

Curriculum Vitae of Dr. Satyandra K. Gupta

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1. PERSONAL INFORMATION

A. RESEARCH INTERESTS

Computer Aided Design, Manufacturing Automation, and Robotics

B. EDUCATION

- Ph.D. in Mechanical Engineering, University of Maryland, College Park, September 1994
- M.Tech. in Production Engineering, Indian Institute of Technology, Delhi, India, December 1989
- B.E. in Mechanical Engineering, University of Roorkee (presently known as Indian Institute of Technology, Roorkee), India, May 1988

C. EMPLOYMENT HISTORY

- Associate Chair, Aerospace and Mechanical Engineering Department, University of Southern California, August 2017 to Present
- Smith International Professor, Aerospace and Mechanical Engineering Department, University of Southern California, January 2016 to Present
- Director, Center for Advanced Manufacturing, University of Southern California, January 2016 to Present
- Leader, Design and Reliability of Systems Division, Department of Mechanical Engineering, University of Maryland, January 2015 to December 2015
- Member, Autonomy Summer Study Task Force, Defense Science Board, February 2015 to August 2015
- Program Director, Information and Intelligent Systems Division, National Science Foundation, September 2012 to September 2014
- Director, Maryland Robotics Center, University of Maryland, September 2014 to December 2015 (previously served in this position from March 2010 to September 2012)
- Co-Director, Simulation-Based System Design Lab, University of Maryland, January 2010 to December 2015
- Professor, Mechanical Engineering Department and Institute for Systems Research, University of Maryland, July 2008 to December 2015
- Director, Advanced Manufacturing Lab, University of Maryland, July 2008 to December 2015

- Affiliate Professor, University of Maryland Institute for Advanced Computer Studies, January 2011 to December 2015
- Senior Fellow, Engineering Laboratory, National Institute of Standards and Technology, September 2011 to August 2012
- Guest Researcher, National Institute of Standards and Technology, July 2004 to June 2005 (on sabbatical from the University of Maryland)
- Associate Professor, Mechanical Engineering Department and Institute for Systems Research, University of Maryland, July 2002 to June 2008
- Assistant Professor, Mechanical Engineering Department and Institute for Systems Research, University of Maryland, July 1998 to June 2002
- Research Scientist, Robotics Institute, Carnegie Mellon University, July 1996 to June 1998
- Project Scientist, Robotics Institute, Carnegie Mellon University, January 1995 to June 1996
- Research Associate, Institute for Systems Research, University of Maryland, September 1994 to December 1994
- Senior Scientific Officer, Numerical Control Laboratory, Indian Institute of Technology, Delhi, February 1990 to August 1990

D. FELLOWSHIPS, PRIZES, AND AWARDS

Awards

- Best Paper Award in 2018 *ASME Computers and Information in Engineering Conference* for the paper “A. V. Shembekar, Y. J. Yoon, A. Kanyuck and S.K. Gupta. Trajectory planning for conformal 3D printing using non-planar layers. *ASME Computers and Information in Engineering Conference*, Quebec City, Canada, August 2018”
- Best Paper Award in 2018 *IEEE International Symposium on Safety, Security, and Rescue Robotics* for the paper “P. Rajendran, T. Moscicki, J. Wampler, B. C. Shah, K. D. von Ellenrieder, and S. K. Gupta. Wave-aware trajectory planning for unmanned surface vehicles operating in congested environments. *IEEE International Symposium on Safety, Security, and Rescue Robotics*, Philadelphia, PA, USA, August 2018”
- Best Paper Award (third place) in 2018 *ASME Manufacturing Science and Engineering Conference* for the paper “A.M. Kabir, A.V. Shembekar, R.K. Malhan, R.S. Aggarwal, J.D. Langsfeld, B.C. Shah, and S.K. Gupta. Robotic finishing of interior regions of geometrically complex parts. *ASME Manufacturing Science and Engineering Conference*, College Station, TX, June 2018”
- Judge’s Choice Award at 2018 *Reusable Abstractions of Manufacturing Processes Workshop* for poster titled “Hybrid Cell for Multi-Layer Prepreg Composite Sheet Layup” by R. Malhan, A. Kabir, B. Shah, T. Centea and S.K. Gupta
- ASME Computer Aided Product and Process Development Technical Committee's Best Paper Award in 2017 *ASME Computers and Information in Engineering Conference* for the paper “C.W. Morato, K.N. Kaipa, and S.K. Gupta. System state monitoring to facilitate safe and efficient human-robot collaboration in hybrid assembly cells. 2017 *ASME Computers and Information in Engineering Conference*, Cleveland, OH”
- First Place, Agile Robotics for Industrial Automation Competition (ARIAC), 2017

- Finalist, Kuka Innovation Award, 2017
- Distinguished Alumnus Award, Indian Institute of Technology, Roorkee, 2014
- ASME Computers and Information in Engineering Division's Excellence in Research Award, 2013
- ASME Computer Aided Product and Process Development Technical Committee's Prakash Krishnaswami Best Paper Award in 2013 *ASME Computers and Information in Engineering Conference* for the paper "C. Morato, K. Kaipa, B. Zhao, and S.K. Gupta. Safe human robot interaction by using exteroceptive sensing based human modeling. 2013 *ASME Computers and Information in Engineering Conference*, Portland, OR"
- Best Paper Award in 2012 *ASME Computers and Information in Engineering Conference* for the paper "S. Bista, S. Chowdhury, S.K. Gupta, and A. Varshney. Using GPUs for real time prediction of optical forces on microsphere ensembles. 2012 *ASME Computers and Information in Engineering Conference*, Chicago, IL"
- Finalist for Best Paper, *International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines* for paper "T. Brewer, K. Kaipa, and S.K. Gupta. A quadruped robot with on-boarding sensing and parameterized gait for stair climbing. *15th International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines*, Baltimore, MD, July 2012."
- 2012 Most Cited Paper Award from *Computer Aided Design Journal* for paper "A. Thakur, A.G. Banerjee, and S.K. Gupta. A survey of CAD model simplification techniques for physics-based simulation applications. *Computer Aided Design*, 41(2):64-80, 2009"
- Kos Ishii-Toshiba Award from American Society for Mechanical Engineers (ASME) Design for Manufacturing and the Life Cycle Committee, August 2011
- Compliant Mechanism Application Award in *2010 ASME Mechanism and Robotics Conference* for the paper "W. Bejgerowski, J.W. Gerdes, S.K. Gupta, H.A. Bruck, and S. Wilkerson, Design and fabrication of a multi-material compliant flapping wing drive mechanism for miniature air vehicles, *ASME Mechanism and Robotics Conference*, Montreal, Canada, August 2010"
- Bioinspiration & Biomimetics Highlights of 2009 (Paper "J.K. Hopkins, B.W. Spranklin, and S.K. Gupta, A survey of snake-inspired robot designs, *Bionispiration and Biomimetics*, 4(2):021001, 2009" was selected as one of the six highlight articles of 2009 by the journal)
- Winner, 2007 Invention of the Year Award in Physical Science Category, University of Maryland (Invention: Minimally Invasive Neurosurgical Intracranial Robot; Inventors: Jaydev P. Desai, Marc J. Simard, Satyandra K. Gupta, Rao Gullapalli, Nicholas Pappafotis, and Wojciech Bejgerowski)
- Finalist, 2007 Invention of the Year Award in Information Science Category, University of Maryland (Invention: Geometry Based Search Software; Inventors: Satyandra K. Gupta, Antonio Cardone, and Maxim Schwartz)
- Fellow of American Society of Mechanical Engineers (Elected in August 2007)
- Best Paper Award in *2006 ASME Computers and Information in Engineering Conference* for the paper "T. Peng and S.K. Gupta, A computational framework for point cloud construction using digital projection patterns, *ASME Computers and Information in Engineering Conference*, Philadelphia, PA, September 2006"
- Trailblazer Award from *Science Spectrum Magazine*, September 2006
- Winner of the First Place in 2003 University of Maryland's Business Plan Competition (Award was given to a team of three members: S.K. Gupta, R. Kumar, and A.K. Priyadarshi)

- Selected to attend National Academy of Engineering's 2002 Frontiers in Engineering Symposium
- Presidential Early Career Award for Scientists and Engineers (PECASE), 2001
- National Science Foundation CAREER Award, 2001
- Robert W. Galvin Outstanding Young Manufacturing Engineer Award, Society of Manufacturing Engineers, 2001
- Outstanding Systems Engineering Faculty Award, Institute for Systems Research, 2001
- Highly Commended Award from Literati Club for the paper "S.K. Gupta, C.J. Paredis, R. Sinha, and P.F. Brown, Intelligent Assembly Modeling and Simulation, *Assembly Automation*, 21(3):215--235, 2001"
- Office of Naval Research Young Investigator Award, 2000
- Best Paper Award in *1999 ASME Design for Manufacturing Conference* for the paper "R.K. Arni and S.K. Gupta, Manufacturability analysis for solid freeform fabrication, *ASME Design for Manufacturing Conference*, Las Vegas, Nevada, September 1999"
- Best Paper Award in the area of Artificial Intelligence and Feature-Based Design and Manufacturing in *1994 ASME Computers in Engineering Conference* for the paper "D. Das, S.K. Gupta, and D.S. Nau, Reducing setup cost by automated generation of redesign suggestions, *ASME Computers in Engineering Conference*, Minneapolis, MN, September 1994"
- Institute for Systems Research's Outstanding Systems Engineering Graduate Student Award, 1994
- Gold Medal for First Rank in Bachelor of Engineering in Mechanical Engineering, University of Roorkee, 1988
- Gold Medal for the Best Engineering Design Project, University of Roorkee, 1988
- First Prize, Science and Technology Entrepreneurship Park, Roorkee Chapter Project Competition, 1988

Fellowships and Scholarships

- Institute for Systems Research Graduate Fellowship, University of Maryland (1992-1994)
- Graduate School Fellowship, University of Maryland (1990-1992)
- University Grant Commission Fellowship, Indian Institute of Technology, Delhi (1988-1989)
- University Merit Scholarship, University of Roorkee (1984-1988)

2. RESEARCH, SCHOLARLY, AND CREATIVE ACTIVITIES

A. BOOKS

Edited Books

1. D.K. Anand, S.K. Gupta, and R.A. Kavetsky (editors), *Simulation Driven Innovation and Discovery in Energetics Applications*, CALCE EPSC Press, College Park, 2011.

Authored Books

1. E.B. Magrab, S.K. Gupta, F.P. McCluskey, and P. Sandborn. *Integrated Product and Process Design and Development: The Product Realization Process*. Second Edition, CRC Press, July 2009.

2. S.K. Gupta, D.K. Anand, J.E. Brough, M. Schwartz, and R.A. Kavetsky. *Training in Virtual Environments: A Safe, Cost-Effective, and Engaging Approach to Training*. CALCE EPSC Press, College Park, July 2008.

Chapters in Books

1. W. Bejgerowski, J. Gerdes, J. Hopkins, L. Lee, M.S. Narayanan, F. Mendel, V. Krovi, and S.K. Gupta. An engineering approach to utilizing bio-inspiration in robotics applications. In A. Goel, D. McAdams and R. Stone (editors), *Biologically Inspired Design*, Springer-Verlag, 2014.
2. M. Schwartz, P. Svec, A. Thakur, and S.K. Gupta. Simulation based synthesis of planning logic for autonomous unmanned sea surface vehicles. *Simulation Driven Innovation and Discovery in Energetics Applications*, CALCE EPSC Press, College Park, 2011.
3. A. Ananthanarayanan, W. Bejgerowski, J. Gerdes, D. Mueller, S.K. Gupta, and S. Wilkerson. Simulation-based design of drive mechanism for flapping wing micro air vehicles. *Simulation Driven Innovation and Discovery in Energetics Applications*, CALCE EPSC Press, College Park, 2011.
4. P. Svec and S.K. Gupta. Automated planning logic synthesis for autonomous unmanned vehicles in competitive environments with deceptive adversaries. *New Horizons in Evolutionary Robotics, Studies in Computational Intelligence*, Springer, pp. 171-193, 2011.
5. A.L. Gershon, L.S. Gyger, Jr., H.A. Bruck, and S.K. Gupta. In situ characterization of residual strains near electronic components embedded in thermoplastic polymers during processing and operation. *Advances in Mathematical Modeling and Experimental Methods for Materials and Structures*. The Jacob Aboudi Volume, Leslie Banks-Sills and Rivka Gilat (editors), Springer, 2009.
6. S.K. Gupta, D.S. Nau, W.C. Regli, and G. Zhang. A methodology for systematic generation and evaluation of alternative operation plans. In *Advances in Feature Based Manufacturing*, pages 161-184, Elsevier Science Publishers, 1994.
7. D.S. Nau, G. Zhang, S.K. Gupta, and R.R. Karinithi. Evaluating product machinability for concurrent engineering. In *Concurrent Engineering: Contemporary Issues and Modern Design Tools*, pages 264-279, Chapman and Hall, 1993.

B. ARTICLES IN JOURNALS

Accepted/Published Articles in Journals

1. P. M. Bhatt, A.M. Kabir, M. Peralta, H.A. Bruck, and S.K. Gupta. A robotic cell for performing sheet lamination-based additive manufacturing. *Additive Manufacturing*, Accepted for publication.
2. A. V. Shembekar, Y. J. Yoon, A. Kanyuck and S.K. Gupta. Generating robot trajectories for conformal 3D printing using non-planar layers. *ASME Journal of Computing and Information Science in Engineering*, Accepted for publication.
3. A.E. Holness, H. Solheim, H.A. Bruck, and S.K. Gupta. A design framework for realizing multifunctional wings for flapping wing air vehicles using solar cells. *International Journal of Micro Air Vehicles*, Accepted for publication.
4. J.W. Gerdes, H.A. Bruck, and S.K. Gupta. A simulation-based approach to modeling component interactions during design of flapping wing aerial vehicles. *International Journal of Micro Air Vehicles*, Accepted for publication.

5. L.S. Santos, S.K. Gupta, and H.A. Bruck. Simulation of buckling of internal features during selective laser sintering of metals. *Additive Manufacturing*. 23:235--245, 2018.
6. G.E. Mullins, C. Kessens, and S.K. Gupta. An adaptive sampling approach for evaluating robot self-righting capabilities. *IEEE Robotics and Automation Letters*. 3(4): 4233--4240, 2018.
7. M. Khrenov, H.A. Bruck, and S.K. Gupta. A novel single camera robotic approach for three-dimensional digital image correlation with targetless extrinsic calibration and expanded view angles. *SEM Experimental Techniques*. 42(6):563--574, 2018.
8. K.N. Kaipa, C.W. Morato, and S.K. Gupta. Design of hybrid cells to facilitate safe and efficient human-robot collaboration during assembly operations. *ASME Journal of Computing and Information Science in Engineering*. 18(3):031004, 2018.
9. Z. Kootbally, T. Kramer, C. Schlenoff, and S.K. Gupta. Implementation of an ontology-based approach to enable agility in kit building applications. *International Journal of Semantic Computing*, 12(1):5-24, 2018.
10. J.D. Langsfeld, A.M. Kabir, K.N. Kaipa, and S.K. Gupta. Integration of planning and deformation model estimation for robotic cleaning of elastically deformable objects. *IEEE Robotics and Automation Letters*, 3(1): 352-359, 2018.
11. Z. Kootbally, C. Schlenoff, B. Antonishek, F. Proctor, T. Kramer, W. Harrison, A. Downs, and S. K. Gupta. Enabling robot agility in manufacturing kitting applications. *Integrated Computer-Aided Engineering*, 25(2):193-212, 2018.
12. A.M. Kabir, J.D. Langsfeld, K.N. Kaipa, and S.K. Gupta. Identifying optimal trajectory parameters in robotic finishing operations using minimum number of physical experiments. *Integrated Computer-Aided Engineering Journal*, 25(2):111-135, 2018.
13. S. Shriyam. B. C. Shah, and S.K. Gupta. Decomposition of collaborative surveillance tasks for execution in marine environments by a team of unmanned surface vehicles. *ASME Journal of Mechanisms and Robotics*, 10(2):025007-025007-7, 2018.
14. N. B. Kumbla, S. Thakar, K. N. Kaipa, J. A. Marvel, and S. K. Gupta. Handling perception uncertainty in simulation based singulation planning in robotic bin picking. *ASME Journal of Computing and Information Science in Engineering*, 18(2):021004-021004-10, 2018.
15. A.E. Holness, H.A. Bruck and S.K. Gupta. Characterizing and modeling the enhancement of lift and payload capacity resulting from thrust augmentation in a propeller-assisted flapping wing air vehicle. *International Journal of Micro Air Vehicles*, 10(1):50--69, 2018.
16. G.E. Mullins, P.G. Stankiewicz, R.C. Hawthorne, and S.K. Gupta. Adaptive generation of challenging scenarios for testing and evaluation of autonomous vehicles. *Journal of Systems and Software*, 137:197-215, March 2018.
17. J.D. Langsfeld, K.N. Kaipa, and S.K. Gupta. Selection of trajectory parameters for dynamic pouring tasks based on exploitation-driven updates of local metamodels. *Robotica*, 36(1):141-166, January 2018.
18. M.J. Kuhlman, M.W. Otte, D.A. Sofge, and S.K. Gupta. Multipass target search in natural environments. *Sensors*, 17(11), 2514, 2017.
19. L.J. Roberts. H. A. Bruck, and S.K. Gupta. Modeling of dive maneuvers for executing autonomous dives with a flapping wing air vehicle. *ASME Journal of Mechanisms and Robotics*, 9(6):061919-061919-11, December 2017.

20. J.W. Gerdes, H.A. Bruck, and S.K. Gupta. Improving prediction of flapping-wing motion by incorporating actuator constraints with models of aerodynamic loads using in-flight data. *ASME Journal of Mechanisms and Robotics*, 9(2):021011-021011-11, 2017.
21. A.M. Kabir, K.N. Kaipa, J. Marvel, S.K. Gupta. Automated planning for robotic cleaning using multiple setups and oscillatory tool motions. *IEEE Transaction on Automation Science and Engineering*, 14(3):1364-1377, July 2017.
22. A. Perez-Rosado, H.A. Bruck and S.K. Gupta. Integrating solar cells into flapping wing air vehicles for enhanced flight endurance. *ASME Journal of Mechanisms and Robotics*, 8(10):051006, October, 2016.
23. B. C. Shah, P. Svec, I.R. Bertaska, W. Klinger, A.J. Sinisterra, K. v. Ellenrieder, M. Dhanak, and S.K. Gupta. Resolution-adaptive risk-aware trajectory planning for surface vehicles operating in congested civilian traffic. *Autonomous Robots*, 40(7): 1139–1163, 2016.
24. Y.S. Kim, H. Shi, N.G. Dagalakis, and S.K. Gupta. Design of a MEMS-based motion stage based on a lever mechanism for generating large displacements and forces, *Journal of Micromechanics and Microengineering*, 26(9): 095008, 2016.
25. K.N. Kaipa, A.S. Kankanhalli-Nagendra, N.B. Kumbala, S. Shriyam, S. S. Thevendria-Karthic, J.A. Marvel, and S.K. Gupta. Addressing perception uncertainty induced failure modes in robotic bin-picking. *Robotics and Computer Integrated Manufacturing*, 42(12):17-38, 2016.
26. I.R. Bertaska, B. Shah, K. von Ellenrieder, P. Svec, W. Klinger, A.J. Sinisterra, M. Dhanak, and S.K. Gupta. Experimental evaluation of automatically-generated behaviors for USV operations. *Ocean Engineering*, 106:496—514, 2015.
27. A. Perez-Rosado, R.D. Gelhar, S. Nolen, S.K. Gupta, and H.A. Bruck. Design, fabrication, and characterization of multifunctional wings to harvest solar energy in flapping wing air vehicles. *Smart Materials and Structures*, 24(6):065042, 2015.
28. Z. Kootbally, C. Schlenoff, C. Lawler, T. Kramer, and S.K. Gupta. Towards robust assembly with knowledge representation for the planning domain definition language (PDDL). *Robotics and Computer-Integrated Manufacturing*, 33:42-55, 2015.
29. E. Raboin, P. Svec, D. S. Nau, and S.K. Gupta. Model-predictive asset guarding by team of autonomous surface vehicles in environment with civilian boats. *Autonomous Robots*, 38(3):261-282, 2015.
30. J.W. Gerdes, A. Holness, A. Perez-Rosado, L. Roberts, A. Greisinger, E. Barnett, J. Kempny, D. Lingam, C.H. Yeh, H.A. Bruck, and S.K. Gupta. Robo Raven: A flapping wing air vehicle with highly compliant and independently controlled wings. *Soft Robotics*, 1(4):275--288, 2014.
31. C. Wang, S. Chowdhury, M. Driscoll, C. Parent, S. K. Gupta, and W. Losert. The interplay of cell-cell and cell-substrate adhesion in collective cell migration. *Interface, Journal of the Royal Society*, 11: 20140684, 2014.
32. Y.S. Kim, N.G. Dagalakis, and S.K. Gupta. Design of MEMS based 3-axis motion stage by incorporating a nested structure. *Journal of Micromechanics and Microengineering*. 24(7): 075009, 2014.
33. M. Mani, J. Madan, J.H. Lee, K.W. Lyons, and S.K. Gupta. Sustainability characterization for manufacturing processes. *International Journal of Production Research*, 52(20): 5895-5912, 2014.
34. A.G. Banerjee, S. Chowdhury, and S.K. Gupta. Optical tweezers: Autonomous robots for the manipulation of biological cells. *IEEE Robotics and Automation Magazine*. 21(3): 81-88, 2014.

35. A. Thakur, S. Chowdhury, P. Svec, C. Wang, W. Losert, and S.K. Gupta. Indirect pushing based automated micromanipulation of biological cells using optical tweezers. *International Journal of Robotics Research*, 33(8):1098-1111, 2014.
36. J.K. Hopkins and S.K. Gupta. Design and modeling of a new drive system and exaggerated rectilinear-gait for a snake-inspired robot. *ASME Journal of Mechanism and Robotics*, 6(2):021001, 2014.
37. P. Svec, A. Thakur, E. Raboin, B.C. Shah, and S.K. Gupta. Target following with motion prediction for unmanned surface vehicle operating in cluttered environments. *Autonomous Robots*, 36(4): 383-405, 2014.
38. S. Chowdhury, A. Thakur, P. Svec, C. Wang, W. Losert, and S.K. Gupta. Automated manipulation of biological cells using gripper formations controlled by optical tweezers. *IEEE Transactions on Automation Science and Engineering*, 11(2): 338-347, 2014.
39. C. Morato, K.N. Kaipa, B. Zhao, and S.K. Gupta. Toward safe human robot collaboration by using multiple Kinects based real-time human tracking. *ASME Journal of Computing and Information Science in Engineering*, 14(1): 011006, Jan 2014.
40. D. Vogtmann, S.K. Gupta, and S. Bergbreiter. Characterization and modeling of elastomeric joints in miniature compliant mechanisms. *ASME Journal of Mechanism and Robotics*, 5(4): 041017, 2013.
41. J.W. Gerdes, K.C. Cellon, H.A. Bruck, S.K. Gupta. Characterization of the mechanics of compliant wing designs for flapping-wing miniature air vehicles. *Experimental Mechanics*, 53: 1561-1571, 2013.
42. S. Chowdhury, P. Svec, C. Wang, K.T. Seale, J.P. Wikswo, W. Losert, and S.K. Gupta. Automated cell manipulation in optical tweezers-assisted microfluidic chamber. *IEEE Transactions on Automation Science and Engineering*, 10(4): 980-989, Oct. 2013.
43. S. Balakirsky, Z. Kootbally, T. Kramer, A. Pietromartire, C. Schlenoff, and S.K. Gupta. Knowledge driven robotics for kitting applications. *Robotics and Autonomous Systems*, 61(11):1205–1214, 2013.
44. C. Morato, K.N. Kaipa, and S.K. Gupta. Improving assembly precedence constraint generation by utilizing motion planning and part interaction clusters. *Computer-Aided Design*, 45(11):1349--1364, 2013.
45. A.G. Banerjee and S.K. Gupta. Research in automated planning and control for micro manipulation. *IEEE Transactions on Automation Science and Engineering*, 10(3): 485--495, July 2013.
46. S. Bista, S. Chowdhury, S.K. Gupta, and A. Varshney. Using GPUs for real time prediction of optical forces on microsphere ensembles. *ASME Journal of Computing and Information Science in Engineering*, 13(3): 031002, April 2013.
47. Y.S. Kim, N.G. Dagalakis, and S.K. Gupta. Creating large out-of-plane displacement electrothermal motion stage by incorporating beams with step features. *Journal of Micromechanics and Microengineering*, 23(5):055008, 2013.
48. C. Wang, S. Chowdhury, S.K. Gupta, and W. Losert. Optical micromanipulation of active cells with minimum perturbations: direct and indirect pushing. *Journal of Biomedical Optics*, 18(4):45001, 2013.

49. A. Thakur, P. Svec, and S.K. Gupta. GPU based generation of state transition models using simulations for unmanned sea surface vehicle trajectory planning. *Journal of Robotics and Autonomous System*, 60(12):1457-1471, December 2012.
50. A. Thakur and S.K. Gupta. Improving performance of rigid body dynamics simulation by removal of inaccessible regions from geometric models. *Computer Aided Design*, 44(12):1190-1204, December 2012.
51. A.G. Banerjee, S. Chowdhury, W. Losert, and S.K. Gupta. Real-time path planning for coordinated transport of multiple particles using optical tweezers. *IEEE Transaction on Automation Science and Engineering*, 9(4):669-678, October 2012.
52. Y.S. Kim, J.M. Yoo, S.H. Yang, Y.M. Choi, N.G. Dagalakis, and S.K. Gupta. Design and fabrication of a MEMS XY-stage using a serial kinematic mechanism for multi-finger manipulation. *Journal of Micromechanics and Microengineering*, 22(8): 085029, 2012.
53. A. Balijepalli, J. Gorman, S.K. Gupta, and T. LeBrun. Significantly improved trapping lifetime of nanoparticles in an optical trap using feedback control. *Nano Letters*, 12 (5), 2347-2351, 2012.
54. J.W. Gerdes, S.K. Gupta, and S. Wilkerson. A review of bird-inspired flapping wing miniature air vehicle designs. *ASME Journal of Mechanism and Robotics*, 4(2), 021003.1-021003.11, 2012.
55. R. Patro, J. Dickerson, S. Bista, S.K. Gupta, and A. Varshney. Speeding up particle trajectory simulations under moving force fields using GPUs. *ASME Journal of Computing and Information Science in Engineering*, 12(2):021006, June 2012.
56. P. Svec and S.K. Gupta. Automated synthesis of action selection policies for unmanned vehicles operating in adverse environments. *Autonomous Robots*, 32(2), 149-164, 2012.
57. J.G. Cevallos, A.E. Bergles, A. Bar-Cohen, P. Rodgers, and S.K. Gupta. Polymer heat exchangers - History, opportunities, and challenges. *Heat Transfer Engineering*, 33(13), 1075-1093, 2012.
58. A. Ananthanarayanan, L. Ehrlich, J.P. Desai, and S.K. Gupta. Design of revolute joints for in-mold assembly using insert molding. *ASME Journal of Mechanical Design*, 133(12):121010, Dec 2011.
59. W. Bejgerowski, J.W. Gerdes, S.K. Gupta, and H.A. Bruck. Design and fabrication of miniature compliant hinges for multi-material compliant mechanisms. *International Journal of Advanced Manufacturing Technology*, 57(5):437-452, 2011.
60. J. Cevallos, S.K. Gupta, A. Bar-Cohen. Incorporating moldability considerations during the design of thermally enhanced polymer heat exchangers. *ASME Journal of Mechanical Design*, 133(8):081009, August 2011.
61. A.G. Banerjee, S. Chowdhury, W. Losert, and S.K. Gupta. Survey on indirect optical manipulation of cells, nucleic acids, and motor proteins. *Journal of Biomedical Optics*, 16(5), 051301, May 2011.
62. A. Weissman, M. Petrov, S.K. Gupta, X. Fiorentini, R. Sudarsan, and R. Sriram. A computational framework for authoring and searching product design specifications. *Advanced Engineering Informatics*, 25(3):516-534, August 2011.
63. D. Bourne, J. Corney, and S.K. Gupta. Recent advances and future challenges in automated manufacturing planning. *ASME Journal of Computing and Information Science in Engineering*, 11(2): 021006, June 2011.

64. A. Thakur and S.K. Gupta. Real-time dynamics simulation of unmanned sea surface vehicles for virtual environments. *ASME Journal of Computing and Information Science in Engineering*, 11(3):031005, September 2011.
65. J.K. Hopkins, B.W. Spranklin, and S.K. Gupta. A case study in optimization of gait and physical parameters for a snake-inspired robot based on a rectilinear gait. *ASME Journal of Mechanism and Robotics*, 3(1):014503, February 2011.
66. B. Koss, S. Chowdhury, T. Aabo, S.K. Gupta, and W. Losert. Indirect optical gripping with triplet traps. *Journal of Optical Society of America B*, 28(5), 982-985, 2011.
67. A. Ananthanarayanan, S.K. Gupta, and H.A. Bruck. Modeling and characterization to minimize effects of melt flow fronts on premolded component deformation during in-mold assembly of mesoscale revolute joints. *ASME Journal of Manufacturing Science and Engineering*, 132 (4): 041006, 2010.
68. A. Ananthanarayanan, S.K. Gupta, and H.A. Bruck. Characterization of a reverse molding sequence at the mesoscale for in-mold assembly of revolute joints. *Journal of Polymer Engineering and Science*, 50(9): 1843–1852, 2010.
69. D. Mueller, H.A. Bruck, and S.K. Gupta. Measurement of thrust and lift forces associated with drag of compliant flapping wing for micro air vehicles using a new test stand design. *Experimental Mechanics*, 50(6):725–735, 2010.
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C. CONFERENCE PUBLICATIONS

Full Paper Refereed Publications in Conference Proceedings

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201. D.S. Nau, S.K. Gupta, and W.C. Regli. AI planning versus manufacturing operation planning: A case study. *International Joint Conference on Artificial Intelligence*, pages 1670-1676, Montreal, Canada, August 1995.
202. S.K. Gupta, W.C. Regli, and D.S. Nau. Manufacturing feature instances: Which ones to recognize? *ACM Symposium on Solid Modeling and Applications*, pages 141-152, Salt Lake City, Utah, May 1995.
203. D.S. Nau, M. Ball, S.K. Gupta, I. Minis, and G. Zhang. Design for manufacture in multi-enterprise partnerships: Current status and future directions. Concurrent Product Design Symposium, *ASME Winter Annual Meeting*, pages 117-125, November 1994.
204. W.C. Regli, S.K. Gupta, and D.S. Nau. Feature recognition for manufacturability analysis. *ASME Computers in Engineering Conference*, pages 93-104, Minneapolis, MN, September 1994.
205. D. Das, S.K. Gupta, and D.S. Nau. Reducing setup cost by automated generation of redesign suggestions. *ASME Computers in Engineering Conference*, pages 159-170, Minneapolis, MN, September 1994.
206. S.K. Gupta, D.S. Nau, and G.M. Zhang. Interpreting product designs for manufacturability evaluation. In Intelligent Concurrent Design, *ASME Winter Annual Meeting*, volume DE-Vol. 66, pages 33-44, New Orleans, LA, November 1993.
207. D.S. Nau, S.K. Gupta, T.R. Kramer, W.C. Regli, and G.M. Zhang. Development of machining alternatives, based on MRSEVs. *ASME Computers in Engineering Conference*, pages 47-57, San Diego, CA, August 1993.

208. S.K. Gupta and D.S. Nau. Generation of alternative feature-based models and precedence orderings for machining applications. *Symposium on Solid Modeling Foundations and CAD/CAM Applications*, Montreal, Canada, May 1993.
209. D.S. Nau, G.M. Zhang, and S.K. Gupta. Generation and evaluation of alternative operation sequences. Quality Assurance through Integration of Manufacturing Processes and Systems. *ASME Winter Annual Meeting*, volume PED-Vol. 56, pages 93-108, Anaheim, CA, November 1992.

Other Publications in Conference and Workshop Proceedings

1. H.A. Bruck, R. Acevedo, J. Rohwerder, L. Johnson, S.K. Gupta. Layered jamming multifunctional actuators. *Annual Conference on Experimental and Applied Mechanics*, Greenville, SC, June 2018.
2. N.B. Kumbla, J.A. Marvel, and S.K. Gupta. Using sensor feedback to estimate part pose in a gripper. Workshop on *Introspective Methods for Reliable Autonomy* held at *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Vancouver, Canada, September 2017.
3. A. Holness, H.A. Bruck, and S.K. Gupta. Flexible energy harvesting/storage structures for flapping wing air vehicles. *Annual Conference on Experimental and Applied Mechanics*, Indianapolis, IN, June 2017.
4. K.Y. Lin and S.K. Gupta. Soft fingers with controllable compliance to enable realization of low cost grippers. *Living Machines Conference*, Stanford, CA, July 2017.
5. P. Rajendran, B.C. Shah, and S.K. Gupta. Dynamics-aware reactive planning for unmanned ground vehicles to avoid collisions with dynamic obstacles on uneven terrains. Workshop on *Planning and Robotics (PlanRob)*, held at *International Conference on Automated Planning and Scheduling*, Pittsburgh, PA, June 2017.
6. Z. Kootbally, T. R. Kramer, C. Schlenoff, and S. K. Gupta. Overview of an ontology-based approach for kit building applications. *IEEE 11th International Conference on Semantic Computing*, San Diego, CA, January 2017.
7. J.W. Gerdes, H.A. Bruck, and S.K. Gupta. Validation of flight power modeling by direct measurement of a flapping wing aerial vehicle. *AIAA Atmospheric Flight Mechanics Conference*, AIAA SciTech Forum, Texas, January 2017.
8. A.E. Holness, A. Perez-Rosado, H.A. Bruck, M. Peckerar, and S.K. Gupta. Multifunctional wings with flexible batteries and solar cells for robotic birds. *SEM Annual Conference and Exposition*, Orlando, FL, June 2016.
9. B.C. Shah, Petr Svec, Atul Thakur, and S. K. Gupta. Path Planning for Unmanned Vehicles Operating in Time-Varying Flow Fields. *Workshop on Planning and Robotics, held at International Conference on Automated Planning and Scheduling*, London, UK, June 2016.
10. J. Gregory, J. Fink, J. Rogers, and S. K. Gupta. A Risk-Based Framework for Incorporating Navigation Uncertainty Into Exploration Strategies. *Workshop on Planning and Robotics, held at International Conference on Automated Planning and Scheduling*, London, UK, June 2016.
11. K.N. Kaipa, A. S. Kankanhalli-Nagendra, and S. K. Gupta. Toward estimating task execution confidence for robotic bin-picking applications. *AAAI Fall Symposium: Self-Confidence in Autonomous Systems*, Arlington, VA, November 2015.
12. K.N. Kaipa, S. Shriyam, N-B. Kumbla, and S. K. Gupta. Automated plan generation for robotic singulation from mixed bins. Workshop on Task Planning for Intelligent Robots in Service and

- Manufacturing, held at *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Hamburg, Germany, October 2015.
13. K.N. Kaipa, N-B. Kumbla, and S. K. Gupta. Characterizing performance of sensorless fine positioning moves in the presence of initial position uncertainty. Workshop on Task Planning for Intelligent Robots in Service and Manufacturing, held at *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Hamburg, Germany, October 2015.
 14. J. D. Langsfeld, K. N. Kaipa, and S. K. Gupta. Generation and Exploitation of Local Models for Rapid Learning of a Pouring Task. Workshop on Machine Learning in Planning and Control of Robot Motion, held at *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Hamburg, Germany, October 2015.
 15. A. Perez-Rosado, S.K. Gupta, and H.A. Bruck. Mechanics of multifunctional wings with solar cells for robotic birds. SEM Annual Conference and Exposition, Costa Mesa, CA, June 2015
 16. A.G. Banerjee, A. Barnes, K.N. Kaipa, J. Liu, S. Shriyam, N. Shah, and S. K. Gupta. An Ontology to Enable Optimized Task Partitioning in Human-Robot Collaboration for Warehouse Kitting Operations. *SPIE Sensing Technology + Applications Symposium, Sensors for Next-Generation Robotics II Conference*, Baltimore, MD, 2015.
 17. V. Shivashankar, K. N. Kaipa, D. S. Nau, and S. K. Gupta. Towards Integrating hierarchical goal networks and motion planners to support planning for human robot collaboration in assembly cells. *AAAI Fall Symposium: Artificial Intelligence for Human-Robot Interaction*, Arlington, VA, November 2014.
 18. M.J. Kuhlman, J. Hays, D. Sofge and S.K. Gupta. Central pattern generator based omnidirectional locomotion for quadrupedal robotics. *Workshop on Real-time Motion Generation & Control – Constraint-based Robot Programming*, held at *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Chicago, IL, September 2014.
 19. J. D. Langsfeld, K. N. Kaipa, R. J. Gentili, J. A. Reggia, and S.K. Gupta. Incorporating failure-to-success transitions in imitation learning for a dynamic pouring task. *Workshop on Compliant Manipulation: Challenges and Control*, held at *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Chicago, IL, September 2014.
 20. V. Shivashankar, K. N. Kaipa, D. S. Nau, and S.K. Gupta. Towards integrating hierarchical goal networks and motion planners to support planning for human-robot teams. *AI and Robotics Workshop*, held at *IEEE/RSJ International Conference on Intelligent Robots and Systems*, Chicago, IL, September 2014.
 21. K.N. Kaipa, C.W. Morato, J. Liu, and S.K. Gupta. Human-robot collaboration for bin-picking tasks to support low-volume assemblies. *Human-Robot Collaboration for Industrial Manufacturing Workshop*, held at *Robotics: Science and Systems Conference*, Berkely, CA, July 2014.
 22. P. Svec, B.C. Shah, I.R. Bertaska, W. Klinger, A. J. Sinisterra, K. von Ellenrieder, M. Dhanak, and S.K. Gupta. Adaptive sampling based COLREGS-compliant obstacle avoidance for autonomous surface vehicles. *Workshop on Persistent Autonomy for Marine Robotics*, held at *IEEE International Conference on Robotics and Automation*, Hong Kong, China, June 2014.
 23. A. Perez-Rosado, A. Philipps, E.Barnett, L. Roberts, J. Gerdes, S.K. Gupta, and H.A. Bruck. Compliant multifunctional wing structures for flapping wing MAVs. *SEM Annual Conference and Exposition*, Lombard, IL, 2013.

24. H.A. Bruck, S.K. Gupta, A. Perez-Rosado, A. Philipps, and L. Roberts. Compliant multifunctional wing structures for harvesting solar energy. *19th International Conference on Composite Materials*, Montreal, Canada, 2013.
25. H.A. Bruck, K. Cellon, S.K. Gupta, M. Kujawski, A. Perez-Rosado, E. Smela, and M. Yu. Mechanics of multifunctional skin structures. *SEM Annual Conference and Exposition*, Costa Mesa, CA, June 2012.
26. E. Raboin, U. Kuter, D. Nau, and S.K. Gupta. Adversarial planning for multi-agent pursuit-evasion games in partially observable Euclidean space. *Workshop on Artificial Intelligence in Adversarial Real-Time Games*, held at *AIIDE*, Palo Alto, California, October 8-12, 2012.
27. R. Madhavan, R. Bostelman, Z. Kootbally, R. Lakaemper, S.K. Gupta, and S. Balakirsky. Smart, flexible, and safe industrial mobile robots: Performance evaluation and standardization efforts. *International Test and Evaluation Association (ITEA) Tech. Review Conference*, Annapolis, MD, U.S.A., July 2011.
28. S.K. Gupta and A. Thakur. Algorithms for contact preserving model simplification for interactive rigid body dynamics simulations. *NSF CMMI Engineering Research and Innovation Conference*, Atlanta, GA, January 2011.
29. A. Ananthanarayanan, F. Bussemmer, J. Desai, and S.K. Gupta. Fabrication of highly articulated miniature snake robot structures using in-mold assembly of compliant joints. *International Symposium on Experimental Robotics (ISER)*, New Delhi, India, December 2010.
30. M. Ho, A. Ananthanarayanan, L. Ehrlich, R. Gullapalli, J. M. Simard, S.K. Gupta, and J.P. Desai. Towards a minimally invasive neurosurgical intracranial robot. *Workshop on Snakes, Worms and Catheters: Continuum and Serpentine Robots for Minimally Invasive Surgery*, held at *IEEE International Conference on Robotics and Automation*, Anchorage AK, May 2010.
31. P. Svec and S.K. Gupta. Competitive Co-evolution of high-level blocking controllers for unmanned surface vehicles. *Exploring New Horizons in Evolutionary Design of Robots Workshop*, held at *International Conference on Intelligent Robots and Systems*, October 2009.
32. A. Balijepalli, T.W. LeBrun, J.J. Gorman, S.K. Gupta. Enhanced force measurement techniques to extend optical trapping towards nanoscale manipulation. *IEEE International Conference on Nanotechnology*, Genoa, Italy, July 2009.
33. W. Bejgerowski, S. K. Gupta, and H.A. Bruck. Multifunctional structures using filled polymers for in-mold assembly of embedded electronic components. *SEM Annual Conference and Exposition*, Albuquerque, NM, 2009.
34. S.K. Gupta, A. Ananthanarayanan, W. Bejgerowski, and H.A. Bruck. Characterizing melt flow and premolded part interactions during in-mold assembly of mesoscale rigid body revolute joints. *NSF CMMI Engineering Research and Innovation Conference*, Honolulu, Hawaii, June 2009.
35. S.K. Gupta and A. Thakur. Off-line model simplification for interactive rigid body dynamics simulations. *NSF CMMI Engineering Research and Innovation Conference*, Honolulu, Hawaii, June 2009.
36. R. Primerano, D. Wilkie, W. Regli, and S.K. Gupta. Engineering informatics education with biologically inspired robots. *Biorobotics: Research Advances, Standards, and Education Workshop*, held at *IEEE International Conference on Robotics and Automation*, Pasadena, CA, USA, May 2008.
37. A. Bar-Cohen, S.K. Gupta, P. Rodgers, J.G. Cevallos, and M. Adi. Mold filling meta model for polymer composite heat exchanger. *Proceedings of the Second International Energy 2030 Conference*, November 4-5, 2008, Abu Dhabi, U.A.E.

38. S.K. Gupta, K. Rajurkar, A. Ananthanarayanan, W. Bejgerowski, and H.A. Bruck. Progress towards In-Mold Assembly of Mesoscale Rigid Body Revolute Joints. *NSF CMMI Engineering Research and Innovation Conference*, Knoxville, TN, January 2008.
39. S.K. Gupta and K. Suresh. Automatic generation of context-dependent simplified models to support interactive virtual assembly. *NSF CMMI Engineering Research and Innovation Conference*, Knoxville, TN, January 2008.
40. A. Balijepalli, T.W. LeBrun, J.J. Gorman, and S.K. Gupta. Methods to directly measure the trapping potential in optical tweezers. *Optical Trapping and Optical Micromanipulation Conference, SPIE Symposium on NanoScience & Engineering*, San Diego, California, August 2008.
41. A. Ananthanarayanan, S.K. Gupta and H.A. Bruck. Mechanical characterization of cold weld-lines and meld lines in mesoscopic revolute joints for bioinspired structures. *SEM Annual Conference and Exposition*, Orlando, Florida, June 2008.
42. M. Schwartz, S.K. Gupta, D.K. Anand, and R. Kavetsky. Virtual mentor: A step towards proactive user monitoring and assistance during virtual environment-based training. *Performance Metrics for Intelligent Systems (PerMIS) Workshop*, Gaithersburg, MD, August 2007.
43. A.L. Gershon, L.S. Gyger, Jr., H.A. Bruck, and S.K. Gupta. Process characterization and modeling for biologically-inspired Embedded Controls, Actuators, and Power Element (ESCAPE) structures. *SEM Annual Conference and Exposition*, Springfield, Massachusetts, June 2007.
44. S.K. Gupta, A. Ananthanarayanan, and H.A. Bruck. Development of multi-stage molding methods for manufacturing of mesoscopic 3D articulated devices. *NSF Design, Service and Manufacturing Grantees and Research Conference*, St. Louis, Missouri, July 2006.
45. S.K. Gupta, A.G. Banerjee, X. Li, and G. Fowler. Development of a manufacturability analysis framework for injection molded multi-material objects. *NSF Design, Service and Manufacturing Grantees and Research Conference*, St. Louis, Missouri, July 2006.
46. L.S. Gyger, Jr., B. Spranklin, S.K. Gupta, and H.A. Bruck. Bio-inspired, modular, and multifunctional Thermal and Impact Protected (TIPed) Embedded Sensing Controls Actuation Power Element (ESCAPE) structures. *SEM Annual Conference and Exposition*, St. Louis, Missouri, June 2006.
47. A. Ananthanarayanan, H.A. Bruck and S.K. Gupta. Interfacial adhesion in multi-stage injection molded components. *SEM Annual Conference and Exposition*, St. Louis, Missouri, June 2006.
48. J.E. Brough, M. Schwartz, S.K. Gupta, D.K. Anand, C.F. Clark, R. Pettersen, and C. Yeager. Virtual Training Studio: A step towards virtual environment assisted training. *IEEE Virtual Manufacturing Workshop*, Alexandria, Virginia, March 2006.
49. L.S. Gyger, Jr., P. Kulkarni, H.A. Bruck, S.K. Gupta, and O.C. Wilson. Porous gelcast ceramics for bone repair implants. *SEM Annual Conference and Exposition*, Portland, OR, June 2005.
50. S.K. Gupta. Progress towards design and manufacturing of multi-material compliant mechanisms using multi-material molding. *NSF Design, Service and Manufacturing Grantees and Research Conference*, Scottsdale, AZ, January 2005.
51. Z. Tuncali, S.K. Gupta, D.K. Anand, and Z. Yao. Design and operation of a storage facility in a virtual environment. *International Conference on Manufacturing Automation*, pp. 521--528, Wuhan, China, October 2004.

52. S.K. Gupta. Progress towards automated manufacturability analysis of molded multi-material objects. *NSF Design, Service and Manufacturing Grantees and Research Conference*, Dallas, TX, January 2004.
53. S.K. Gupta and J. Huang. Manufacturability-driven spatial partitioning: A systematic approach to computational shape synthesis in manufacturing applications. *Computational Synthesis, AAAI Spring Symposium*, Stanford, CA, March 2003.
54. S.K. Gupta. Progress towards development of a geometric algorithm for designing multi-material molds. *NSF Design, Service and Manufacturing Grantees and Research Conference*, Birmingham, AL, January 2003.
55. G. Fowler, S.K. Gupta, and H.A. Bruck. Manufacturing of bio-inspired heterogeneous structures with improved interfacial strength using a multi-stage multi-material molding technique. *SEM Annual Conference and Exposition*, Milwaukee, WI, June 2002.
56. S.K. Gupta and D. Rajagopal. Forming part families for generating shared press-brake setups. *NSF Design, Service, and Manufacturing Conference*, Tampa, FL, January 2001.
57. S.K. Gupta and U. Alva. Automated punch design for multi-part process planning. *NSF Design and Manufacturing Conference*, Vancouver, Canada, January 2000.
58. B. Baidya, S.K. Gupta, and T. Mukherjee. MEMS component extraction. *Modeling and Simulation of Microsystems (MSM) Conference*, San Juan, Puerto Rico, April 1999.
59. S.K. Gupta. Shared setup generation for sheet metal bending. *NSF Design and Manufacturing Conference*, Long Beach, CA, January 1999.
60. S.K. Gupta and P.F. Brown. Integrated assembly design/planning systems: How far away are we from commercialization? *IFIP Workshop on Knowledge Intensive CAD*, Pittsburgh, PA, September 1996.
61. S.K. Gupta, D.S. Nau, W.C. Regli, and G. Zhang. IMACS: Interactive manufacturability analysis and critiquing system. *NSF Design and Manufacturing Grantees Meeting*, January 1996.
62. D.S. Nau, S.K. Gupta, and W.C. Regli. Manufacturing-operation planning versus AI planning. *AAAI Spring Symposium on Integrated Planning Applications*, 1995.
63. S.K. Gupta, D.S. Nau, and W.C. Regli. Systematically analyzing the manufacturability of machined parts. *NSF Design and Manufacturing Grantees Meeting*, January 1995.
64. D.S. Nau, M. Ball, S.K. Gupta, I. Minis, and G. Zhang. Design for manufacture by multi-enterprise partnerships. *Bridging the Generations: An International Workshop on the Future Directions of Computer-Aided Engineering*, pages 149--154, June 1994.
65. G.M. Zhang, D.S. Nau, W. Ko, and S.K. Gupta. Economic evaluation of alternative machining operation plans. *NSF Design and Manufacturing Grantees Meeting*, January 1994.
66. S.K. Gupta, D.S. Nau, and G.M. Zhang. Systematically generating and evaluating alternative operation plans. *NSF Design and Manufacturing Grantees Meeting*, January 1994.
67. D.S. Nau, S.K. Gupta, T.R. Kramer, W.C. Regli, and G. Zhang. Using MRSEVs to develop machining alternatives. *AAAI/SIGMAN Workshop on Intelligent Manufacturing*, 1993.
68. S.K. Gupta, D.S. Nau, and G.M. Zhang. Generation of machining alternatives for machinability evaluation. *NSF Design and Manufacturing Systems Conference*, pages 1771--1780, University of North Carolina, Charlotte, NC, January 1993.

69. S.K. Gupta, P.N. Rao, and N.K. Tewari. Use of part features for process planning. *Fifth International Conference on CAD/CAM Robotics and Factories of the Future*, pages 211--216, Norfolk, VA, December 1990.

D. PATENTS

1. S. K. Gupta and D. A. Bourne. *Apparatus and Method for Multi-Part Setup Planning for Sheet Metal Bending Operations*. U.S. Patent 6,233,538. Awarded on May 15, 2001.
2. B. Shah, P. Svec, and S. K. Gupta. *Surface Vehicle Trajectory Planning Systems, Devices, and Methods*. U.S. Patent 10,019,006, Awarded on July 10, 2018.

E. INVITED PRESENTATIONS AND SEMINARS

Invited Presentations at Conferences, Workshops, and Panels

1. Panelist, CRO Summit, Automation Technology West, *Driving the Next Wave of Robotics Through AI*, Automation Technology West, Anaheim, CA, February 2019
2. Panelist, Automation Technology West, *New Technology Applications: What Does This Mean for the Next Generation of Robots?* Anaheim, CA, February 2019
3. Speaker, NSF Summer School on Decision Making in Large Systems, Los Angeles, CA, June 2018 (Presentation Title: *Decision Making and Robotics*)
4. Workshop Speaker, Aerospace and Defense Manufacturing Conference, Long Beach, CA, March 2018 (Presentation Title: *Smart Robotic Assistants for Small Volume Manufacturing Tasks*)
5. Panelist, International Conference on Systems Engineering Research, Redondo Beach, CA, March 2017 (Presentation Title: *Realizing Smart Manufacturing by Making Informed Decisions*)
6. Panelist, Advanced Manufacturing Partnership, Southern California, Los Angeles, CA, March 2017 (Presentation Title: *Recent Advances in Industrial Robots and their Implications on Advanced Manufacturing*)
7. Invited Speaker, Emerging Disruptive Technologies Assessment Symposium, Sydney, Australia July 2015 (Presentation Title: *Challenges and Opportunities in Human Robot Collaboration*)
8. Invited Speaker, A Global Dialogue on Emerging Technology for Emerging Needs, American Red Cross, Washington DC, December 2014 (Presentation Title: *The Role of Robots in Disaster Response*)
9. Invited Speaker, All India Manufacturing Technology, Design and Research, Guwahati, India, December 2014 (Presentation Title: *Towards Automated Manufacturing of Geometrically-Complex Heterogeneous Structures*)
10. Invited Speaker, UMD/NVIDIA GPU Summit, College Park, MD, October 2014 (Presentation Title: *GPU-Enabled Computing in Robotics and Advanced Manufacturing Applications*)
11. Invited Speaker, Robo Business, Boston, MA, October 2014 (Presentation Title: *Government Programs for Supporting Robotics Technology Commercialization*)
12. Invited Speaker, Industry Form, IEEE/RSJ International Conference on Intelligent Robots and Systems, Chicago, IL, September 2014 (Presentation Title: *NSF Programs for Supporting Technology Commercialization in Robotics*)
13. Invited Speaker, Robots for Good: How Robotics is Changing our World, Washington DC, August 2014 (Presentation Title: *Recent Advances in Industrial Robots and Their Implications on Advanced Manufacturing*)

14. Invited Speaker, Motion Planning for Industrial Robots Workshop, Hong Kong, June 2014 (Presentation Title: *Automated Planning for Supporting Human Robot Collaboration in Assembly Cells*)
15. Panelist, British Embassy Science and Technology Conference, Washington DC, May 2014 (Presentation Title: *Robotics and Autonomy Challenges and Opportunities*)
16. Keynote Speaker, Symposium on The Intersection of Robust Intelligence and Trust in Autonomous Systems, Stanford University, CA, March 2014 (Presentation Title: *Realizing Autonomous Systems that Exhibit Robust Intelligence and Engender Human Trust*)
17. Invited Speaker, Conference on Machines and Mechanisms (iNACoMM 2013), Roorkee, India, December 2013 (Presentation Title: *Design and Manufacturing of Biologically Inspired Robots*)
18. Invited Speaker, International Forum on Industry-Academia Collaboration in Robotics Planning and Programming Technologies for Industrial Robots, International Robotics Exhibition, Tokyo, Japan, November 2013 (Presentation Title: *What will it Take to Deploy Industrial Robots in Small and Medium Manufacturing Enterprises?*)
19. Keynote Speaker, IEEE Robotic and Sensors Environments (ROSE), Washington DC, October 2013 (Presentation Title: *Physics-Aware Planning for Autonomous Robots: A Step Towards Realizing Unmanned Sea Surface Vehicles*)
20. Panelist, National Robotics Initiative Panel, ASME Mechanism and Robotics Conference, Portland OR, August 2013 (Presentation Title: *Overview of National Robotics Initiative*)
21. Invited Speaker, Intelligent Robotics Systems Workshop, Bellevue, WA, July 2013 (Presentation Title: *Planning for Autonomous Robots: Challenges and Opportunities*)
22. Invited Speaker, Combining Task and Motion Planning Workshop, Karlsruhe, Germany, May 2013 (Presentation Title: *Planning for Autonomous Robots: Challenges and Opportunities*)
23. Invited Speaker, ARO Workshop on “Planning and Learning in Multi-Agent Adversarial Environments” College Park, MD, April 2012 (Presentation Title: *Learning Challenges and Opportunities in Physics-Aware Planning*)
24. Invited Speaker, AFRL/AFOSR Workshop on “Compliant Mechanisms in Aerospace System Design” Dayton, OH, March 2012 (Presentation Title: *In-Mold Assembly of Miniature Compliant Mechanisms*)
25. Keynote Speaker, Performance Metrics for Intelligent Systems (PerMIS'12) Workshop, College Park, MD, March 2012 (Presentation Title: *Simulation-Based Design and Evaluation of Physics-Aware Planners for Robotic Operations in Challenging Environments*)
26. Invited Speaker, USA-Finland Joint Networking Workshop on Digital Product Process, Washington DC, September 2011 (Presentation Title: *Simulation Based Computational Synthesis*)
27. Invited Speaker, Robotics in Endoscopy Workshop, Hyderabad, India, July 2011 (Presentation Title: *Towards a New Manufacturing Approach to Realizing Miniature Robots*)
28. Invited Speaker, NSF Workshop on Bio-Inspired Design, Palo Alto, CA, March 2011 (Presentation Title: *Bio-Inspired Robotics*)
29. Keynote Speaker, All India Manufacturing Technology, Design and Research, Visakhapatnam, India, December 2010 (Presentation Title: *Towards a New Manufacturing Approach to Realizing Bio-Inspired Robots with Mesoscale Features*).

30. Keynote Speaker, Tools and Methods of Competitive Engineering, Ancona, Italy, April 2010 (Presentation Title: *Recent Advances and Potential of Simulation Driven Innovation and Discovery for Intelligent Systems*).
31. Panelist, Tools and Methods of Competitive Engineering, Ancona, Italy, April 2010 (Panel: *Mobile and Ubiquitous Technologies in Design and Engineering*).
32. Keynote Speaker, Northrop Grumman Design Automation Summit, Baltimore, September 2009 (Presentation Title: *Towards Next Generation Design Automation*).
33. Panelist, NSF CMMI Engineering Research and Innovation Conference, Honolulu, Hawaii, June 2009 (Panel: *Getting the Word Out*).
34. Invited Speaker, IEEE Spring Symposium on Technology for the Golden Years, College Park, MD, May 2008 (Presentation Title: *Product Development Challenges and Opportunities for Meeting the Needs of People with Disability*)
35. Invited Speaker, NIST Second Workshop on 3D and 2D Content Representation, Analysis and Retrieval, Gaithersburg, MD, May 2008 (Presentation Title: *Part Similarity Assessment for Injection Molding Applications*)
36. Invited Speaker, NIST First Workshop on 3D and 2D Content Representation, Analysis and Retrieval, Gaithersburg, MD, April 2007 (Presentation Title: *Feature-Based Part Similarity Assessment*)
37. Panelist, Maryland Modeling, Simulation, and Analysis Council Conference, Annapolis, MD January 2007 (Presentation Title: *Virtual Prototyping*)
38. Invited Tutorial Speaker, Computer Aided Design Conference, Phuket Island, Thailand, June 2006 (Presentation Title: *Content Based Search Techniques for Searching CAD Databases*)
39. Keynote Speaker, NSF Sponsored Symposium on Biologically Inspired Design, Georgia Institute of Technology, Atlanta, GA, May 2006 (Presentation Title: *Using Biologically Inspired Robots as Case Studies for Teaching Bio-Inspired Product Development*)
40. Panelist, Design, Analysis and Manufacturing Panel, ACM Symposium on Solid and Physical Modeling, Boston, MA, June 2005 (Presentation Title: *Geometric Computing Challenges in Micro and Nano Manipulation Using Optical Tweezers*)
41. Invited Speaker, Intergovernmental Workshop on Intelligent Information Use in Manufacturing, National Science Foundation, Arlington, VA, September 2004 (Presentation Title: *Improving Product Realization Through Intelligent Design Information Management*)
42. Panelist, Design for X Panel, ASME Computers and Information in Engineering Conference, Salt Lake City, UT, October 2004 (Presentation Title: *Implications of Emerging Manufacturing Processes on DFMA Research and Education*)
43. Keynote Speaker, Tools and Methods of Competitive Engineering Conference, Lausanne, Switzerland, April 2004 (Presentation Title: *A Step towards Integrated Product and Process Development of Molded Multi-Material Structures*)

Invited Seminars at Universities, Government Labs, and Industry

44. *Realizing Smart Robotic Assistants through Advances in Artificial Intelligence*, Indian Institute of Technology, Delhi, India, March 2019
45. *Realizing Smart Robotic Assistants through Advances in Artificial Intelligence*, PARC, Palo Alto CA, March 2019

46. *Realizing Next Generation Additive Manufacturing through Use of Advanced Robotics*, Aerospace Corporation, El Segundo, California, June 2018
47. *Realizing Next Generation Additive Manufacturing through Use of Advanced Robotics*, Army Research Laboratory, Aberdeen Proving Ground, MD, May 2018
48. *Smart Robotic Assistants for Manufacturing Applications*, National Institute of Standards and Technologies, Gaithersburg, MD, May 2018
49. *Smart Robotic Assistants for Manufacturing Applications*, University of California, San Diego, CA, April 2018
50. *Smart Robotic Assistants for Manufacturing Applications*, University of California, Irvine, CA, April 2018
51. *Smart Robotic Assistants for Small Volume Manufacturing Tasks*, University of Michigan, Ann Arbor, MI, January 2018
52. *Smart Robotic Assistants for Small Volume Manufacturing Tasks*, Arizona State University, Tempe, AZ, October 2017
53. *Rapid Realization of Flexible Multifunctional Materails and Strcyures through Advances in Modeling, Characterization, Manufacturing*, Air Force Research Lab, Wright-Patterson Air Force Base, OH, October 2017
54. *Smart Robotic Assistants for Non-Repetitive Manufacturing Tasks*, University of California, Los Angeles, May 2017
55. *Bringing Positive Societal Change through Use of Autonomous Systems*, University of Maryland, College Park, September 2016
56. *Robo Raven: A Flapping Wing Air Vehicle with Compliant and Independently Controlled Wings*, Purdue University, West Lafayette, April 2016
57. *RoboSAM: Robotic Smart Assistant for Manufacturing*, Oregon State University, Corvallis April 2016
58. *RoboSAM: Robotic Smart Assistant for Manufacturing*, ABB Corporate Research Center, Windsor, CT, December 2015
59. *RoboSAM: Robotic Smart Assistant for Manufacturing*, Intelligent Systems Division, National Institute of Standards and Technology, Gaithersburg, MD, November 2015
60. *Robo Raven: A Flapping Wing Air Vehicle with Compliant and Independently Controlled Wings*, University of Connecticut, Storrs, March 2015
61. *Exploiting Synergy Between Robotics and Manufacturing*, Indian Institute of Technology Roorkee, India, November 2014
62. *Exploiting Synergy Between Robotics and Manufacturing*, University of California, San Diego, CA, October 2014
63. *Towards Automated Manufacturing of Geometrically-Complex Heterogeneous Structures*, Ohio State University, Columbus, OH, October 2014
64. *Towards Automated Optical Micromanipulation of Biological Cells*, City University of Hong Kong, Hong Kong, June 2014
65. *Exploiting Synergy Between Robotics and Manufacturing*, University of Illinois, Urbana Champaign, IL, April 2014

66. *Towards Automated Manufacturing of Geometrically-Complex Heterogeneous Structures*, University of Southern California, CA, April 2014
67. *Biologically Inspired Robots*, Meadowside Nature Center, Rockville, MD, April 2014
68. *Designing and Building Autonomous Robot for Challenging Environments*, Intelligent Automation Inc., Rockville, MD, April 2014
69. *Exploiting Synergy Between Robotics and Manufacturing*, Johns Hopkins University, Baltimore, MD, March 2014
70. *Design and Manufacturing of Biologically Inspired Robots*, George Washington University, Washington DC, December 2013
71. *Towards Automated Optical Micromanipulation of Biological Cells*, University of Buffalo, The State University of New York, NY, November 2013
72. *Physics-Aware Planning for Autonomous Robots*, Naval Research Lab, Washington DC, April 2013
73. *Physics-Aware Planning for Autonomous Robotic Operations in Challenging Environments*, Seoul National University, Seoul, South Korea, August 2012
74. *Towards Assembly Automation at Small Scales*, University of California, Los Angeles, CA, May 2012
75. *Planning for Autonomous Robotic Operations in Physically Challenging Environments*, University of Pennsylvania, Philadelphia, PA, February 2012
76. *Automated Planning for Low Production Volume Robotic Assembly Workstations*, Intelligent Systems Division, National Institute of Standards and Technology, Gaithersburg, MD, November 2011
77. *Towards Simulation-Based Computational Synthesis*, Systems Integration Division, National Institute of Standards and Technology, Gaithersburg, MD, November 2011
78. *Planning for Autonomous Robotic Operations in Physically Challenging Environments*, Georgia Institute of Technology, Atlanta, GA, October 2011
79. *Autonomous Unmanned Vehicles*, Intelligent Automation Inc., Rockville, MD, June 2011
80. *Autonomous Unmanned Vehicles*, Applied Physics Lab, Laurel, MD, April 2011
81. *Towards Simulation-Based Computational Synthesis of Robot Behaviors and Structures*, Johns Hopkins University, Baltimore, MD, March 2011
82. *Towards Simulation-Based Computational Synthesis of Robot Behaviors and Structures*, Carnegie Mellon University, Pittsburgh, PA, October 2010
83. *A Computational Framework for Simulation Driven Innovation and Discovery*, Drexel University, Philadelphia, PA, June 2010
84. *A Computational Framework for Simulation Driven Innovation and Discovery*, Missouri University of Science and Technology, Rolla, MO, May 2010
85. *A Simulation Based Framework for Automatically Synthesizing Planning Logic for Autonomous Unmanned Sea Surface Vehicles*, Northrop Grumman Undersea Systems, Annapolis, MD, April 2010
86. *A Computational Framework for Simulation Driven Innovation and Discovery*, University of Maryland at Baltimore County, MD, November 2009

87. *Towards a New Manufacturing Approach to Realizing Bio-Inspired Robots*, Johns Hopkins University, Baltimore, MD, April 2009
88. *Towards a New Manufacturing Approach to Realizing Bio-Inspired Robots*, University of Connecticut, Storrs, CT, October 2008
89. *Towards a New Manufacturing Approach to Realizing Bio-Inspired Robots*, Indian Institute of Technology, Kanpur, India, August 2008
90. *Towards a New Manufacturing Approach to Realizing Bio-Inspired Robots*, Indian Institute of Technology, Roorkee, India, August 2008
91. *Towards Automated Micro and Nanoscale Assembly Using Optical Tweezers*, University of Michigan, Ann Arbor, MI, November 2007
92. *Geometry Based Search Tool*, Toshiba Corporate Manufacturing Engineering Center, Yokohama, Japan, July 2007
93. *Towards Automated Micro and Nanoscale Assembly Using Optical Tweezers*, Illinois Institute of Technology, Chicago, IL, April 2007
94. *Virtual Training Studio: A Virtual Environment-Based Training System for Mechanical Assembly Operations*, Naval Research Laboratory, Washington DC, January 2007
95. *Feature-Based Shape Similarity Assessment*. Department of Automation and Computer Aided Engineering, Chinese University of Science and Technology, Hong Kong, January 2006
96. *Integrated Product and Process Development for Molded Multi-Material Structures*. Mechanical Engineering Department, Hanyang University, Korea, January 2006
97. *Feature-Based Shape Similarity Assessment*. Mechanical Engineering Department, Sungkyunkwan University, Korea, January 2006
98. *Improving Product Development through Intelligent Design Information Management*. Industrial and Systems Engineering Department, University of Wisconsin, Madison, WI, December 2005
99. *Automated Shape Generation and Recognition: Applications in Automated Mold Design*. Solid Works Corporation, Boston, MA, November 2005
100. *Improving Product Development through Intelligent Design Information Management*. School of Mechanical Engineering, Georgia Institute of Technology, Atlanta, GA, April 2005
101. *Improving Product Development through Intelligent Design Information Management*. National Institute of Standards and Technology, Gaithersburg, MD, November 2004
102. *Automated Design of Multi-Stage Molds: A Step towards Cost Effective Manufacturing of Multi-Material Objects*. Mechanical Engineering Department, University of Maryland at Baltimore County, Baltimore, MD, September 2004
103. *Automated Design of Multi-Stage Molds: A Step towards Cost Effective Manufacturing of Multi-Material Objects*. Mechanical Engineering Department, Michigan Technological University, Houghton, MI, January 2004
104. *Next Generation Process Planning Technologies*. Surfware Inc., Westlake Village, CA, December 2003
105. *Automated Design of Multi-Stage Molds: A Step towards Cost Effective Manufacturing of Multi-Material Objects*. Industrial Engineering Department, University of Buffalo (SUNY), Buffalo, NY, April 2003

106. *Automated Design of Multi-Stage Molds: A Step towards Cost Effective Manufacturing of Multi-Material Objects.* Mechanical and Industrial Engineering Department, University of Illinois, Urbana Champaign, IL, October 2002
107. *Automated Design of Multi-Stage Molds: A Step towards Cost Effective Manufacturing of Multi-Material Objects.* Mechanical Engineering Department, University of California, Riverside, CA, October 2001
108. *Parametric and Feature-Based Methodologies for Design and Manufacturing Integration.* United Technology Research Center, Hartford, CT, May 2001
109. *Automated Design and Fabrication of Multi-Piece Molds: A Step towards Creating Geometrically Complex Objects.* Toshiba Corporate Manufacturing Engineering Center, Yokohama, Japan, February 2001
110. *Web-Based Manufacturability Analysis: A Step towards Buying and Selling Manufacturing Services on the Internet.* Toshiba Corporate Manufacturing Engineering Center, Yokohama, Japan, February 2001
111. *Automated Design and Fabrication of Multi-Piece Molds: A Step towards Creating Geometrically Complex Objects.* Mechanical Engineering Department, Indian Institute of Technology, Kanpur, India, December 2000
112. *Automated Design and Fabrication of Multi-Piece Molds: A Step towards Creating Geometrically Complex Objects.* GRASP Lab, University of Pennsylvania, PA, November 2000
113. *Web-Based Manufacturability Analysis: A Step towards Buying and Selling Manufacturing Services on the Internet.* Mechanical Engineering Department, Drexel University, PA, February 2000
114. *Generating Shared Setups: A Step Towards Cost Effective Small Batch Manufacturing.* Department of Mechanical and Industrial Engineering, University of Massachusetts, Amherst, MA, February 1998
115. *Generating Shared Setups: A Step Towards Cost Effective Small Batch Manufacturing.* Department of Industrial and Manufacturing Engineering, Pennsylvania State University, PA, February 1998
116. *Generating Shared Setups: A Step Towards Cost Effective Small Batch Manufacturing.* Mechanical Engineering Department, University of Minnesota, MN, January 1998
117. *Design for Manufacturing: A Computational Perspective.* Mechanical Engineering Department, University of Connecticut, CT, November 1997
118. *Design for Manufacturing: A Computational Perspective.* Mechanical Engineering Department, Carnegie Mellon University, PA, Fall 1997
119. *Composable Assembly Simulation and Visualization.* Lockheed Martin Missiles and Space Company, Palo Alto, CA, May 1997
120. *Next Generation Process Planning Technologies.* Amada Inc., Isehara, Japan, February 1997
121. *Integrating Feature Recognition with Process Planning.* Allied Signal, Kansas City, MO, November 1996
122. *Next Generation Process Planning Technologies.* Electronic Data Systems, Cypress, CA, August 1996
123. *Composable Assembly Simulation and Visualization.* Raytheon Company, Tewksbury, MA, April 1996

124. *Automated Manufacturability Analysis for Machined Part*. National Institute of Standards and Technology, Gaithersburg, MD, April 1995
125. *Automated Manufacturability Analysis for Machined Part*. Robotics Institute, Carnegie Mellon University, PA, May 1994
126. *Automated Manufacturability Analysis for Machined Part*. Department of General Engineering, University of Illinois at Urbana Champaign, IL, April 1994
127. *Design Critiquing for Machining Applications*. Mechanical Engineering Department, Indian Institute of Technology, Delhi, India, June 1993
128. *Design Critiquing for Machining Applications*. Mechanical Engineering Department, Indian Institute of Science, Bangalore, India, June 1993
129. *Design Critiquing for Machining Applications*. Research Development and Design Center, Pune, India, June 1993

3. TEACHING, MENTORING, AND ADVISING

A. COURSES TAUGHT

University of Southern California

- Bio-Inspired Robotics (AME 499): Spring 2017 and Spring 2018
- Foundations for Manufacturing Automation (AME 599 and AME 547): Fall 2016, Fall 2017, and Fall 2018
- Design for Manufacturing and Assembly (AME 546): Spring 2019

University of Maryland

- Bio-Inspired Robotics (ENME 489L): Spring 2006, Spring 2007, Spring 2008, Spring 2010, Spring 2011, and Fall 2014
- Computer Aided Design (ENME 414): Fall 2002
- Computer-Aided Manufacturing (ENME 616): Fall 1999 and Spring 2001
- Emerging Manufacturing Technologies (ENME 808B): Fall 2007 and Fall 2009
- Geometric Modeling for CAD/CAM Applications (ENME 611): Fall 1998, Spring 2000, Spring 2002, Fall 2003, and Fall 2005
- Integrated Product and Process Development (ENME 472): Fall 2006 and Spring 2009
- Manufacturing Automation (ENME 489M): Fall 2000, Fall 2001, Spring 2003, Spring 2004, and Fall 2008
- Planning for Autonomous Robots (ENME 696): Spring 2015
- Statics (ENES 102): Spring 1999

Carnegie Mellon University

- Advanced Product Realization Technologies (45-934): Spring 1997, Summer 1997 and Spring 1998

B. CURRICULUM DEVELOPMENT

New Courses Developed at the University of Southern California

- *Design for Manufacturing and Assembly (AME 546)*: This course provides an overview of the methods and tools available for Design for Manufacturing and Assembly (DFMA). DFMA provides a systematic procedure for analyzing a proposed design from the point of view of assembly and manufacture and help in reducing the product cost. Topics covered in the course include the following: design for assembly, design for additive manufacturing, design for machining, design for composites, design for injection molding, design for casting, design for sheet metal forming, design for pcb manufacturing, design for automation, material selection, geometric and dimensional tolerances, cost estimation, and engineering design making.
- *Foundations for Manufacturing Automation (AME 547)*: This course covers fundamentals underlying the contemporary manufacturing automation. It covers the underlying building blocks of the automation system and also discusses mechanics-based models for designing automation system. It covers physical as well as decision making aspects of automation. The course is taught using a project-based learning approach. This course is intended for would be manufacturing system designers who intend to lead product development teams and play strategic roles in selection and deployment of advanced manufacturing automation technologies. This course provides students with the basic and the specialized training in using and deploying modern automation systems.

New Courses Developed at the University of Maryland

- *Bio-Inspired Robotics (ENME 489L)*: This course is a senior elective and uses bio-inspired robots as a means to teach the principles behind bio-inspired designs and robotics. This course covers the following main topics: (1) fundamentals of traditional robotic manipulators, (2) fundamentals of biologically-inspired robots, (3) sensors and actuators for robotics, and (4) design and fabrication of biologically-inspired robots. Several examples of bio-inspired robots are discussed in detail, including the motivation and biological inspiration for their design, as well as technical specifications and comparisons to conventional robots. The examples include robots inspired by the cockroach, snake, and tuna. This course emphasizes hands-on learning. As a part of the course projects, student teams have an opportunity to design and build their own robots.
- *Geometric Modeling for CAD/CAM Applications (ENME 611)*: This is an introductory graduate course and introduces geometry representations, algorithms, and the underlying mathematical foundations, essential to solving geometry-related problems in computer-aided design and computer-aided manufacturing applications. This course covers (1) geometric representation of three dimensional solid objects, (2) curve and surface representation, (3) geometric algorithms for curves, surfaces, and solids, and (4) real-world applications of geometric modeling. This course is intended for graduate students who plan to work in computer-aided design, computer-aided manufacturing, computer-aided engineering analysis, robotics, and virtual prototyping areas.
- *Manufacturing Automation (ENME 489M)*: This course is a senior elective and covers fundamentals underlying the contemporary manufacturing automation technologies. The following two aspects of manufacturing automation are emphasized: (1) computer-based systems for automating and controlling manufacturing processes such as numerically controlled machines, industrial robots, rapid prototyping machines, coordinate measurement machines, and programmable logic controllers; and (2) use of software systems in facilitating information exchange between different components of manufacturing decision support systems. This course is intended for would-be manufacturing system designers who plan to play strategic roles in selection and deployment of advanced manufacturing automation technologies.
- *Emerging Manufacturing Technologies (ENME 808B)*: This is an advanced graduate course and provides an overview of several emerging manufacturing technologies. Representative technologies include: micro and nano manipulation, layered manufacturing, multi-material molding, powder injection molding, micro molding, nano-composite molding, and self assembly. For each of the topics, we provide technology overview, assessment of the current state of the technology, and

examples of applications where the technology is being used. This course is intended for researchers interested in developing new manufacturing technologies and engineers interested in evaluating and deploying emerging manufacturing technologies.

- *Planning for Autonomous Robots (ENME 696)*: This is an introductory graduate course. Planning is a fundamental capability needed to realize autonomous robots. Planning in the context of autonomous robots is carried out at multiple levels. At the top level, task planning is performed to identify and sequence the tasks needed to meet mission requirements. At the next level, planning is performed to determine a sequence of motion goals that satisfy individual task goals and constraints. Finally, at the lowest level, trajectory planning is performed to determine actuator actions to realize the motion goals. Different algorithms are used to achieve planning at different levels. This graduate course introduces planning techniques for realizing autonomous robots. In addition to covering traditional motion planning techniques, this course emphasizes the role of physics in the planning process. Mobile robots are used as examples to illustrate the concepts during this course. However, techniques introduced in the course are equally applicable to robot manipulators.

New Courses Developed at Carnegie Mellon University

- *Advanced Product Realization Technologies (45-934)*: The purpose of this course was to familiarize MBA students with new design, manufacturing, and information technologies. This course was a part of the Management of Technology specialization. The main course objectives were (1) introducing newly emerging technologies for improving the product realization process and (2) providing a realistic assessment of the effectiveness of these new technologies. As a part of this course, students performed a wide variety of case studies and experiments in the area of applying emerging technologies to improve the product realization process.

Significant Revision of Old Courses at the University of Maryland

- Computer-Aided Manufacturing (ENME 616)

C. ADVISING

Postdoctoral Fellows

1. Brual Shah (August 2016-Present)
2. Anantha Narayanan (July 2013-Present)
3. Iain Brookshaw (January 2016-June 2017)
4. Sagar Chowdhury (October 2013-September 2014)
5. Mahesh Mani (August 2011-June 2013)
6. Krishna Kaipa (May 2011-June 2013)
7. Atul Thakur (September 2011-August 2012)
8. Zeid Kootbally (June 2010-June 2012)
9. Madan Dabbeeru (June 2010-May 2012)
10. Petr Svec (August 2008-June 2011)
11. Arvind Ananthanarayanan (May 2009-May 2010)
12. Tao Peng (January 2007-December 2007)
13. XuanFang Zha (October 2005-January 2007)
14. Zhiyang Yao (August 2002-July 2003)

Research Engineers and Programmers

1. Alec Kanyuck (September 2016 – Present)
2. Nithyanand Kumbla (July 2016 – June 2018)
3. Alexander Weismann (February 2007-August 2008)
4. Cheuk Ip (May 2005-July 2007)
5. Maxim Schwartz (May 2004-September 2007)

Ph.D. Dissertation Completed

1. Michael J. Kuhlman, *Trajectory Planning for Autonomous Vehicles Performing Information Gathering Tasks*, August 2018
2. John W. Gerdes, *Improved Prediction of Flapping Wing Aerial Vehicle Performance through Component Interaction Modeling*, August 2018
3. Galen Mullins, *Adaptive Sampling Methods for Testing Autonomous Systems*, May 2018
4. Joshua Langsfeld, *Learning Task Models for Robotic Manipulation of Nonrigid Objects*, January 2017
5. Brujal Shah, *Planning for Autonomous Operation of Unmanned Surface Vehicles*, July 2016
6. Carlos Morato, *Computational Foundations for Safe and Efficient Human-Robot Collaboration In Assembly Cells*, April 2016
7. Yong-Sik Kim, *Design of Three Degrees-of-Freedom Motion Stage for Micro Manipulation*, December 2014 (Co-advised with Dr. Nicholas Dagalakis)
8. James Hopkins, *Design and Analysis of Exaggerated Rectilinear Gait-Based Snake Inspired Robots*, February 2014
9. Juan Cevallos, *Thermal and Manufacturing Design of Polymer Composite Heat Exchangers*, December 2013 (Co-advised with Dr. Avram Bar-Cohen)
10. Sagar Chowdhury, *Planning for Automated Optical Micromanipulation of Biological Cells*, September 2013
11. Atul Thakur, *Physics-Aware Model Simplification For Interactive Virtual Environments*, August 2011
12. Arvind Balijeppali, *Modeling and Experimental Techniques to Demonstrate Nanomanipulation with Optical Tweezers*, January 2011 (Co-advised with Tom LeBrun)
13. Wojciech Bejgerowski, *In-Mold Assembly of Multi-Functional Structures*, November 2010
14. Ashis Banerjee, *Real-Time Path Planning for Automating Optical Tweezers based Particle Transport Operations*, August 2009
15. Arvind Ananthanarayanan, *Development of In-Mold Assembly Methods for Producing Mesoscale Revolute Joints*, May 2009
16. Tao Peng, *Algorithms and Models for 3-D Shape Measurement Using Digital Fringe Projections*, December 2006
17. Alok Priyadarshi, *Algorithms for Generating Multi-Stage Molding Plans for Articulated Assemblies*, September 2006
18. Antonio Cardone, *A Feature-Based Shape Similarity Assessment Framework*, August 2005

19. Changxin Xu, *Computational Foundations for Computer Aided Design of Multiple Interaction-State Mechatronic System*, May 2005
20. Xuejun Li, *Geometric Algorithms for Automated Design of Multi-Stage Molds for Manufacturing Multi-Material Objects*, July 2003
21. Zhiyang Yao, *Geometric Algorithms for Operation Planning of Geometrically Complex Milling Features*, August 2002 (Co-advised with Dr. Dana Nau)
22. Jun Huang, *Accessibility-Driven Spatial Partitioning: A Step towards Automated Design of Multi-Piece Molds*, December 2001

Ph.D. Dissertation in Progress

1. Shaurya Shriyam (Ph.D. Candidate)
2. Pradeep Rajendran (Ph.D. Candidate)
3. Ariyan Kabir (Ph.D. Candidate)
4. Shantanu Thakar (Passed Screening Exam)
5. Yeo Jung Yoon
6. Jason Gregory
7. Sarah Al-Hussaini
8. Rishi Malhan
9. Prahar Bhatt

M.S. Thesis Completed

1. Lena Johnson, *SUR Hand: A Soft Underactuated Robotic Hand*, May 2016
2. Andrew Vogel, *Design of Compliance Assisted Gaits for a Quadrupedal Amphibious Robot*, May 2013
3. Brian Russ, *Development of a CAD Model Simplification Framework For Finite Element Analysis*, January 2012
4. Tom Brewer, *Development of a Quadruped Robot and Parameterized Stair-Climbing Behavior*, December 2011
5. Timothy Hall, *Manufacturability Analysis of Thermally-Enhanced Polymer Composite Heat Exchangers*, August 2011
6. John Gerdes, *Design, Analysis, and Testing of a Flapping Wing Miniature Air Vehicle*, May 2010
7. Abhijit Deshmukh, *Content Based Search of Mechanical Assemblies*, October 2006
8. Ashis Banerjee, *Computer Aided Design of Side Actions in Injection Molding of Complex Parts*, October 2006
9. John Brough, *Assessment of Training Modes and Features in the Virtual Training Studio*, August 2006 (Co-Advised with Dr. D.K. Anand)
10. Brent Spranklin, *Design, Analysis, and Fabrication of A Snake Inspired Robot with a Rectilinear Gait*, June 2006
11. Ira Golden, *Function-Based Archival and Retrieval: Developing a Repository of Biologically Inspired Product Concepts*, August 2005 (Co-Advised with Dr. E.B. Magrab)

12. Greg Fowler, *Cost And Performance Evaluation Models For Comparing Multi-Shot And Traditional Injection Molding*, August 2004
13. Mukul Karnik, *Geometric Containment Analysis System for Rotational Parts*, August 2003 (Co-advised with Dr. E. B. Magrab)
14. Alok Priyadarshi, *Geometric Algorithms for Automated Design of Multi-Piece Permanent Molds*, August 2003
15. Sunil Saini, *Algorithms for Computing Cutter Engagement in 2.5D Milling Operations*, August 2002
16. Sashidhar Bellam, *Geometric Algorithms for Automated Extraction and Emulation of MEMS Devices*, August, 2001
17. Yusheng Chen, *Process/Material Selection for Mechanical Components During Embodiment Design*, August 2001
18. Malay Kumar, *Automated Design of Multi-Stage Molds for Manufacturing Multi-Material Objects*, June 2001
19. Deepak Rajagopal, *Part Family Formation of Sheet Metal Parts for Generating Shared Press-brake Setups*, June 2001
20. Anoop Samuel, *Integrating Market Research with the Product Development Process*, November 2000
21. Ujval Alva, *Automated Design of Sheet Metal Tools for Bending Multiple Parts in a Single Setup*, July 2000
22. Ramakrishna Arni, *Web-Based Manufacturability Analysis for Solid Freeform Fabrication*, June 2000
23. Savinder Dhaliwal, *Automated Design of Sacrificial Molds*, June 2000
24. Bikram Baidya, *MEMS Extraction*, May 1999 (Co-advised with Dr. T. Mukherjee)

M.S. Scholarly Papers Completed

1. Luke Roberts, *Physics-Aware Decision Making to Enable Autonomous Operation of a Highly Maneuverable Flapping Wing Unmanned Aerial Vehicle*, May 2016
2. Elisabeth LeBrun, *Overview of Terminal Sterilization Methods*, May 2013
3. Alexander Weissman, *Selecting a Design-Stage Energy Estimation Approach for Manufacturing Processes*, August 2011
4. Jorge Diaz, *Use of Additive Manufacturing for the Fabrication of Load Bearing Implants*, June 2011
5. Jeffrey Coleman, *A Reduction Selection Process for Collaborative Technologies*, December 2001
6. Krishnakumar Venkatesan, *Generation of Atomic Representations for MEMS Extraction*, May 2000

B.S. Independent Study Completed

1. J. Hugh, *Analysis and Optimization on the Compliant Flap and Leg Structure of the RoboTerp II Platform*, May 2015
2. Z. Gao, *RoboTerp III*, May 2015
3. G. Krummel, *Development of a Horseshoe Crab Inspired Robot for Surf Zone Traversal*, May 2014
4. R. Taeb, *Design and Functional Improvements to Four Legged Walking Platform*, December 2010
5. M. Stevens, *Design and Manufacturing of a Self-Charging Docking Station for a Robot*, December 2009

6. Z. Schramm, *Design and Manufacture a Prototype Prosthetic Hand Based on the Physiological Structure of the Human Hand*, July 2009
7. G. Ramu, *Izzy: The Lizard Robot*, May 2009
8. B. Freas, *Lizard Inspired Robot*, March 2007
9. J. Zuckerman, *Tool Design and Implementation for Polyhedral Body Editing Application*, May 2005
10. R. Gouker, *Rapid Prototyping Articulated Multi-Material Assemblies Using Multi-Piece Multi-Stage Molding*, May 2004
11. B. Spranklin, *Gelcasting of Geometrically Complex Objects*, December 2003
12. I. Golden, *Cutter Path Planning for 3D Replication*, December 2002
13. G. Fowler, *Design and Manufacturing Issues for Macroscopic Interfaces in Heterogeneous Assemblies*, December 2001
14. O. Morgan, *CNC Tool Path Generation for Three-Axis Machining of Sculptured Surfaces*, May 2000
15. D. Butler, *Using Computer Vision for Determining Vise Position for Intelligent Machining*, December 1999

Advisor for Undergraduate Students from Mannheim University of Applied Sciences, Germany

- T. Jacob (September 2000 to February 2001); K. Stoppel (September 2001 to February 2002); S. Bennewitz (September 2002 to February 2003); M. Schroeder (March 2003 to August 2003); T. Holzschuh (September 2003 to February 2004); S. Schiefner (March 2004 to August 2004); E. Eick (March 2004 to August 2004); W. Mosler (September 2004 to February 2005); F. Kerbs (September 2004 to February 2005); S. Warth (March 2005 to August 2005); A. Gfell (March 2005 to August 2005); S. Koch (March 2006 to August 2006); P. Wandji (September 2006 to February 2007); D. Muller (March 2007 to August 2007); T. Karch (September 2007 to February 2008); Kenan Ozdemir (March 2009 to August 2009); Lester Ehrlich (March 2009 to August 2009); Felix Bussemer (September 2009 to February 2010); Lester Ehrlich (March 2010 to August 2010); Christoph Pazer (March 2015 to August 2015)

Advisor for ISR REU Students

- J. Hammer (Summer 2001); A. Lo (Summer 2001); W. Dickenson (Summer 2002); B. Spranklin (Summer 2003); L. Fomundan (Summer 2003); G. Gouker (Summer 2004); N. Charoosah (Summer 2004); G. Kung (Summer 2004); N. Deshpande (Summer 2005); K. Ledoux (Summer 2005); T. Oberc (Summer 2006); G. Brock (Summer 2006); W. Miranda (Summer 2006); D. Rich (Summer 2007); Suchit Bhattarai (Summer 2008); B. Farris (Summer 2012); J. Trischler (Summer 2012)

Ph.D. Thesis Committee Member

- Manish Kumar Govil (March 1999); Antonio Diaz-Calderon (June 2000); Rajrishi Sinha (January 2002); Sameer Joshi (March 2002); Mandar Chincholkar (June 2002); Bikram Baidya (July 2003); Xinhua Long (November 2005); Maomao Chen (April 2006); Peng Xu (2008); Anand Pillarisetti (September 2008); Ion Matei (September 2010); Mark Paul Kujawski (February 2011); Sandip Haldar (2013); Mingyen Ho (2013); Cheuk Yiu Ip (2013); Sujal Bista (2014)

M.S. Thesis Committee Member

- S. Karthik (February 1999); S. Balasubramanian (July 1999); D. Pelinescu (September 2000); S. Saikumar (September 2000); V. Mathur (June 2001); H. Surendranath (July 2001); R. Kumar (May 2002); Z. Tuncali (May 2003); L. Gyger (August 2006); J. Krufft (January 2007)

4. SERVICE

A. PROFESSIONAL ACTIVITIES

Professional Society Membership

- Fellow, American Society of Mechanical Engineers (ASME)
- Senior Member, Society of Manufacturing Engineers (SME)
- Senior Member, Institute of Electrical and Electronics Engineers (IEEE)

Technical Committee Membership

- Chair, ASME Design for Manufacturing Committee (July 2005-June 2007)
- Vice Chair, ASME Design for Manufacturing Committee (July 2003-June 2005)
- Secretary, ASME Design for Manufacturing Committee (July 2001-June 2003)
- Awards and Honors Chair, ASME Design for Manufacturing Committee (July 1999-June 2001)

Editorship

- Editor, *ASME Journal of Computing and Information Science in Engineering* (July 2017 to present)
- Editor-in-Chief, *Advanced Manufacturing Book Series*, World Scientific Publishing Company (2016 to present)
- Member, Editorial Advisory Board, *Assembly Automation* (2015 to present)
- Associate Editor, *IEEE ICRA 2016*
- Associate Editor, *IEEE ICRA 2015*
- Associate Editor, *ASME Journal of Mechanisms and Robotics* (July 2014 to June 2017)
- Member, Advisory Board, *IEEE Transaction on Automation Science and Engineering* (2013 to 2016)
- Editor, Manufacturing Automation Track, *IEEE International Conference on Automation Science and Engineering*, 2012
- Guest Co-Editor, Special Issue on Manufacturing and Construction, *Virtual Reality Journal*, Volume 15, Number 1, 2011
- Associate Editor, *SME Journal of Manufacturing Processes* (April 2008 to December 2011)
- Guest Co-Editor, Special issue on Advances in Computer Aided Manufacturing, *ASME Journal of Computing and Information Science in Engineering*, Volume 7, Number 3, September 2007
- Associate Editor, *ASME Journal of Computing and Information Science in Engineering* (January 2006 to December 2011)
- Member, Editorial Advisory Board, *Computer Aided Design and Application* (2005 to present)
- Associate Editor, *IEEE Transaction on Automation Science and Engineering* (March 2004 to February 2006)
- Member, Editorial Advisory Board, *Assembly Automation* (2001 to 2013)
- Guest Co-Editor, Special issue on Feature Based Manufacturing, *Computer Aided Design Journal*, Volume 33, Number 9, August 2001

Conference Organization

- Program Co-Chair, *IEEE International Conference on Automation Science and Engineering*, 2019
- Session Chair, *Conference on System Engineering Research (CSER)*, 2017
- Member, Advisory Committee, *Additive Manufacturing + 3D Printing*, Boston, MA, 2015
- Member, Advisory Committee, *ASME Advanced Design and Manufacturing Impact Forum*, Buffalo, NY, 2014
- Member, Scientific Committee, *International Conference on Mechanical Engineering and Mechatronics (ICMEM)*, 2014
- Member, Program Committee, *CLAWAR* 2014
- Member, Program Committee, *International Symposium on Experimental Robotics*, 2014
- Member, Program Committee, *International Symposium on Assembly and Manufacturing (ISAM)*, 2013
- Member, Scientific Committee, *International Conference on Mechanical Engineering and Mechatronics (ICMEM)*, 2013
- Member Scientific and Advisory Committee, *NEWTECH* 2013
- Member, Program Committee, *CLAWAR* 2013
- Member, Advisory Committee, *International Conference on Innovations in Automation and Mechatronics Engineering*, 2013
- Session Chair, *IEEE CASE*, 2012
- Member, Program Committee, *International Symposium on Experimental Robotics*, 2012
- Member, Program Committee, *ACM Solid and Physical Modeling Symposium*, 2012
- Member, Program Committee, *Performance Metrics for Intelligent Systems (PerMIS'12) Workshop*, 2012
- Member, Program Committee, *IEEE International Conference on Automation Science and Engineering*, 2012
- Member, Local Organizing Committee, *International Conference on Climbing and Walking Robots and the Support Technologies for Mobile Machines (CLAWAR)*, 2012
- Member, Scientific Committee, *NEWTECH*, 2011
- Member, Program Committee, *International Conference on Design and Advances in Mechanical Engineering*, 2011
- Member, Program Committee, *International Symposium on Assembly and Manufacturing*, 2011
- Member, Program Committee, *AIMTDR*, 2010
- Member, Program Committee, *ACM Solid and Physical Modeling Symposium*, 2010
- Member, Program Committee, *Computer Aided Design Conference*, 2009
- Member, Program Committee, *ACM Solid and Physical Modeling Symposium*, 2009
- Member, Program Committee, *Computer Aided Design Conference*, 2008
- Member, Program Committee, *IEEE CASE*, 2008

- Member, Program Committee, *Virtual Manufacturing Workshop*, 2008
- Member, Program Committee, *ACM Solid and Physical Modeling Symposium*, 2008
- Session Chair, *IEEE International Symposium on Assembly and Manufacturing*, 2007
- Member, Program Committee, *IEEE International Symposium on Assembly and Manufacturing*, 2007
- Member, Program Committee, *CAD and Graphics Conference*, 2007
- Member, Program Committee, *Computer Aided Design Conference*, 2007
- Member, Program Committee, *Product Lifecycle Management Conference*, 2007
- Member, Program Committee, *Product Lifecycle Management Conference*, 2006
- Member, Program Committee, *Geometric Modeling and Processing Conference*, 2006
- Member, Program Committee, *Computer Aided Design Conference*, 2006
- Member, Program Committee, *ACM Solid and Physical Modeling Conference*, 2006
- Session Chair, *ASME International Mechanical Engineering Congress and Exposition*, 2005
- Member, Program Committee, *CAD and Graphics Conference*, 2005
- Member, Program Committee, *Computer Aided Design Conference*, 2005
- Member, Program Committee, *ACM Solid and Physical Modeling Conference*, 2005
- Session Chair, *ASME Computers and Information in Engineering Conference*, 2005
- Session Chair, *Computer Aided Design Conference*, 2005
- Session Chair, *ASME Computers and Information in Engineering Conference*, 2004
- Session Chair, *International Symposium on Tools and Methods for Competitive Engineering*, 2004
- Session Organizer, *ASME International Mechanical Engineering Congress and Exposition*, 2003
- Conference Chair, *ASME Design for Manufacturing Conference*, 2003
- Session Chair, Manufacturing and Process Planning, *ASME Computers and Information in Engineering Conference*, 2003
- Session Chair, Layered Fabrication, *ASME Design for Manufacturing Conference*, 2003
- Session Co-Chair, Geometric Reasoning and Modeling for Manufacturing, *ASME Design for Manufacturing Conference*, 2003
- Program Chair, *ASME Design for Manufacturing Conference*, 2002
- Session Chair, Design Applications, *ASME Computers and Information in Engineering Conference*, 2002
- Session Chair, Design and Manufacturing Integration, *ASME Design for Manufacturing Conference*, 2002
- Paper Review Coordinator, *ASME Design for Manufacturing Conference*, 2001
- Session Chair, Design Approaches for Assemblies and Tooling, *ASME Computers and Information in Engineering Conference*, 2001

- Session Chair, Tool Path Planning for Freeform Surfaces and Pocket Features Session, *ASME Computers and Information in Engineering Conference*, 2001
- Session Chair, Design and Manufacturing Representation Session, *ASME Design for Manufacturing Conference*, 2001
- Session Chair, Design for Manufacturing Session, *ASME Mechanical Engineering Congress and Exposition*, 2000
- Session Chair, Advanced System Assembly Analysis Session, *ASME Design for Manufacturing Conference*, 2000
- Session Co-Chair, Process Planning Session, *ASME Computers in Engineering Conference*, 2000
- Session Co-Chair, Global Manufacturing Session, *Flexible Automation and Intelligent Manufacturing Conference*, 2000
- Paper Review Coordinator, *ASME Design for Manufacturing Conference*, 2000
- Exhibit Chair, *ASME Design Engineering Technical Conference*, 2000
- Papers Chair, *ASME Design for Manufacturing Conference*, 1999
- Session Co-Chair, *ASME Design for Manufacturing Conference*, 1999
- Co-Chair, Feature Recognition Session, *ASME Computers in Engineering Conference*, 1998
- Program Co-Chair, *ASME Design for Manufacturing Conference*, 1998
- Area-Chair, Integration of CAD and Planning, *ASME Design for Manufacturing Conference*, 1997
- Chair, Integrated Computing Environments, *ASME Computers in Engineering Conference*, 1997
- Area-Chair, Integration of CAD and Planning, *ASME Design for Manufacturing Conference*, 1996
- Chair, Industry Panel Discussion, *ASME Design for Manufacturing Conference*, 1996
- Chair, Feature Recognition Session, *ASME Computers in Engineering Conference*, 1996
- Co-Chair, Feature-Based Process Planning Session, *ASME Computers in Eng. Conference*, 1995
- Chair, Geometric Modeling Session, *ASME Computers in Engineering Conference*, 1995
- Vice-Chair, Feature-Based Applications Session, *ASME Computer in Engineering Conference*, 1994

Paper Reviewer for Journals

- *Computer Aided Design; Research in Engineering Design; ASME Journal of Mechanical Design; ASME Journal of Manufacturing Science and Engineering; ASME Journal of Computing and Information Science in Engineering; IEEE Transactions on Robotics and Automation; IEEE Transaction on Automation Science and Engineering; IEEE Transactions on Robotics; IEEE Transactions on Visualization and Computer Graphics; IEEE Transactions on Mechatronics, IIE Transactions; SME Journal of Manufacturing Systems; SME Journal of Manufacturing Processes; AI in Design and Manufacturing; International Journal of Expert Systems; International Journal of Production Research; Journal of Engineering Manufacture (Proceedings of the Institution of Mechanical Engineers Part B); Virtual Reality; Computer Integrated Manufacturing; Proceedings of the National Academy of Sciences*

Paper Reviewer for Conferences

- *ASME Design for Manufacturing Conference; ASME Computers in Engineering Conference; ASME International Mechanical Engineering Congress and Exposition; ASME Design Automation Conference; ASME Mechanism and Robotics Conference; ASME Winter Annual Meeting; ACM Symposium on Solid and Physical Modeling; International Symposium on Tools and Methods for Competitive Engineering; Computer Aided Design Conference; CAD and Graphics Conference; Geometric Modeling and Processing Conference; International Conference on Product Lifecycle Management; IEEE International Symposium on Assembly and Manufacturing; IEEE Conference on Automation Science and Engineering; IEEE Robotics and Automation Conference; North American Manufacturing Research Institute Conference; All India Machine Tool Design and Research Conference*

NSF Workshop Participation (Participation by invitation only)

- 2007 NSF CI-TEAM Workshop, July 9-11, Washington, DC
- 2005 NSF EXCITED Workshop, February 28 - March 1, 2005, Arlington, VA
- 2004 NSF Engineering Design Workshop, March 26-29, 2004, Phoenix, AZ

Proposal Reviewer

- Department of Energy, 2013
- National Science Foundation (14 different panels between 1997 and 2016)
- University Grant Commission, Hong Kong (reviewed more than 40 proposals between 1997 and 2012)
- King Abdulaziz City for Science and Technology, 2011
- Air Force Office of Scientific Research, 2010
- Maryland Industrial Partnership Program, 2007
- National Institute of Standards and Technology, 2005
- Ohio University Baker Funds, 2001

B. INSTITUTIONAL SERVICE

USC Viterbi School of Engineering

- Member, Research Committee (Spring 2016 to present)

USC Aerospace and Mechanical Engineering

- Member, AME Search Committee (Fall 2016, Spring 2017, Fall 2017, Spring 2018)
- Member Promotion Committee for Tim Centea (Spring 2016)

UMD College of Engineering

- Member, ME Chair Search Committee (Fall 2010 and Spring 2011)
- Maryland Technology Extension Service Consulting for Maryland Thermoform, Marlin Steel, Cyto Pulse, and Advanced Thermal Batteries
- Advisory Committee for NIST-ARRA Fellowship (Spring 2010 to Summer 2012)
- Member, ISR Director Search Committee (Summer 2009)
- Member, Committee for Reviewing ISR Director (Spring 2007)

- Member, Selection Committee for Venture Accelerator Director (Fall 2004)
- Mechanical Engineering Representative, College APT Committee (Fall 2003)
- Mentor for Reginald McNeill, ESTEEM program participant (Spring 2010)
- Mentor for Umaru Sillah, ESTEEM program participant (Fall 2002 and Spring 2003)
- Mentor for Stefan Roxborough, ESTEEM program participant (Summer 1999, Fall 1999, and Spring 2000)
- Mechanical Engineering Representative, Engineering Council (1998-2000)

UMD Mechanical Engineering

- Member, Faculty Advisory Committee (Spring 2015 to Fall 2015)
- Member, Academic Affairs Committee (Spring 2015 to Fall 2015)
- Member, APT Committee (Spring 2015 to Fall 2015)
- Chair, Faculty Search Committee (Fall 2014 to Spring 2015)
- Chair, APT Committee for Promotion of Dr. Elisabeth Smela (Summer 2010 and Fall 2010)
- Member, Graduate Committee (Spring 2008 to Summer 2012)
- Member, APT Committee (Spring 2008 to Summer 2012)
- Mentor for Sarah Bergbreiter (Fall 2008 to Spring 2014)
- Chair, Awards Committee (Spring 2007 to Summer 2010)
- Member, Risk Based Design Search Committee (Fall 2006 to Spring 2007)
- Member, APT Committee for Promotion of Dr. Peter Sandborn (Fall 2008)
- Chair, Energetics Technology Center Building Specification Committee (Spring 2007 to Fall 2007)
- Chair, Energetics Technology Center Coordinator Search Committee (Fall 2006 to Spring 2007)
- Chair, APT Committee for Appointment of Dr. Jaydev Desai as Tenured Associate Professor (Spring 2006)
- Member, Qualifying Exam Review Committee (Fall 2005 to Spring 2006)
- Co-Chair, Robotics Search Committee (Fall 2005 to Spring 2006)
- Member, Reliability-ME Integration Task Force (November 2002 to May 2003)
- Chair, Awards Committee (Spring 2002 to Summer 2004)
- Advisor, SME Student Chapter (July 2002 to June 2004)
- Chair, Adhoc Committee for Organizing SME LEAD Award Site Visit (Spring 2000)

UMD Institute for Systems Research

- Member, ISR Strategic Planning Committee (Spring 2014 to Fall 2015)
- Member, Executive Committee (July 2011 to August 2012)
- Chair, Robotics Initiative Committee (October 2009 to March 2010)
- Member, Education Committee (July 2008 to June 2010)

- Member, APT Committee (Fall 2008 to Spring 2009)
- Member, Facilities and Services Committee (July 2005 to June 2007)
- Chair, APT Committee (Fall 2005 to Spring 2006)
- Chair, Strategic Planning Committee for Product Realization and Manufacturing Systems Group (Fall 2003 to Spring 2004)
- Member, Education Committee (July 2003 to June 2004)
- Member, Adhoc Committee for Public Relations (September 2002 to June 2004)
- Member, Space and Facilities Committee (July 2001 to June 2003)
- Member, Education Committee (July 1999 to June 2001)
- Institute for Systems Research Representative, Space Planning Committee for Virtual Reality Laboratory in the New Engineering Laboratory Building (Fall 1999)
- Member, 2nd Strategic Planning Workshop (Spring 1999)