cancer diagnostic device
    Role: PI
    Collaborator: None
    Agency/Company: Giglio Family Breast Cancer Funds
    Period of Contract: 12/1/16-11/30/18

24. Title of Project: Design and Development of a Robotically Steerable Guidewire
    Role: PI:
    Collaborators: None
    Agency/Company: Georgia Research Alliance
    Period of Contract: 01/29/18-11/30/18

25. Title of Project: Robotically Steerable Guidewire for Endovascular Interventions
    Role: PI
    Collaborator: Zachary L. Bercu (PI)
    Agency/Company: GT/Emory Coulter Translational Research Partnership Program
    Period of Contract: 08/15/18 - 10/31/19

26. Title of Project: To restore hand function in people with chronic, cervical spinal cord injury
    Role: PI
    Collaborator: Steven Wolf (Co-I)
    Agency/Company: Craig H. Neilsen Foundation
    Period of Contract: 10/31/17-10/30/19

27. Title of Project: (Pretesh Patel) - Micro-Machined Steerable Needles for High Dose Rate (HDR) Prostate Brachytherapy for Optimal Dose Delivery
    Role: PI (on Georgia Tech side)
    Collaborator: Pretesh Patel (PI)
    Agency/Company: Emory University
    Period of Contract: 07/01/2019 – 06/30/2020

28. Title of Project: Innovation Investment: Design, Development, and Evaluation of a Flexible and Steerable Robotic Monopolar Electrocautery Probe for Pediatric Neurosurgery
    Role: PI

Collaborators: Joshua J. Chern (PI) and Shreyes N. Melkote (PI)
Agency/Company: Children's Healthcare of Atlanta, Atlanta, GA
Period of Contract: 09/01/2018 – 08/31/2020

29. Title of Project: Image-Guided Intravascular Robotic System for Mitral Valve Repair and Implants
Role: Contact-PI
Collaborators: Baowei Fei (PI), Sai Muralidhar Padala (PI), and Robert Guyton (Co-I)
Agency/Company: National Institutes of Health
Period of Contract: 03/15/2018 - 02/28/2022

30. Title of Project: Ultrasound-guided, Robotically Steerable Guidewire for Endovascular Interventions
Role: PI
Collaborators: Brooks Lindsey (Co-I), Sai Muralidhar Padala (Co-I), Stanislav Emelianov (Co-I), Zachary Bercu (Co-I), and Khusrow Niazi (Co-I)
Agency/Company: National Institutes of Health
Period of Contract: 4/15/2019-3/31/2023

31. Title of Project: Customized Hand Exoskeleton System for Spinal Cord Injury Patients
Role: PI
Collaborator: Scott Kozin (PI)
Agency/Company: Shriners Hospitals for Children International
Period of Contract: 01/01/20 – 12/31/21

32. Title of Project: Steerable Robotic Endoscopic Tools for Pediatric Neurosurgery
Role: PI
Collaborators: Joshua J. Chern (Co-I) and Shreyes Melkote (Co-I)
Agency/Company: National Institutes of Health
Period of Contract: 08/01/2020-07/31/2022

E2. As Co-Principal Investigator

1. Title of Project: Drexel University GAANN Fellowships in Emerging Areas of Research: Nanotechnology, Information Technology, and Biotechnology
Role: Co-PI
Collaborators: Mun Young Choi (PI), Steven Wrenn (Co-PI), Fredericka Reisman (Co-PI), Stephen Cox (Co-PI), and Yury Gogotsi (Co-PI)
Agency/Company: Department of Education

2. Title of Project: RET Site: Research Experience for Teachers in Areas of Innovative and Novel Technologies in Philadelphia [RETAIN Technologies in Philadelphia]
Role: Co-PI
Collaborators: Mun Young Choi (PI), Anthony Lowman (Co-PI), Fredericka Reisman (Co-PI), and Yury Gogotsi (Co-PI)
Agency/Company: The National Science Foundation
Period of Contract: 3/15/2003 – 2/28/2006

3. Title of Project: Research Experiences for Teachers in Areas of Innovative and Novel Technologies in Philadelphia
   Role: Co-PI
   Collaborators: Mun Young Choi (PI), Yury Gogotsi (Co-PI), Athina Petropulu (Co-PI), and Fredricka Reisman (Co-PI)
   Agency/Company: National Science Foundation
   Period of Contract: 3/1/2006-2/28/2009

4. Title of Project: Mechanical Phenotyping of Embryonic Stem Cell Differentiation
   Role: Co-PI
   Collaborators: Carol Keefer (PI)
   Agency/Company: STMD-Maryland Technology Development Corporation
   Period of Contract: 6/30/08-6/29/11

E3. As Senior Personnel or Contributor

1. Title of Project: International Symposium on Medical Robotics
   Role: Other Significant Contributor
   Collaborator: Tsz Ho Tse (PI)
   Agency/Company: National Institutes of Health
   Period of Contract: 12/1/2017-11/30/2018

2. Title of Project: International Symposium on Medical Robotics
   Role: Other Significant Contributor
   Collaborator: Tsz Ho Tse (PI)
   Agency/Company: National Institutes of Health
   Period of Contract: 12/17/2018-11/30/2019

V. Education

A. Courses Taught

Note: Only those courses taught at Georgia Tech are listed below.

Semester, Year	Course Number	Course Title	Number of Students
Fall, 2020	BMED 4739 / BMED 6739	Medical Robotics	17 = 14 (4739) + 3 (6739)
Fall, 2020	BMED 2250	Problems in Biomedical Engineering	Total: 159; 36 in my section
Fall, 2019	BMED 8813	Robotics	5
Fall, 2019	CS/AE/ECE/ME/BMED 8750/8751	Robotics Research Fnd I and II	13 (Has child course(s) ECE 8750, ME 8751, AE 8750, CS 8750, and CS 8751 included)
Spring, 2019	BMED 4739 / BMED 6739	Medical Robotics	17 (Has child course BMED 6739 included)
Fall, 2018	BMED 8813	Robotics	9
Spring, 2018	BMED 4739 / BMED 6739	Medical Robotics	23 (Has child course BMED 6739 included)
Fall, 2017	BMED 8813	Robotics	7
Spring, 2017	BMED 4803 / BMED 8813	Medical Robotics	30 = 22 (4803) +8 (8813)

B. Individual Student Guidance

B1. Ph.D. Students

B1.a. Graduated Ph.D. Students

Note: The current position for the graduated students mentioned below is based on the last known data/communication with the student/website(s)/social media such as LinkedIn/etc.

1. Name: Christopher Kennedy
   Year of Graduation: 2004
   Title of Dissertation: Enabling Technologies for Robotically-Assisted Sutureless Coronary Anastomosis
   Current Position: Adjunct Assistant Professor of Radiation Oncology, University of Pennsylvania
   Special Recognition/Honors/Awards: 1) Koerner Fellowship for excellence in graduate studies in the Department of Mechanical Engineering and Mechanics and 2) The Dean's Fellowship

2. Name: Tie Hu
   Year of Graduation: 2006

Title of Dissertation: Reality-based Soft Tissue Probing: Experiments and Computational Model for Application to Minimally Invasive Surgery
Current Position: Hyperfine Research, Inc.

3. Name: Teeranoot Chanthasopeephan
   Year of Graduation: 2006
   Title of Dissertation: Characterization of Soft Tissue Cutting for Haptic Display: Experiments and Computational Models
   Current Position: Associate Professor, King Mongut's University of Technology Thonburi, Thailand
   Special Recognition/Honors/Awards: Link Foundation Fellowship (2005-2006)

4. Name: Gregory Tholey
   Year of Graduation: 2007
   Title of Dissertation: A Teleoperative Haptic Feedback Framework For Computer-Aided Minimally Invasive Surgery
   Current Position: Kulicke and Soffa Industries, Inc.
   Special Recognition/Honors/Awards: 1) 2003 National Science Foundation Graduate Research Fellowship and 2) The Dean's Fellowship

5. Name: Anand Pillarisetti
   Year of Graduation: 2008
   Title of Dissertation: Mechanical Manipulation and Characterization of Biological Cells
   Current Position: Woodward Inc.

6. Name: Kevin Lister
   Year of Graduation: 2012
   Title of Dissertation: Development of a Reality-Based, Haptics-Enabled Simulator for Tool Tissue Interactions
   Current Position: Corvid Technologies, LLC
   Special Recognition/Honors/Awards: Link Foundation Fellowship in Advanced Simulation and Training (2011-2012)

7. Name: Bo Yang
   Year of Graduation: 2013
   Title of Dissertation: Design, Development, and Evaluation of a Teleoperated Master-Slave Surgical System for Breast Biopsy Under Continuous MRI Guidance
   Current Position: Johnson and Johnson
   Special Recognition/Honors/Awards: 2011 NSF funded ICRA GRASSROOTS Travel Fellowship

8. Name: Mingyen Ho
   Year of Graduation: 2013
   Title of Dissertation: Design, Development, and Evaluation of a MRI-Guided Neurosurgical Intracranial Robot
   Current Position: Auris Health, Inc.
   Special Recognition/Honors/Awards: 1) 2011 NSF funded ICRA GRASSROOTS Travel Fellowship and 2) Travel grant to attend ICRA 2012

9. Name: Rajarshi Roy
   Year of Graduation: 2014
   Title of Dissertation: Mechanical Characterization of Normal and Cancerous Breast Tissue Specimens Using Atomic Force Microscopy
   Current Position: Corvid Technologies, LLC
   Special Recognition/Honors/Awards: Selected to participate in the Dean's Doctoral Research Competition, 2014

10. Name: Elif Ayvali
    Year of Graduation: 2014
    Title of Dissertation: Design, Development, and Evaluation of a Discretely Actuated Steerable Cannula
    Current Position: Auris Health, Inc.
    Special Recognition/Honors/Awards: Department of Mechanical Engineering Best Dissertation Award, 2015

11. Name: Chad Kessens
    Year of Graduation: 2018
    Title of Dissertation: A Self-sealing Suction Technology for Versatile Grasping
    Current Position: U.S. Army CCDC Army Research Laboratory

12. Name: Shing Shin Cheng
    Year of Graduation: 2018
    Title of Dissertation: Design, Development, and Evaluation of a Meso-Scale Robotic System for Deep Intracranial Tumor Removal
    Current Position: Assistant Professor, The Chinese University of Hong Kong
    Special Recognition/Honors/Awards: 1) Travel support to attend the “Community Consensus Benchmarks for Clinical Translation of Medical Robots” workshop at IEEE/RSJ International Conference on Robotics and Systems (IROS) 2014, 2) Travel grant supported by the IEEE Robotics and Automation Society and the US National Science Foundation, for attending the 2015 ICRA conference in Seattle, 3) Awarded the Jacob K. Goldhaber Travel Grant from the University of Maryland, College Park, to attend 2015 IEEE International Conference on Robotics and Automation, 4) IROS Travel Award for Doctoral Consortium funded by the US National Science Foundation, 2017, and 5) IEEE International Conference on Robotics and Automation (ICRA) 2018 Robotics and Automation Society (RAS) Travel Grant

13. Name: Jun Sheng
    Year of Graduation: 2019
    Title of Dissertation: Smart Actuation and Sensing for Meso-Scale Surgical Robotic Systems
    Current Position: Assistant Professor, Electrical Engineering, Univ. of California, Riverside
    Special Recognition/Honors/Awards: 1) Awarded: a) International Conference Student Support Award (ICSSA) and the Jacob K. Goldhaber Travel Grant from the University of Maryland, College Park, and b) National Science Foundation Travel Award, to attend 2015 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). However, he was unable to attend the conference because he was not able to get the visa in time. 2) IROS Travel Award for Doctoral Consortium funded by the US National Science Foundation, 2017

14. Name: Kihan Park
    Year of Graduation: 2019
    Title of Dissertation: Micro-scale Characterization of Breast Cancer Using MEMS and Robotics
    Current Position: Assistant Professor, University of Massachusetts Dartmouth Special Recognition/Honors/Awards: Best Student Paper award at 2017 International Conference on Manipulation, Automation, and Robotics at Small Scales (MARSS), Montreal, Canada.

B1.b. In Process Ph.D. Students

1. Name: Yash Chitalia
   Advisement date: Fall 2016 - present
   Progression: Passed Robotics Ph.D. program Qualifying exam; Passed Robotics Ph.D. program Comprehensive Examination (Proposal)
   Tentative Title of Dissertation: Design, Modeling and Control of Micro-scale and Meso-scale Tendon Driven Surgical Robots
   Special Recognition/Honors/Awards: IEEE International Conference on Robotics and Automation (ICRA) 2018 Robotics and Automation Society (RAS) Travel Grant.

2. Name: Phillip Tran
   Advisement date: Fall 2017 - present
   Progression: Passed BioE Ph.D. Qualifying exam
   Special Recognition/Honors/Awards: Best Symposium Paper Award at the International Symposium on Medical Robotics, 2019.

3. Name: Nancy Deaton
   Advisement date: Spring 2019 - present
   Special Recognition/Honors/Awards: 2019 National Science Foundation (NSF) Graduate Research Fellowship (GRF).

4. Name: Achraj Sarma
   Advisement date: Fall 2019 - present

5. Name: Namrata Nayar
   Advisement date: Fall 2019 - present

6. Name: Sharan R. Ravigopal
   Advisement date: Spring 2020 – present

B2. M.S. Students (Indicate Thesis Option for Each Student)

B2.a. Graduated M.S. Students

1. Name: Carolyn Davis
   Non-Thesis option
   Year of completion: 2015

2. Name: Wenxue Zhao
   Non-Thesis option
   Year of completion: 2015

B2.b. In Process M.S. Students

1. Name: Patrick Lis
   Thesis option
   Expected year of completion: 2022

B3. Undergraduate Students

Georgia Institute of Technology

1. Ankita Verma (2017, 2018, 2019)
2. Ji Alice Bok (2018) - Petit Undergraduate Research Scholars program, 2018.
3. Gabrielle E. Lonsberry (2018) - Co-Author on a paper published in IEEE Transactions on Biomedical Engineering
4. Jack Corelli (2018)
5. Hannah J. Paterson (2018, 2019)
6. Kent Yamamoto (2018, 2019, 2020, 2021) - Petit Undergraduate Research Scholars program, 2019; President's Undergraduate Research Award (PURA), 2020.
7. Hanhao Zhang (2018, 2019)
8. Shovan Bhatia (2019, 2020, 2021) – President's Undergraduate Research Award (PURA), 2020; Nominee from Georgia Tech for 2021 Barry Goldwater Scholarship.
9. Shlok Natarajan (2019)
10. Yujin Choi (2019)
11. Salvador M. Aristides (2019)
12. Alec Mills (2019)
13. Alexandra K. Bohm (2019)
14. Lichao Tang (2019, 2020)

15. Fanzhe Lyu (2019)
16. Nikhil Chittaluru (2019, 2020, 2021)
17. Yatong Bai (2019)
18. Netra Gandhi (2020, 2021)
19. Maxina Sheft (2020, 2021)
20. Golda Gershanok (2020)
21. Nicolas Castro (2020)
22. Marshall M. Nambiar (2020, 2021)
23. Dhruv Bhattaram (2020)
24. Grace Trimpe (2020, 2021)
25. Lauren Henley (2021)
26. Asees Singh (2021)

University of Maryland, College Park (2006-2016)

1. Ahmed Siddiqui
2. Chungho Patrick Woo
3. Zachary Brandes
4. Danielle Khoo
5. Christopher Caruso
6. Bethany Springer
7. Yasamin Ekrami
8. Alondra Hernandez
9. Peter Phelps
10. Yalun Wu

Drexel University (1999-2006)

1. Socheth Bith
2. Jake
3. Justin
4. John
5. Brian Schmidt
6. Theodore A. Bieniosek
7. James Hing
8. Angelina Schulz
9. Gregory Tholey
10. Mary Emig
11. Roseanne Crockett
12. Griffin Harold
13. Christopher Kennedy

B4. Service on Thesis or Dissertation Committees

B4.a. Internal

Georgia Institute of Technology

1. Shing Shin Cheng
   School/Department: Biomedical Engineering
   Advisor: Jaydev P. Desai
   Ph.D. Defense date: June 12, 2018

2. Kihan Park, Biomedical Engineering
   School/Department: Biomedical Engineering
   Advisor: Jaydev P. Desai
   Ph.D. Defense date: June 7, 2019

3. Jun Sheng
   School/Department: Biomedical Engineering
   Advisor: Jaydev P. Desai

Ph.D. Defense date: July 2, 2019

4. Yongmin Cho
   School/Department: Mechanical Engineering
   Advisor: Frank L. Hammond
   MS Thesis Defense date: April 10, 2020

5. Waiman Meinhold
   School/Department: Mechanical Engineering
   Advisor: Jun Ueda
   Ph.D. Proposal date: May 14, 2020

6. Lasitha Wijayarathne
   School/Department: Mechanical Engineering
   Advisor: Frank L. Hammond
   Ph.D. Proposal date: September 11, 2020

7. Kirthana Sreerangathama Suresh
   School/Department: Biomedical Engineering
   Advisor: Muralidhar Padala
   Ph.D. Proposal date: October 2, 2020

8. Graham Collins
   School/Department: Biomedical Engineering
   Advisor: Brooks Lindsey
   Ph.D. Proposal date: January 21, 2021

University of Maryland, College Park

M.S. Thesis Committee Member

1. Robert Cullen (2015)

2. Mary Claire Tellers (2015)

Proposal and Dissertation Committee Member

1. Anand Pillarisetti (2008)

2. Konstantinos Bitsakos (2010)

3. Lijun Zhu (2010)

4. Kevin Lister (2012)

5. Rajarshi Roy (2012)

6. Yen-Chen Liu (2012)

7. Bo Yang (2013)
8. Mingyen Ho (2013)
9. Elif Ayvali (2013)
10. Pavan Tallapragada (2013)
11. James K. Hopkins (2013)
12. Sagar Chowdhury (2013)
13. Rubyca Jaai (2013)
14. Carlos Morato (2013)
15. Chia-Pin Liang (2014)
16. Carlos Morato (2016)
17. Chad Kessens (2018)

Department of Mechanical Engineering: Ph.D. Qualifying Exam committee

1. Dennis Leber (2007)
2. Ashis Banerjee (2007)
3. Peyman Karimian (2008)
4. Atul Thakur (2008)
5. Pavan Tallapragada (2009)
6. Chris Brown (2010)
7. Dana Vogtmann (2011)
8. Mohammad Ali (2012)
9. Galen Mullins (2013)
10. Prasad Chanekar (2014)
11. Ryan St. Pierre (2014)
12. Mehdi Kohani (2014)

13. Michael Kuhlman (2015)

14. Shing Shin Cheng (2015)

15. Kihan Park (2015)

16. Jun Sheng (2015)

17. Yimeng Dong (2015)

18. Wenxue Zhao (2015)

Department of Aerospace Engineering: Comprehensive Exam Committee

1. Ryan Robinson (2013)

2. Badri Ranganathan (2013)

3. Amanda Salmoiraghi (2013)

B4.b. External

University of Maryland, College Park

1. Chad C. Kessens
   School/Department: Mechanical Engineering
   Advisor: Jaydev P. Desai
   Ph.D. Defense date: June 5, 2018

B5. Mentorship of Postdoctoral Fellows or Visiting Scholars

B5.a. Postdoctoral Fellows

1. Zhan Gao (2007-2010).

2. U-Xuan Calvin Tan (2009-2011). Currently an Assistant Professor at Singapore University of Technology and Design (SUTD), Singapore.

3. Hardik J. Pandya (2012-2016). Currently an Assistant Professor at Indian Institute of Science, Bengaluru, India.

4. Yeongjin Kim (2013-2016). Currently an Assistant Professor, Department of Mechanical Engineering, Incheon National University, Republic of Korea.

5. Xuefeng Wang (2017 - 2018). Currently an Assistant Professor, Department of Mechanical Engineering, The University of Alabama, Tuscaloosa, USA.

6. Nahian Rahman (2018 - 2019).

7. Seokhwan Jeong (2018 – 2020). He has an offer to start as an Assistant Professor, Department of Mechanical Engineering, Sogang University on March 1, 2021.

VI. Service

A. Professional Contributions

A1. Editorial Board Memberships

1. Editor-in-Chief, Journal of Medical Robotics Research (2014-present)

A2. Society Offices, Activities, and Membership

1. Co-Chair, IEEE Robotics and Automation Society Technical Committee on Surgical Robotics, 2005 - 2013.

2. Member, Technical Committee on BioRobotics for IEEE Engineering in Medicine and Biology (EMB) Society, 2005 - 2017.

3. Member, IEEE Robotics and Automation Society (RAS) Administrative Committee (AdCom), 2019.

4. Co-Chair, Education Committee, Member Activities Board (MAB), 2019.

5. Member, 2020 IEEE Robotics and Automation Society (RAS) Fellow Nomination Committee.

6. Member, AIMBE Review Committee, 2020 Class of the College of Fellows.

7. Associate Vice President, Technical Program, Conference Activities Board (CAB), 2020-2021.

8. Member, IEEE Robotics and Automation Society (RAS) Administrative Committee (AdCom), 2020 - 2022 (3-year term).

9. Member, AIMBE Review Committee, 2021 Class of the College of Fellows.

10. Member, Award Selection Committee, 2020.

A3. Organization and Chairmanship of Technical Sessions, Workshops, and Conferences

1. Invited Session Chair, “Humanoid Robots”, 2001 IEEE International Conference on Robotics and Automation, Seoul, Korea, 2001. (Unable to attend the conference due to personal reasons and had to decline the invitation.)

2. Member, Program committee, 2001 IEEE International Conference on Robotics and Automation, Seoul, Korea, 2001.

3. Session Chair, 2001 IEEE/RSJ International Conference on Intelligent Robots and Systems, Maui, Hawaii, 2001.

4. Member, Program committee, 2001 IEEE/RSJ International Conference on Intelligent Robots and Systems, Maui, Hawaii, 2001.

5. Session Chair, 2002 IEEE International Conference on Robotics and Automation, Washington D.C., 2002.

6. Member, Program committee, 2002 IEEE International Conference on Robotics and Automation, Washington D.C., 2002.

7. Member, Program committee, Fifth International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), Tokyo, Japan, 2002.

8. Member, Program committee, International Conference on Advanced Robotics, Coimbra, Portugal, 2003.

9. Member, Program committee, Sixth International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), Montreal, Canada, 2003.

10. Session Chair, International Conference on Advanced Robotics, Coimbra, Portugal, 2003.

11. Member, Program committee, International Conference on Intelligent Robots and Systems, Las Vegas, NV, 2003.

12. Member, International Program Committee, Tenth IASTED International Conference on Robotics and Applications, Honolulu, HI, 2004.

13. Member, Program committee, EuroHaptics, Munich, Germany, 2004.

14. Track chair, Surgical and Rehabilitative Robotics Theme, 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, San Francisco, CA, 2004.

15. Member, International Program Committee, Solid and Physical Modeling 2005, MIT, Cambridge, MA, 2005.

16. Invited Member, Program Committee, International Conference on Advanced Robotics, Seattle, WA, 2005.

17. Member, 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems Program Committee, Alberta, Canada, 2005.

18. Member, 2006 IEEE International Conference on Robotics and Automation Program Committee, Orlando, Florida, 2006.

19. Theme Co-Chair, "Biomechanics, Bio-Robotics, and Surgical Planning", IEEE 2006 International Conference of the Engineering in Medicine and Biology Society, New York, NY, 2006.

20. Awards Chair, 14th Symposium on Haptic Interfaces for Virtual Environment and Teleoperator Systems, Arlington, VA, 2006.

21. Area Chair, Robotics: Science and Systems Conference, Atlanta, GA, 2007.

22. Member, Awards Committee, Best Conference Paper award, IEEE International Conference on Robotics and Automation, Rome, Italy, 2007.

23. Area Chair, Robotics Science and Systems (RSS), Zurich, Switzerland, 2008.

24. Program Chair, Second Biennial IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob 2008), Scottsdale, AZ, 2008.

25. Co-organizer, Workshop titled: “Meso-scale Robotics for Medical Interventions” at IEEE International Conference on Robotics and Automation, Anchorage, AK, 2010.

26. Chair, Travel Awards Committee, 2010 IEEE International Conference on Robotics and Automation, Anchorage, AK, 2010.

27. Chair, Awards Committee, Third IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics (BioRob 2010), Tokyo, Japan, 2010.

28. Chair, Awards Committee, 2010 IEEE Haptics Symposium, Waltham, MA, 2010.

29. Co-organizer, Workshop titled: “Image-guided Medical Robotic Interventions” at IEEE/RSJ International Conference on Intelligent Robots and Systems, San Francisco, CA, 2011.

30. Chair, Bio-Systems and Health Care Technical Committee of ASME Dynamic Systems and Control Division (DSCD), 2012-2013.

31. Organizer, 2-day single-track Symposium on Surgical Robotics, IEEE International Conference on Biomedical Robotics and Biomechatronics, Rome, Italy, 2012.

32. Member, Organizing Committee, 13th International Symposium on Experimental Robotics, Quebec City, Canada, 2012.

33. Member, Steering Committee, 2014 International Symposium on Experimental Robotics, Morocco, 2014.

34. Member, Steering Committee, 2016 International Conference on Manipulation, Automation and Robotics at Small Scales (MARSS), Paris, France, 2016.

35. Member, Steering Committee, International Conference on Manipulation, Automation

and Robotics at Small Scales (MARSS), Montreal, Canada, 2017.

36. Program Co-Chair, 2017 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vancouver, Canada, 2017.

37. Member, IROS 2017 Senior Program Committee, Vancouver, Canada, 2017.

38. Invited by RAS Student Activities Committee, 2018 ICRA Lunch with Leaders, Brisbane, Australia, 2018.

39. General Chair, 2018 International Symposium on Medical Robotics, Atlanta, GA, 2018.

40. Panelist, Innovation Workshop, Emory University School of Medicine, Department of Radiology and Imaging Sciences, 2018.

41. Panelist, Robotics in Healthcare Panel, 2018 Southeastern Medical Devices Association (SEMDA), Greenville, SC, 2018.

42. General Chair, 2019 International Symposium on Medical Robotics, Atlanta, GA, 2019.

43. Program Chair, 2019 IEEE International Conference on Robotics and Automation, Montreal, Canada, 2019.

44. Invited by RAS Student Activities Committee, 2019 ICRA Lunch with Leaders, Montreal, Canada, 2019.

45. General Chair, 2020 International Symposium on Medical Robotics, Atlanta, GA, 2020.

46. Invited by RAS Student Activities Committee, 2020 ICRA Lunch with Leaders, (Online due to COVID-19), 2020.

47. General Chair, 2021 International Symposium on Medical Robotics, Atlanta, GA, 2021.

A4. Technical Journal or Conference Referee Activities

Journal Referee Activities

1. *IEEE/ASME Transactions on Mechatronics*

2. *ASME Journal of Medical Devices*

3. *IEEE Transactions on Biomedical Engineering*

4. *Medical Image Analysis*

5. *IEEE Transactions on Robotics*

6. *IEEE Transactions on Automation Science and Engineering*
7. *Autonomous Robots*
8. *IEEE Transactions on Robotics and Automation*
9. *ASME Journal of Mechanical Design*
10. *Journal of Dynamic Systems, Measurement, and Control*
11. *IEEE Transactions on Rehabilitation Engineering*

Conference/Symposium Referee Activities

1. International Symposium of Robotic Research (ISRR)
2. Haptic Interfaces for Virtual Environment and Teleoperator Systems (Haptics Symposium)
3. Medical Image Computing and Computer-Assisted Intervention (MICCAI)
4. IEEE International Conference on Robotics and Automation
5. International Conference on Advanced Robotics
6. IEEE/RSJ Conference on Intelligent Robots and Systems

A5. Proposal Panels and Reviews

1. NASA: Research proposals in the area of Intelligent Systems Program, Automated Reasoning program element.
2. National Science Foundation - Two Review Panels in 2002
3. National Science Foundation – Two Review Panels in 2004
4. National Institutes of Health (2004)
5. National Institutes of Health (2005)
6. National Institutes of Health (2006)
7. Invited to serve on the NIH grant application review meeting in June 2006.
8. National Science Foundation – Review Panel in 2006

9. National Institutes of Health (2007)
10. National Science Foundation - Three Review Panels in 2007
11. National Science Foundation - Two Review Panels in 2008
12. National Science Foundation – Review Panel in 2009
13. National Institutes of Health (2009)
14. National Science Foundation – Five Review Panels in 2010
15. Member of the NIH College of CSR Reviewers (2010-2012)
16. National Institutes of Health (2010)
17. National Science Foundation – Three Review Panels in 2011
18. National Institutes of Health (2011)
19. European Commission (2012)
20. National Science Foundation – Three Review Panels in 2012
21. European Commission (2013)
22. National Science Foundation – Two Review Panels in 2013
23. National Institutes of Health – Mail Reviewer 2013
24. National Science Foundation – 2014
25. European Commission (2014)
26. European Commission (2015)
27. National Institutes of Health (2015)
28. National Institutes of Health (2016)
29. National Institutes of Health (2017):
30. National Institutes of Health (2018):
31. National Institutes of Health (2019):
32. European Commission (2020)

33. National Institutes of Health (2020)

B. Institute Contributions

B1. Institute Committee Service

Drexel University

1. Reviewer, *GRID*: Grants for Research Impact at Drexel (A Distribution of Synergy and Tobacco Funds) proposals, 2005.

B2. College Committee Service

Georgia Institute of Technology

1. BME representative, Robotics Ph.D. Program Committee, IRIM, 2017 – present.

University of Maryland, College Park

1. Member, International/Development/Outreach Strategic Planning Committee, 2008.
2. Member, Fischell Institute of Biomedical Devices Committee, 2008 and 2009.
3. Department of Mechanical Engineering – Alternate, APT Committee Member, A. James Clark School of Engineering (Associate Professor Level), 2009.
4. Department of Mechanical Engineering - APT Committee Member, A. James Clark School of Engineering (Associate Professor Level), 2010 and 2011[1].
5. Major Awards Committee, 2013 – 2015.

Drexel University

1. Member, Interdisciplinary Course Development Committee, Gateway-Drexel "Engineering Horizons" Initiative, 2000-2001.

B3. School Committee Service

Georgia Institute of Technology

1. Member, BME Imaging Search Committee, 2016-2017.
2. Interview participant, BME staff hires, 2017, 2019, 2020.

[1] In 2011, I was unable to participate in the committee discussions for Associate Professor cases due to personal reasons.

3. Member, Reappointment, Promotion and Tenure (RPT) Committee, 2017-present.
4. Member, BME Imaging Search Committee, 2017-2018.
5. TFA Chair, Biomedical Robotics, 2017-2019.
6. Member, BME Faculty Advisory Committee, 2018-2020.
7. Member, BME Leading Edge Search Committee, 2018-2019.
8. Member, BME GOLD team (strategic initiatives for the department), 2019.
9. TFA Chair, Biomedical Robotics, 2020-2021.
10. Faculty Recruitment Committee, 2020-2021.
11. Member, Endowed Positions Evaluation Committee, 2021.

University of Maryland, College Park

1. Fellowship Workshop for Graduate Students
2. Advisor, ASME Student Chapter, 2007-2009.
3. Member, Faculty Advisory Committee, 2009.
4. Member, Best M.S. Thesis / Ph.D. Dissertation Selection Committee, 2009-2011.
5. Member, Appointment, Promotion, and Tenure Sub-committee, 2010-2011.
6. Member, Department Chair Search Committee, 2010-2011.
7. Member, Self-study Committee, 2011-2012.
8. Member, Faculty Search Committee, 2012-2014.
9. Member, Faculty Advisory Committee, 2013-2015.
10. Member, Appointment, Promotion, and Tenure Sub-Committee, 2013-2014.
11. Advisor, ASME Student Chapter, 2015-2016.
12. Member, Graduate Committee, 2012-2016.

Drexel University

1. Departmental Faculty Computers and Networking Contact, 1999-2000.

2. Faculty Advisor, American Society of Mechanical Engineers, 1999-2001.

3. Member, Departmental Laboratory Curriculum Development Committee, 2000.

4. Member, Graduate Affairs Committee, 2000-2001.

5. Departmental Seminar Coordinator, 2001-2004.

6. Member, Graduate Affairs Committee, 2003-2004.

7. Member, Faculty Recruitment Committee, Department of Mechanical Engineering and Mechanics, 2004-2005.

8. Member, Graduate Affairs Committee, 2005-2006.

9. Member, Undergraduate Affairs Committee, 2005-2006.

10. Member, Selection Committee for Pei Chi Chou Assistant Professor, Fall 2005.

B4. Program Development: Research

1. Associate Director, Institute for Robotics and Intelligent Machines (IRIM), Georgia Institute of Technology, Atlanta, GA, 2017-present.

2. Director, Georgia Center for Medical Robotics, Georgia Institute of Technology, Atlanta, GA, 2017-present.

3. Founding General Chair, International Symposium on Medical Robotics (ISMR), 2018-present.

4. Founder, Georgia Center for Medical Robotics Seminar Series, Georgia Institute of Technology, Atlanta, GA, 2019.

5. General Chair, Spring School on Medical Robotics, Georgia Institute of Technology, Atlanta, GA, 2019.

B5. Program Development: Academic

1. Made significant contributions to revising the Robotics Ph.D. Qualifying exam for the Robotics Ph.D. degree program at the Georgia Institute of Technology.

2. Provided input for the launching of the new Master of Science in Robotics Degree at the Georgia Institute of Technology.