
Karthik Ramani

August 2017

Academic Rank

Donald W. Feddersen Professor of Mechanical Engineering
Professor of Electrical and Computer Engineering (by courtesy)

Education

Stanford University, Stanford, CA Ph.D. in Mechanical Engineering, Design Division	June 1987 - June 1991
The Ohio State University, Columbus, OH M.S. in Mechanical Engineering	March 1985 - August 1986
Indian Institute of Technology, Madras, India Bachelor of Technology in Mechanical Engineering	August 1980 - January 1985

Experience

Professor (by courtesy) School of Educational Studies, College of Education	Fall 17
Visiting Researcher, Mathematical Institute/Merton College, Oxford University	Summer 16
Visiting Professor, Computer Science, Stanford University	1/08 – 6/08
Visiting Scientist, Intelligent Systems Group, PARC (Formerly Xerox PARC)	1/08 – 6/08
Fellow, Institute of Pure and Applied Mathematics, UCLA	8/07 – 12/07
Advisory Board, NSF, Small Business Innovation Research, IIP Division	8/07 – present
Co-founder and Chief Scientist, ZeroUI	8/13 - present
Technical Advisor, Imaginestics. [Chief Scientist 05-08]	8/05 – 08/15
Professor (by Courtesy), School of Electrical and Computer Engineering	8/07 – present
Chair, Manufacturing Area, School of Mechanical Engineering	8/04 – present
Professor School of Mechanical Engineering, Purdue University	8/01 – present
Director, Center for Information Sciences in Engineering, Purdue University	8/01 – 8/08
Invited Guest Research Scientist, National Institute of Standards and Technology	8/00 – 12/00
Associate Professor, School of Mechanical Engineering, Purdue University	7/97 – 8/01
Assistant Professor, School of Mechanical Engineering, Purdue University	7/91 – 7/97
Summer Faculty Intern, Dow Plastics, Advanced Materials	Summer 93
Research Assistant, Design Division, Stanford University	6/87 – 6/91
Teaching Assistant, Mechanical Engineering, Stanford University	Autumn 89
Summer Intern, Delco Products, Advanced Composite Systems	Summer 89
Visiting Scholar, Center for Design Research, Stanford University	9/86 – 6/87
Research Assistant, Mechanical Engineering, The Ohio State University	3/85 – 8/86
Teaching Assistant, Mechanical Engineering, The Ohio State University	Spring 85

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HONORS AND AWARDS

NSF Invited lecture: Cyber Learning, Washington DC, VA	2017
Lindbergh Distinguished Lecture, University of Wisconsin, Madison	2016
Best of Consumer Electronics Show (CES 2016) Finalist (ZeroUI)	2016
Best Poster Award UIST	2015
Highly Cited Author Award from Elsevier Computer-Aided Design Journal	2015
Distinguished Lecturer, Designing Disruptive Learning Technologies, NSF	2014
Research Excellence Award, ASME Computers and Information in Engineering Division	2014
Kos Ishii Toshiba Award, ASME	2013
Distance Educator Award, Purdue University	2013
Design for Manufacturing and Lifecycle Best Paper Award	2013
Purdue Innovators Hall of Fame	2013
Ruth and Joel Spira Award, Outstanding Contributions to the ME (two time awardee), Purdue University	2012
All Conference Best Paper Award, ASME International Design Engineering Technical Conference (IDETC), Computers and Information in Eng./Systems Engineering	2011
Donald W. Feddersen Professor of Mechanical Engineering,	2010
Fellow of the American Society of Mechanical Engineers	2010
Best Student Paper Award, Computer-Aided Design and Applications	2010
Three of the top ten most cited paper awards, Computer-Aided Design Journal	2010
Outstanding Commercialization Award for Purdue University Faculty	2010
Best Paper Award, ASME IDETC, Computers and Information in Eng./CAPPD	2009
Most Highly Cited paper in the Journal of Computer-Aided Design (Elsevier)	2006
Most Highly Cited paper in the Journal of Computer-Aided Design (Elsevier)	2007
Thomas French Award, The Ohio State University	2007
Purdue University, College of Engineering's only Research Excellence Award	2007
Purdue Acorn Award	2006
Innovation of the Year Award, Techpoint, Indiana	2006
Discovery in Mechanical Engineering Award	2005
University Faculty Scholar, Purdue University	2002
Society for Manufacturing Engineers, Outstanding Young Manufacturing Engineer	1999
Ruth and Joel Spira Award for Outstanding Contributions to the Mechanical Engineering Curriculum, Purdue University	1997
Faculty Study in Second Discipline Award, Vice Presidents Office, Purdue University	1997
Ralph R. Teetor Educational Award, Society of Automotive Engineers	1996
National Science Foundation CAREER Award	1996
National Science Foundation Research Initiation Award	1993
Dupont Young Faculty Award	1992
Society for the Advancement of Materials and Process Engineering Student Award	1991
Best Academic Record Award for Junior and Senior Year, IIT Madras, India (1984-85)	1985

In 2007 Professor Ramani received the College of Engineering's Faculty Award of Excellence for Research (one given per year for 350 or so faculty). The criteria for the Research Award include "Innovation and Impact" and "National and/or International recognition of excellence and impact". The citation read: "*for his achievements in discovery, learning, and entrepreneurship and for his innovative research in information and shape sciences.*"

The Faculty Commercialization Award involves a cash prize, as well as official recognition at a major campus event and at the Inventor's Recognition Dinner. The Award is offered in recognition of Purdue tenure-track faculty members and research scientists who have been most active and/or successful in their efforts to contribute directly to the commercialization of Purdue-generated/owned technologies. The award is intended as an official acknowledgement of the importance of technology commercialization by Purdue faculty, as well as its relevance for preeminence in the discovery, learning and engagement priorities of the University.

He is also the only Purdue Engineering Faculty to receive both the Research Excellence Award and Commercialization Award.

RESEARCH: CONTRIBUTIONS

Our current research is at the crossroads of mechanical engineering and computer sciences driven by geometry and design inspired areas. Our research traverses computer vision (machine learning/deep learning of shapes), human-computer interaction, and computational fabrication. Our current application areas are inspired by the future we strive to create. We build upon our past successes such as in shape-based search, developing tools for early design, and significant experiences in the making of things. We design geometry inspired algorithms for natural creation of shapes that are manufacturable.

Our current areas of closely interrelated research are computationally inspired for (1) creative and natural design of shapes using hands and natural user interfaces aided by computational algorithms, (2) creating natural, collaborative and visual digital exploratoriums for design and computational fabrication, (3) designing of next generation interactive gestural interactions with tangibles, embedded and embodied interfaces, (4) development of new responsive products, artistic and construction kits for children's science-technology-engineering-arts-mathematics (STEAM) learning such as new robotic learning platforms (www.ziro.io), and (5) geometry inspired machine learning kernels to understand shapes, graphs and data spaces.

An underlying theme of our research in design is closely tied to helping students learn to design using play and fun with toy design as a test-bed as well as a platform for interdisciplinary design projects. We develop workshops for children and curricular that encompasses design-build-test to learn through making using engineering design (games, automata, disassembly, and design tools for fabrication) to lead to robotic design and play design for learning.

Our past research (1985 – 2000) was deep rooted in designing and developing processes and machines for manufacturing to create affordances for new designs. We used extensive simulation and modeling to reduce the risk in the process development and design. We reinvented our labs by inverting our focus towards creating new affordances for the new emerging manufacturing processes. For example, we are developing an entirely new genre of “functional” 3D printing. Our computational fabrication systems encompassing both the machines and design metaphors to support them, the natural interfaces driven design paradigms, as well as design learning frameworks are exemplars for our new research. In a focus towards learning in our design-build-play constructs, we both support as well as study collaborative and social construction of design knowledge.

Journal Articles

1. Ramani, K., Miller, A.K., and Cutkosky, M.R., "A New Approach to the Forming of Thermoplastic-Matrix Continuous-Fiber Composites-Part 1: Process and Machine," *Journal of Thermoplastic Composite Materials*, Vol. 5, No. 3, pp. 184-201, 1992.
2. Ramani, K., Miller, A.K., and Cutkosky, M.R., "A New Approach to the Forming of Thermoplastic-Matrix Continuous-Fiber Composites-Part 2: Experiments and Model," *Journal of Thermoplastic Composite Materials*, Vol. 5, No. 3, pp. 202-227, 1992.
3. Ramani, K., Miller, A.K., and Cutkosky, M.R., "Die-less Forming of Thermoplastic Matrix Continuous Fiber Composite Materials-Process and Demonstration," *Journal of Engineering for Industry, Transactions of the ASME*, Vol. 117, No. 4, pp. 501-507, 1995.
4. Ramani, K., Bank, D.H., and Kraemer, N., "Effect of Screw Design on Fiber Damage in Extrusion Compounding and Composite Properties," *Polymer Composites*, Vol. 16, No. 3, pp. 258-266, 1995.
5. Ramani, K., Woolard, D.E., and Duvall, M.S., "An Electrostatic Powder Spray Process for Manufacturing Thermoplastic Composite Materials," *Polymer Composites*, Vol. 16, No. 6, pp. 459-469, 1995.
6. Ramani, K., and Hoyle, C.H., "Processing of Thermoplastic Composites Using a Powder Slurry Technique. I. Impregnation and Preheating," *Materials and Manufacturing Processes*, Vol. 10, No. 6, pp. 1169-1182, 1995.
7. Ramani, K., and Hoyle, C.H., "Processing of Thermoplastic Composites Using a Powder Slurry Technique. II. Coating and Consolidation," *Materials and Manufacturing Processes*, Vol. 10, No. 6, pp. 1183-1200, 1995.
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9. Ramani, K., and Vaidyanathan, A., "Finite Element Analysis of Effective Thermal Conductivity of Filled Polymeric Composites," *Journal of Composite Materials*, Vol. 29, No. 13, pp. 1725-1740, 1995.
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11. Woolard, D.E., and Ramani, K., "Electric Field Modeling of Electrostatic Powder Coating of a Continuous Fiber Bundle," *Journal of Electrostatics*, Vol. 35, No. 4, pp. 373- 387, 1995.
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13. Parasnis, N.C., Ramani, K., Borgaonkar, H.M., "Ribbonizing of Electrostatic Powder Spray Impregnated Thermoplastic Tows by Pultrusion," *Composites , Part A - Applied Science and Manufacturing*, Vol. 27, No. 7, pp. 567-574, 1996.

14. Duvall, M.S., Ramani, K., Bays, M., and Caillat, F., "In-situ Composite Manufacture Using an Electrostatic Powder Spray Process and Filament Winding," *Polymer and Polymer Composites*, Vol. 4, No. 5, pp. 325-334, 1996.
15. Ramani, K., and Tagle, J., "Process Induced Effects in Thin-Film Bonding of PEKEKK in Metal-Polymer Joints," *Polymer Composites*, Vol. 17, No. 6, pp. 879-886, 1996.
16. Ingram, C., and Ramani, K., "The Effect of Sodium Hydroxide Anodization on the Durability of Poly(Etherketoneetherketoneketone) Adhesive Bonding of Titanium," *International Journal of Adhesion and Adhesives*, Vol. 17, No. 1, pp. 39-45, 1997.
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28. Parasnis, N., and Ramani, K., "Numerical Simulation of Compression Molding of UHMWPE," Part II. Residual Stress Model, *International Journal of Polymer Processing*, Vol. XV, No. 2, pp. 194-201, 2000.

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31. Kumar, G., and Ramani, K., "Characterization of Wood-Polypropylene Composite Sandwich System," *Journal of Composite Materials*, Vol. 34, No. 18, pp. 1582-1599, 2000.
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39. Iyer, N., and Ramani, K., "A Study of Localized Shrinkage in Injection Molding with High Thermal Conductivity Molds," *Journal of Injection Molding Technology*, Vol. 6, No. 2, 2002.
40. Ramani, K., and Dai, H., "Design and process for preformed woven, knitted and braided thermoplastic composite reinforced arrestor," *Journal of Composite Materials*, Vol. 35, pp. 1-16, 2002.
41. Xu, C., Siegmund, T., and Ramani, K., "Rate-Dependent Crack Growth in Adhesives I. Modeling Approach," *International Journal of Adhesion and Adhesives*, Vol. 23, pp. 9-13, 2003.
42. Xu, C., Siegmund, T., and Ramani, K., "Rate-Dependent Crack Growth in Adhesives II. Experiments and Analysis," *International Journal of Adhesion and Adhesives*, Vol. 23, pp. 15-22, 2003.

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75. Subramaniam Jayanti, Yagnanarayanan Kalyanaraman, Karthik Ramani, "Shape-based clustering for 3d CAD objects: A comparative study of effectiveness", *Computer-Aided Design*, Volume 41, Issue 12, December 2009, Pages 999-1007
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91. Senthil K. Chandrasegaran, Karthik Ramani, Ram D. Sriram, Imre Horváth, Alain Bernard, Ramy F. Harik, Wei Gao: The evolution, challenges, and future of knowledge representation in product design systems. *Computer-Aided Design* 45(2): 204-228 (2013). [Most downloaded paper in Elsevier Computer-Aided Design for 2013-14]
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High Impact Conferences (Computer Science Oriented)

These conferences are considered to be of very high value in computer sciences and computer engineering. The best ones play a more important role than journal articles in tenure decisions in Computer Sciences and Engineering. The acceptance rates are low. CHI, UIST, and UbiComp are all ranked as #1, #3 and #4 of more than 168 Human Computer Interaction Conferences in Computer Science by Microsoft Academic Research and other rankings. CVPR and CHI are ranked as #4 and #7 of more than 3523 Computer Science Conferences. Also ICDE - #26, UIST - #58 and IROS - #67 are among the 3523 Computer Science Conferences. UIST, UbiComp and TEI are all ranked as A level conferences.

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8. Ramani, K., Borgaonkar, H. and Hoyle, C.H., "Compression Molding and Pultrusion of Thermoplastic Powder Impregnated Tows," International Conference on Composites Engineering, pp. 417-418, August, 1994.
9. Ramani, K. and Henderson, D., "Use of PRO/Engineer and ANSYS in Undergraduate Engineering Education," Symposium on Changes in Undergraduate Engineering Education, SAE International Congress and Exposition, Milwaukee, Wisconsin, SAE Technical Paper Series 941748, pp. 1-4, September 12-14, 1994.
10. Ramani, K., Woolard, D.E., and Duvall, M.S., "In-situ Powder Impregnation in Composites Manufacture," NSF Design and Manufacturing Grantees Conference, San Diego, California, pp. 479-480, January 3-7, 1995.
11. Ramani, K., Tagle, J., and Ingram, C., "CAREER: In-situ Adhesive-less Joining of Thermoplastics and Their Composites to Metals in Net-shape Processes and an Integrated Design and Processing Education Plan," Proceedings 1996 NSF Design and Manufacturing Grantees Conference, Albuquerque, New Mexico, pp. 423-424, January, 1996.
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17. Lou, K., Jayanti, S., Iyer, N., Kalyanaraman, Y., Ramani, K., and Prabhakar, S., "A Reconfigurable, Intelligent 3D Engineering Shape Search System Part II: Database Indexing, Retrieval and Clustering," Proceedings of ASME DETC' 03, 23rd Computers and Information in Engineering (CIE) Conference, Chicago, Illinois, September 2-6, 2003.
18. Ramani, K. and Babu, M., Nikhil Joglekar, Aliasgar Ganiji, "Flexible Software Framework for Collaboration Systems, Collaborative Design Tools" International CIRP Design Seminar, Grenoble, France, Page 27, May 12-14, 2003.
19. Chung, C., Raj, A., Turuvekere, S., Agarwal, V., and Ramani, K., "A Customer-Supplier System for Distributed Global Product Management, Cooperation between Designers" International CIRP Design Seminar, Grenoble, France, Page 50, May 12-14, 2003.
20. Karthik, S., Chung, C., Ramani, K., and Tomovic, M., "Methodology for Metalcasting Process Selection," SAE 2003 World Congress, Detroit, Michigan, March 3-6, 2003
21. Karthik, S., Chung, C., and Ramani, K., "Development of Process Capability - Supplier Models," ASME 2003 International Design Engineering Technical Conferences, Chicago, Illinois, pp. 891-900, September 2-6, 2003.
22. Uppuluri, S., Xu, X., and Ramani, K., "Remote Services Model for Laser Micro-Machining," ASME 2003 International Design Engineering Technical Conferences, Chicago, Illinois, September 2-6, 2003
23. Lee, A, Brink J., C., Anderson, D., Ramani, K., "Wire-Path Rapid Tooling and Supporting Software Development", 8th ASME Design for Manufacture Conference, Chicago, IL, 2003.
24. Lee, A, Ramani, K., "Wire-Path: A New Method of Rapid Tooling", Moldmaking Expo, Cleveland, OH, 2003.
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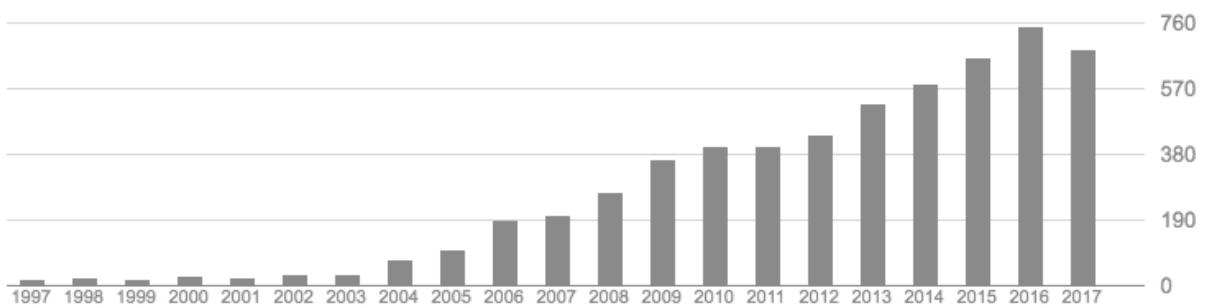
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Seminars, Presentations and Invited Lectures

1. "Die-less Forming of Thermoplastic Composite Materials," Cincinnati Milacron, Inc., Advanced Machine Development Division, Cincinnati, Ohio, August, 1989.
2. "Thermoplastic Filament Winding Using a Wet-Slurry Method," General Motors Corporation, Advanced Composite Systems, Dayton, Ohio, August, 1989.
3. "Filament Winding of Thermoplastic Composites," Materials Science and Engineering Seminar on Mechanical Properties of Solids, Stanford University, Palo Alto, California, October, 1989.
4. "Elastic-viscoplastic Rate Dependent Model for Die-less Forming," Materials Science and Engineering Colloquium Speaker, Stanford University, California, August 1990.
5. "Die-less Forming of Thermoplastic Composite Materials," University of Arizona, Tucson, Arizona, February, 1991.
6. "Recent Advances in Composites Manufacturing," National University of Singapore, Singapore, July, 1992.
7. "Fiber Damage During Extrusion Compounding of Glass Reinforced SPS," Dow Chemical Company, Midland, Michigan, August, 1993.
8. "In-situ Composite Manufacture," Zimmer Inc., Warsaw, Indiana, May, 1994.
9. "In-situ Impregnation and Coating of Glass Fibers using Electrostatic Powder Sprays," Owens Corning Fiberglass, Granville, Ohio, August, 1994.
10. "In-situ Coating and Joining," Delco Products, Dayton, Ohio, August, 1994.
11. "Hot Inert Gas Compression Molding Process," Zimmer Inc., Warsaw, Indiana, December, 1994.
12. "In-situ Impregnation of Polymeric Powders for Net-Shape Manufacture and In-situ joining", Best of German and American Automotive Technology Conference, Dearborn, Michigan, June, 1995.
13. "Thin-Film Thermoplastic Bonding of Metals and Application to In-situ Joining," Ford Motor Company, Dearborn, Michigan, August, 1995.
14. "An Integrated Approach to Design and Manufacture with Composites and Polymers," Department of Mechanical Engineering, Indiana University-Purdue University at Indianapolis, Indianapolis, Indiana, April, 1996.
15. "Approaches to Thermoplastic Polymer Joining to Metals," Motorola Inc., Northbrook, Illinois, May, 1996.
16. "Young Faculty Experience in Using the Research Process," special lecture for new faculty, Purdue University, West Lafayette, Indiana, September, 1996.
17. "Integrated Design, Processing and In-situ Approaches to Polymer Bonded Systems," Materials Science and Engineering Seminar, Purdue University, West Lafayette, Indiana, March, 1997.

18. "From Molecules to Machines: Design and Processing with Thermoplastic Polymer Bonded Systems," Department of Mechanical Engineering and Applied Mechanics, University of Michigan, Ann Arbor, Michigan, June, 1999.
19. "Processing and Durability Comparison of Thermoplastic Hot-Melt and Polyurethane Thermoset Bonded to Galvanized Steel," Keynote Lecture, International Conference on Composite Materials (ICCM -11), Paris, France, July, 1999.
20. "In-situ Polypropylene Composite Bonded to Wood Sandwich System," Keynote Lecture, International Conference on Composite Materials (ICCM -11), Paris, France, July, 1999.
21. "New Paradigms for Collaborative Systems," Invited Lecture, Volvo Concept Design Center, Los Angeles, CA, July 2001.
22. "Navigating a start-up to success: war stories," invited panel member, Purdue Entrepreneurial Symposium, October, 2001.
23. "Technical Assistance Program: Overview of Product and Process Design," Annual Industrial Advisory Council Meeting, October, 2001.
24. "CADDAC: Computer-Aided Distributed Design and Collaboration: A Prototype," Computer Sciences and Engineering, Purdue University, February, 2001.
25. "Next Generation Product Development Enterprises," Zimmer Inc., March, 2002. (Invited Speaker)
26. "Multi-client Multi-mode Architecture for Distributed Thin-client Interactions," Massachusetts Institute of Technology, (Mechanical Engineering Seminar Series, Invited Speaker), November, 2002.
27. "PRECISE: Research at Center for Information Systems in Engineering," GE Global, John Welch Center, Bangalore, India, (Invited Seminar Speaker), December, 2002.
28. "PRECISE: Research at Center for Information Systems in Engineering," Babha Atomic Research Center, Bombay, India, (Invited Seminar Speaker), December, 2002.
29. "Multi-mode Distributed Thin Client Collaboration on Large Geometric Models," I-Light Applications Workshop, Indiana's Optical Fiber Initiative, Indianapolis, Indiana, (Featured speaker for I-Light network use in distance visualization and collaboration applications) , December, 2002.
30. "3DESS: A Reconfigurable 3D Engineering Shape Search System," Computer Science and Engineering, Computing Research Institute, Spring 2003 Invited Seminar.
31. "Shape Search with a Hierarchical Shape Representation," University of California Berkeley, September 2003.
32. "Engineering Advisory Systems and Parts Search," Alcoa, Pittsburgh, invited R&D seminar, September 2003.
33. "Shape Search with a Hierarchical Shape Representation," University of Texas, Austin, California Berkeley, September 2003.
34. "Engineering Advisory Systems," The Ohio State University, Invited Seminar, October 2003.
35. "Shape Based Information Retrieval and Engineering Advisory Systems," Alcoa Technical Center, Invited Speaker, October 2003.

36. "Shape Based Information Retrieval and Engineering Advisory Systems," Caterpillar Mossville Technical Center, Invited Speaker, October 2003.
37. "Shape Based Information Retrieval and Engineering Advisory Systems," General Motors, Invited Speaker, October 2003.
38. "Similar Shape Search with a Hierarchical Shape Representation," MEEM graduate seminar, November, 2003.
39. "Emerging Technologies: Customization and Configuration," Panel Speaker, Purdue University, Advanced Manufacturing Summit, May 2004.
40. "Shape Search in Large Part Repositories," Adobe Corporate Research Headquarter, San Jose, Invited Seminar, September 2004.
41. "Shape Search in Large Part Repositories," Mechanical Engineering and Applied Mechanics, Invited Graduate Seminar, University of Michigan, Ann Arbor, December 2004.
42. "Towards a Customer Driven Enterprise: Search on 3D Parts in Large Repositories," The George W. Woodruff School of Mechanical Engineering CAE/Design Seminar, December 2004.
43. "Search by Shape: 3-D Parts in Large Networked Repositories," Invited Plenary lecture, NexGens Technologies, TTI Vanguard, December 2004.
44. "Cyber-Infrastructure: Customer Driven Manufacturing Networks," Invited Speaker, NSF Cyber-Infrastructure Workshop, August 2004.
45. "Cyber-Infrastructure: Design and Manufacturing," Invited Speaker, NSF Cyber-Infrastructure – Engineering Design Workshop, January 2005.
46. "Shape Search on 3D Parts from a Reuse Perspective," Plenary Speaker, International Symposium on Tools and Methods in Competitive Engineering, April, 2006, Ljubljana, Slovenia.
47. "Tech Transfer via Start-Up: a NSF-SBIR Case Study," Invited panel Speaker, national Council on Entrepreneurial Tech Transfer (NCET2), Washington DC, October 2006.
48. "Engineering Ontologies," Invited panel Speaker, U.S.-French Workshop on Information and Communication Standards for Product Lifecycle and Supply Chain Management, Washington DC, November 2006.
49. "Shape Analysis for Design, Manufacturing and Supply Chain," Invited Plenary Speaker, International Conference on Advances in Mechanical Engineering (ICAME 2006), December 14-16, 2006 in Madras (India).
50. "Searching for Shapes: From Engineering Design to Proteomics," Invited speaker, Department of Mechanical Engineering, University of Connecticut, February, 2008.
51. "In Search of Shapes," Workshop on 3D Shape retrieval and Analysis, National Institute of Standards and Technology, May 2-3, 2008.
52. "Extracting Prominent-cross sections in Mesh Models," Computer Graphics Forum, Stanford University, March 2008.
53. "Searching on 3D Content," Plenary Speaker, Computer-Aided Design and Applications, Orlando, Florida, June 2008.

54. "On Developing Engineering Ontologies," Ontology Workshop, KAIST, Daejeon, Korea, July 2008.
55. "Towards Search Space Representations," Hanyang University, Seoul, Korea, July 2008.
56. "In Search of Shapes," University of Illinois at Urbana Champaign, Joint Seminar between Mechanical Science and Engineering and Industrial and Systems Engineering, March 2009.
57. "In Search of Shapes," Illinois Institute of Technology, Chicago, March 2009.
58. "Working Knowledge Model and Visual Tools," Tata Consulting Services, Chennai, India, August 2009.
59. "Incorporating Sustainability into Early Design," Indo-U.S. conference in Sustainable Product Design, Manufacturing and Services, August 2009.
60. "Reverse Parameterization," General Electric, Cincinnati, July 2009.
61. Invited Distinguished Speaker for United Technology Center, Design Sensing: Integrating Digital Manufacturing and Design, January 2012.
62. "Gesture based shape modeling and touch based interaction," Iowa State University, Distinguished Lecture Series in Mechanical Engineering, November 2012.
63. Invited Panelist, Internet Enabled Manufacturing, July 2012 NSF CMMI Grantees Conference.
64. Invited Science Keynote 2012 NSF Cyber-physical systems grantees meeting, Framing the CPS Issues in Manufacturing and Design, Bruce Kramer (NSF/CMMI) and Karthik Ramani (Purdue).
65. Invited Speaker, Deconstructing Design, New Delhi, India, November 2013.
66. Invited Seminar, "Hand-Based User Interfaces", Iowa State, August, 2013
67. Invited Presentation, Rethinking Design Scenarios through Concurrent Multi-dimensional Exploration for Sustainable Decisions, US-China SM Workshop 2014, Wuhan, China, March 2013.
68. Invited Keynote Speaker, "Using Hands: Sketching, Shaping and Building to Create", Goteborg, Sweden, SIGRAD, June 2014.
69. Distinguished Lecture, New Tools to Foster Creative Collaboration During Design: Designing Disruptive Learning Technologies, National Science Foundation, May 2014 in Washington, D.C. (With Dr. Pepler, Indiana University)
70. Invited Lecture, "Remaking Engineering through Design", Engineering and the Maker Movement: Intersection and Opportunities, NSF Workshop, July 24, in Washington, D.C.
71. Invited Colloquium, "The Disappearing UI", Computer Science, Brigham Young University, Jan 09, 2014.
72. Invited Speaker, Distinguished Seminar Series, "Using Hands Naturally for Design & Creative Expression" The University of Utah, September 2014.
73. Invited Speaker, "Hands-on Design and Creative Expression in Digital Environments," Epstein Institute Seminar Series, University of Southern California, November 2014.

74. Invited Speaker, "Human in the loop: Towards Dynamic Interactive Representations", TCS Innovation Forum, Chicago, April 2015.
75. Invited Speaker, "Human in the loop: Visually Integrated Decision Making", Wright Dialog with Industry, Dayton, OH, July 2015.
76. Invited Speaker, "Closing the Cognitive Gap in Decision Making Environments," TCS Innovation Forum, 2015 - Silicon Valley, San Jose, CA, November 2015.
77. Invited Keynote Speaker, "The Emergence and Role of Personalization in the Product Lifecycle," The 13th IFIP conference on Product Lifecycle Management, Columbia, South Carolina, July 2016.
78. Lindbergh Distinguished Lecture, "Personalized Design and Fabrication through Human Computer-Interaction and Interfaces", University of Wisconsin, Madison, WI, October 2016.
79. Invited Lecture, Dawn or Doom, "Computers as a Partner! It is All Within the Reach of our Hands." Purdue University, IN, July 2016.
80. Invited Lecture, Smart Lean Ecosystems, "Empowering Cyber-Physical Human-Computer Interaction, Interfaces, and Workflows", DCMME Conference, Purdue University, West Lafayette, IN, September 2016.

RESEARCH AND EDUCATION: GRANTS

Dr. Ramani has secured a total research funding of over \$15.0 million as Principal Investigator. His share of funding has been ~\$10 million. He has been associated with securing over \$20 million of research including those with others as the co-PI. The sponsors include National Science Foundation, Los-Alamos National Labs, Zimmer, Bell Helicopter, Sika Corp., Wabash National, Kemlite, Dow Plastics, Alcoa, Proctor and Gamble, St. Vincent's Hospital, U.S. Army, Defense Logistics Agency, National Center for Manufacturing Sciences, Imaginestics, PLM center at Purdue (Boeing, IBM, EDS, PTC, Siemens, Honda, Satyam), General Electric, Lilly Corporation, and Tata Consulting Services and National Institute of Health.

1. "Micro-fiber Form for Enhancing Through Thickness Conductivity of Ultra-thin Composite Laminates," Los-Alamos National Laboratory, Los-Alamos, New Mexico, \$18,000, July 1992 - January 1993.
2. Co-principal investigator with Prof. K. Kokini, "Video Image Analysis System for Creative Undergraduate Instruction Project," Purdue University Dean's Club, \$4,570 (Dr. Ramani's share), February 1992 - January 1993.
3. "In-Situ Impregnation of Thermoplastic Powder in a Pultrusion Process," Purdue University David Ross Grant, \$19,000, August 1992 - August 1994.
4. co-principal investigator with Profs. C. T. Sun and J. Caruthers, "Intelligent Manufacturing Systems for Thermoplastic Composites," National Science Foundation Engineering Research Center for Intelligent Manufacturing Systems, \$180,476 (Dr. Ramani's share), October 1993-June 1996.
5. "Reduced Fiber Damage in Injection Molding and Extrusion," Dow Plastics and National Science Foundation, Engineering Faculty Internship, \$24,000, July 1993 - January 1994.
6. "In-situ Impregnation of Polymers and Ceramics in Composites Manufacturing," National Science Foundation, Research Initiation Award, \$100,000, August 1993 - September 1996.
7. "Concurrent Design of Polymer Bonding Process and Joint Design," Zimmer Inc., \$24,500, May 1994 - December 1995.
8. "In-situ Impregnation of Polymers and Ceramics in Composites Manufacturing: Research Experiences for Undergraduates," National Science Foundation, \$20,000, January 1995 - January 1997.
9. "In-situ Coating for Prototyping," Bell Helicopter Textron, Inc., \$6,970, January 1995-June 1995.
10. "Preliminary Analysis of Compression Molding Process," Zimmer Inc., \$900, August, 1994- December 1994.

11. "Design of a Rapid Resin Impregnation Gun to Manufacture Flexible Composite "Prepregs" for Net-Shape Manufacturing," Purdue Research Foundation, Summer Faculty Grant, \$5,000, May 1995 - August 1995.
12. "Hot Inert Has Compression Molding Process," Zimmer Inc., \$20,000, January 1995 - August 1995.
13. "Scale-up of Electrostatic Powder Spray Process," Purdue Research Foundation and TRASK, \$15,000, January 1995 - December 1995.
14. "In-situ Joining of Thermoplastics and Their Composites to Metals in Net-shape Processes: Hot-melt, Filament Winding, Injection Molding, Shrink Fitting," National Science Foundation, Research Equipment Grant, \$60,000, July 1995 - June 1996.
15. "In-situ Joining of Thermoplastics and Their Composites to Metals in Net-Shape Processes and an Integrated Design and Processing Education Plan," National Science Foundation CAREER Award, \$300,000, August 1995- August 1999. (\$100,000 of the \$300,000 has been provided by NSF for matching industrial funds, \$25,000 each year. Dr. Ramani has obtained four years of matching increments for \$100,000.)
16. "Induction Heated Compression Molding Process," Zimmer Inc., \$27,000, January 1996 - October 1996.
17. "In-situ Joining in Injection Molding: Research Experiences for Undergraduates," National Science Foundation, \$10,000, January 1996 - January 1997.
18. "Fiber Placed Fiber-Reinforced Thermoplastic (FRTP) Anti-torque Structure," Bell Helicopter Textron Inc., \$6000, June 1996 - August 1996.
19. "High-Rate Thermoplastic Composite Manufacture using Electrostatic Powder Spray Coating and In-situ Filament Winding: Cross-roads to Technology Transfer", Purdue Research Foundation, \$11,040, March 1996 - February 1997.
20. "Test Method Development for Polymer-Ceramic Bonding," \$3,600, November 1996 - January 1997, TP Orthodontics.
21. "Highly Durable Thermoplastic Metal Interfacial Bonding Process," Zimmer Inc., \$30,000, March 1997 - April 1998.
22. "Joining of PMMA to Cobalt Chromium via Injection Molding and Post Induction Joining," Zimmer Inc., \$40,000, April 1997 - October 1997.
23. "Highly Durable Polymer-Metal Interphases for Multiple Industrial Applications," Chang Memorial Fund, \$120,000 (Dr. Ramani's share), Co-PI Xu, X., April 1997 - April 1998.
24. "Joining and Durability of Composite Sheets Bonded to Metal," Sika Corporation, \$42,000, April, 1997 - April 2000.
25. "Joining and Durability of Composite Sheets Bonded to Metal," Kemlite, \$41,000, April 1997 - until April 2000.
26. "A Collaborative Manufacturing Environment for Integrated Design and Processing of Polymer Bonded Systems," National Science Foundation Engineering Research Center for Collaborative Manufacturing Systems, \$18,299, May 1997 - September 1997.
27. "An Integrated High Speed Bonding Process for Thermoplastic Composite to Wood," Wabash National Corporation, \$150,000, October 1997 - November 1998.

28. "Inductively Heated Rivet Insertion Process," Landis & Gyr, \$10,000, December 1997 - January 1998.
29. "How to skin the cat? New Low-Cost High-speed Manufacturing Processes for Thermoplastic based Impact Enclosure," Joslyn Manufacturing a Division of Danahur Corporation, \$170,000, February 1998 - June 2000.
30. "Dynamic Mechanical Characterization of Specialty Foams," \$5,000, August 1997- May 1998.
31. "Dynamic Mechanical Characterization of Specialty Polymer Blends," \$1,500, August 1997- May 1998.
32. "Faculty Study in Second Discipline: Surface Science and Interphase Behavior," \$3,500, August 1998- January 1999.
33. "Producing and Evaluating Durability of New Thermoplastic Polymer/Composite-Metal Interphases for Multiple Industrial Applications," \$105,000 (Dr. Ramani's Share), Co-PI Lauterbach, J., and Kokini, K., May 1998- June 1999.
34. "Web-editor ASME Materials Division," \$2,500, January 1998- January 1999.
35. Alcoa, "Aluminum QE-7 Production Tooling for Injection Molding: A Strategic Polymer, Process and Tooling Analysis," \$95,000, January 1999 - December 1999.
36. TAP Projects, "Various," \$30,000, January 1999 - August 1999.
37. Development of Composite Disc Brake Rotors. JL French Automatic Castings, Inc., \$7,903, June 2002- May 2003.(Dr. Ramani's share \$0, Co-PI)
38. Metal casting Related Information Technology, American Foundry Society, Inc., \$2,000, April 2002 – September 2003.(Dr. Ramani's share \$0, Co-PI)
39. Proctor and Gamble, "Hands-on Innovation in Product and Process Design," \$150,000, June 1999 – June 2002.
40. State of Indiana, "21st Century Computer-Aided Rapid Tooling Design and Digital Manufacture," 1,085,000, August 2000 – September 2002. (PI and Project Director.)
41. Advanced Technology Institute, "Short Run Tooling Advisor," \$452,000 (Co-PI: Dr Ramani's share \$223,734, this funding source is the Defense Logistics Agency), December 2001 – December 2004.
42. National Science Foundation, "ToolingNET: A Partnership for Enhancing the Tooling Industry in Indiana through the use of Information Technology in the Advanced Manufacturing Sector," \$600,000, September 2002 – December 2004. (Dr. Ramani is the PI)
43. State of Indiana ToolingNET: Foundations for a Multiclient Platform for Industrial Tooling Customer-Supplier Resource Management from Concept Through Design and Manufacture: \$1,654,197. (Dr. Ramani is the PI, Project Includes other Co-Pi's and more than 10 Industry Partners)
44. Imaginestics, LLC, "Shape query and representation methods for early design advice." \$133,620. 1/1/05-12/31/06

45. U.S. ARMY, “Complete Reverse: Remanufacturing Legacy Parts, \$1,200,000, 7/1/2005-6/30/2006. (Co-PI with 5 others, Dr. Ramani’s share is \$140,000)
46. National Science Foundation, Sketch-based Computer-Aided Design, \$299,990, 03/15/2006 - 2/28/2009.
47. U.S. ARMY, “Complete Reverse: Remanufacturing Legacy Parts, \$1,200,000, 8/1/2006-8/30/2007. (Co-PI with 5 others, Dr. Ramani’s share is \$140,000)
48. National Center for Manufacturing Sciences, “Dynamic Shape Advice for Casting, \$90,000, 1/1/07 – 6/1/08.
49. Imaginestics, Supply Chain Optimization and Product Explorer (SCOPE), \$133,000, 8/1/06 – 8/30/07.
50. St. Vincents Hospital (Ascension Group), Decomposition based Interaction for Craniofacial Surgery, \$50,000, 8/1/07 – 6/30/08. (with Bill Peine)
51. National Science Foundation, GOALI Supplement, Sketch Understanding, \$75,000, 1/1/08 – 8/30/08. (Partner with PARC-Palo Alto Research Center – formerly Xerox PARC).
52. Product Life-Cycle Management Consortium, Computer Support for Conceptual Design, \$60,000, 8/1/07 – 8/1/08. (IBM, Boeing, EDS, Siemens, Satyam).
53. Product Life-Cycle Management Consortium, Computer Support for Conceptual Design, \$60,000, 1/1/10 – 8/1/10.
54. National Institute of Health, Surface Shape Based Screening of Protein Structure Databases, \$1,500,000 (Co-PI with one other PI, Dr. Ramani’s share \$750,000). 8/1/2005 – 7/31/2010.
55. General Electric, From Point Clouds to Parameterized Models, 8/1/08 – 12/30/10, \$240,000.
56. National Science Foundation, "3DHub: A Geometric Kernel and Infrastructure for Community-based Rapid Application Development and Deployment", Recommended for Award, 4/1/09 – 4/31/12, \$600,000. (PI, with Mark Lundstrom, George Adams, Leah Jamieson, Ramani’s share \$480 K).
57. National Science Foundation, “Enabling Project-Based Learning of Ecodesign: Method Development and Curriculum Reform,” Innovations in Engineering Education, Curriculum, and Infrastructure (IEECI), \$150 K, 8/1/09 – 7/31/12. (with F. Zhao)
58. Purdue University, E2020 Seed Grant, \$40 K, “Enabling Innovation through Design of Student Projects,” \$40,000 (4/1/10 – 12/31/10) (PI, with Kisselburgh, L., Visser, S., Cipra, R., Clement, N., Handwerker, C., and Hirleman, D.)
59. National Science Foundation, IGERT: Global Traineeship in Sustainable Electronics, NSF, 07/01/2012-06/30/2017, \$3,373,674. (Co-PI, with Handwerker, C., Hua, I., Iyer, A., Hosur, M.)
60. National Science Foundation, “Integration of Design and Manufacturing for Sustainability,” \$410,000, Materials Processing and Manufacturing/Design Innovation. (Pi, with Zhao, F., and Sutherland, J.)

61. NSF, Eager: A Prototype Network Architecture For Advanced Manufacturing Built With Manufacturinghub.org And Us Ignite!, \$100,000 10/01/2011 - 09/30/2012. (Co-PI with Adams, G.)
62. A-DRIVE: Affordable Design by Realistic Interactions for Virtual Explorations, CMMI, 09/01/2012-2015; \$415,164. (Includes a GOALI supplement of \$75 K)
63. Integrating Design and Manufacturing Considerations Towards Sustainable Decision Making (Principal Investigator: Karthik Ramani; Co-Principal Investigator: John Sutherland, Fu Zhao) CMMI Award Date:05/01/2011-2014, 418,284.
64. EAGER: skWiki - A Sketch-based Wiki (Principal Investigator:Niklas Elmqvist; Co-Principal Investigator: Karthik Ramani; IIS Award Date:08/01/2012-1014; Award Amount: \$200,000.
65. DIP: V-ICED Visually-Integrated Cyber Exploratorium for Design, Principal Investigator: Karthik Ramani; Co-Principal Investigator: Niklas Elmqvist, Lorraine Kisselburgh; Kylie Pepler (Indiana University), IIS Award Date:10/01/2012-2015; Award Amount: \$750,000.
66. I-Corps: Zero-UI: Translation of Purdue Gesture-based Creative Interaction Technologies into the Real World Award Number:1243868; Principal Investigator:Karthik Ramani; Mentor: ZeroUI; IIP Award Date:07/01/2012; Award Amount: \$50,000.
67. IDEA-Pen: Interactive Design and Analysis through a Pen-Based Interface, Award Number: 1245780; Principal Investigator:Karthik Ramani; NSF Organization: DUE Award Date: 09/15/2013; Award Amount: \$200,000.
68. CPS: Synergy: Foundations of Cyber-Physical Infrastructure for Creative Design and Making of Cyber-physical Products, Award Number: 1329979; Purdue University; NSF Organization: CMMI Award Date: 09/01/2013; Award Amount: \$1,000,000 (CoPI with Jitesh Panchal and Michael Atallah)
69. AIR Option 1: Technology Translation Gesture-based free form shape modeling, Award Number: 1312167; Principal Investigator: Karthik Ramani; NSF Organization: IIP Award Date:05/15/2013; Award Amount: \$154,500
70. Visually Integrated Decision Models for Collaborative Design Processes using Natural Interfaces, Tata Consulting Services, Karthik Ramani. 1/1/2014 – 12/31/2017, \$396,000.
71. UNS: Advancing Environmental Sustainability through Innovative Design and Operation of Digital Manufacturing Equipment, Award Number 1512217, NSF CBET, Award Date: 5/1/2015 – 4/30/2019, \$499,000.
72. CHS: Small: C3DaR- Collection, Creation, and Collaboration for Engineering Design and Reflection, Award Number 1422341, NSF, 9/1/2014-8/31/2017, Award Amount to Purdue University: \$500,000.
73. STTR Phase I: Dynamic Robust Hand Model for Gesture Intent Recognition, 1549864, NSF, 1/1/2016 – 12/31/2016, Award Amount to Purdue University: \$75,000
74. PFI:BIC MAKERPAD: Cognitively Intuitive Shape-Modeling and Design Interface enabling a Distributed Personalized Fabrication Network. NSF, 9/1/2016 – 8/31/2019, Award Amount; \$1,000,000.

75. NRI: Towards Dexterous Micromanipulation and Assembly. NSF, 9/1/2016 – 8/31/2019, Award Amount; \$1,000,000.
76. Towards the future of an augmented reality environment, General Electric, 8/1/2016 – 12,31/2017, \$200,000.
77. SensePack, Lilly Corporation, 8/1/2016 – 12/31/2017, \$100,000.
78. Mobile Mid-Air Interactive Systems and Design Workflows for Creative 3D Shape Modeling, Award Number: 1538868; 09/01/2015 – 08/31/2017; Award Amount: \$200,000.00;
79. EAGER/Collaborative Research/Cyber Manufacturing: Cyber-Manufacturing Systems for Open Product Realization Award Number: 1547134; Start Date:09/01/2015 – 08/31/2017; Award Amount: \$120,000.00.

Engineering Professional Education:

Professor Ramani's course on Product and Process Design (ME553) is a popular and award winning engineering professional education course. The course enrollments have been on the average about 70 students for each offering over the past decade. This brings the total income to the University to ~\$2.5 million and the School of Mechanical Engineering to > ~\$250 k.

Senior Personnel:

1. National Science Foundation, \$2,530,874, "IGERT: Innovation Realization Laboratory: Integrating Science and Engineering with Economics and Management." PI: Dan J. Kovenock (one of the senior personnel named and involved in the proposal preparation).
2. National Science Foundation, \$862,011, "MRI: Acquisition of Equipment for Purdue Envision Center for Data Perceptualization." PI: Christoph Hoffmann. (one of the senior personnel named in the proposal).

EDUCATIONAL ACTIVITIES

My Dissertations:

Ramani, K., "Die-Less Forming of Thermoplastic-Matrix Continuous-Fiber Composite Materials," Doctoral Dissertation, Stanford University, June 1991 (Advisor: A.K. Miller, Materials Science; Co-Advisor: M.R. Cutkosky, Design Division, Mechanical Engineering).

Ramani, K., "Off-line Programming and Calibration of Robots," Master's Dissertation, Ohio State University, June 1987 (Advisor: K. J. Waldron, Past Head, Mechanical Engineering).

Thesis Supervision

Ph.D. Students

1. Mark S. Duvall, Ph.D., "In-situ Composite Manufacture using an Electrostatic Powder Spray Process and Filament Winding," January, 1998. (Director, Electric Transportation, Electric Power Research Institute (EPRI)).
2. Narasinha Parasnis, Ph.D., "Compression Molding Simulation of UHMWPE," August, 1998. (Becton Dickinson, Past: Manager, Bayer Healthcare)
3. Borgaonkar H., Ph.D., "Processing and Rheology in Thermoplastic and Composites," August, 1998. (Manager, American Medical Systems; Past Principal Engineer, Boston Scientific; Senior Engineer, Guidant)
4. Natraj Iyer, Ph. D., "Three Dimensional Shape Search," 2004. (Engineering Manager, Stryker, before he passed away)
5. Chan Woo Chung, Ph. D., "Distributed Product Lifecycle Informatics Agents," December 2004. (Samsung)
6. Kuiyang Lou, Ph.D., "An Intelligent Three-Dimensional Shape Search System: Effectiveness and Efficiency," May 2004. (General Electric)
7. Alexander Lee, Ph.D., "Wire-Path™: Modular and Flexible Tooling for Rapid Product Development," December 2005. (Schlumberger)
8. Wenping Zhao, Ph.D., "Thermoplastic Composite Bonding to Metals in Filament Winding and Injection Molding," June, 1999. (United Technologies Research Center)
9. Chongchen Xu, Ph.D., "Durable Thermoplastic-Metal Interphases," August, 2001. (IBM) [Co-Advised with Professor Siegmund]
10. Dai Heming, Ph.D., "Process Design for Continuous Thermoplastic Composite-Wood Bonding," January, 2001. (Tyco International)
11. Jun-Ki Choi, Ph.D., "Environmental Considerations in Early Product Design," June, 2006. (Assistant Professor University of Dayton)

12. Jayanti Subramaniam, Ph.D., "Clustering Using Shape Similarity for Large Engineering Repositories," June, 2006. (Division Manager, Third Wave Systems, Inc.)
13. Zhanjun Li, PhD, "Ontology-based Shape Retrieval," December, 2007. Suyu Hou, Ph.D., "Intelligent Interfaces for Shape Searching," August 2007. (St. Jude Medical)
14. Min Liu, Ph.D., "Reverse Engineering using Faced Models and Feature Search," April, April 2003. (Assistant Professor, Tsinghua University)
15. Suyu Hou, Ph.D., "A Framework for Engineering Shape Search with Semantics," April 2007. (General Electric)
16. Srikanth Devanathan, Ph.D., "Large Scale Product Architectural Optimization using Physics Based Configuration, April, 2009. (Simulia, Dassault)
17. Noel Titus, Ph.D., "Explanation Systems for Conceptual Design", December 2008. (Becton Dickinson, Biomedical Design)
18. Yagna Kalyanaraman, Ph.D., "Search and Navigation in Large Engineering Repositories, December 2008. (Dreamworks Animation)
19. Fang Yi, "Clustering Protein Structures and Complexes," October 2011. (Assistant Professor, Electrical and Computer Engineering, New York University)
20. Sundar Murugappan, Ph.D. "Sketch Parameterization and its applications," October 2012. (General Electric, Industrial Internet Initiative, San Ramon, CA)
21. William Benjamin, Ph.D., "Sketch based Design," August 2014. (Nokia HCI Group/Here).
22. Senthil Chandrasegaran, Ph.D., "Working knowledge Model and Visual Tools" August 2015. (Post doctoral research associate, University of Maryland)
23. Cecil Piya, Ph.D., "Combining 2D and 3D spatial interactions using gestures and constraints," May 2016. (Dassault, Solid Works)
24. William Bernstein, Ph.D., "Design for Sustainability: Methodology Development for Early Design Stages," December 2015. [Joint Student with Prof. Fu Zhao]
25. Devarajan Ramanujan, Ph.D., "Function-Impact and Function-Process Methods with Uncertainties," December 2015. (Pot Doctoral Researcher MIT)
26. Fnu Vinayak, Ph.D., "Gesture based shape modeling of free form shapes," December 2015. (Assistant Professor, Texas A&M University)
27. Wei Gao, Ph.D., "Kinetogami: Folded Metamorphic Design," December 2015. (Robotics Corp.)
28. Joran Booth, Ph.D., "Design Abstraction Models through Understanding how things work and sketching," July 2016. (Co-Advisor with Professor Reid) (Post Doctoral Associate, Yale University)
29. Ayan Sinha, Ph.D., "Muti-scale network and shape analysis using graph-based and learnt representations," August 2016. (Post Doctoral Researcher MIT)
30. Sujin Jang, Ph.D., "Spatial Analytistics for gesture based modeling," Started October 2012. (Candidate)

31. Ke Huo, Ph.D., “Tangibles and User Interfaces,” Started August 2013. (Candidate)
32. Chiho Choi, Ph.D., “Dynamic Tracking of Hands”, Started August 2013. ((Electrical and Computer Engineering, Candidate)
33. Sang Ho Yoon, Ph.D., “Tangible Interactions with Mobile Hand-Held”, Started August 2013. (Candidate)
34. Yuanzhi Cao, Ph.D., “Augmented Design and Fabrication Interfaces,” Started August 2015. (Candidate)
35. Sang Pil Kim, Ph.D.” Dynamic Tracking of Hand-Held Physical Objects,” Started January 2017 (Electrical and Compute Engineering, candidate)
36. Ana Maria Villanueva, “Human Object Interaction: Multi-Modal Data Analysis,” Started August 2016.
37. Terrell Glenn, “Design-Build-Play: Designing and Realizing Stories through Robotic Plays,” August 2016.
38. Chinning Chen, “Deep Visual Search and Synthesis,” August 2016. (Electrical and Computer Engineering)

Post Doctoral Researchers and Visiting Scholar Mentoring

1. Dr. Kumar Ganesan, “Processing of New Dissimilar Polymeric Interphases: Polymer-Polymer and Polymer-Polymeric Composite Interphases,” April, 1997 – August, 2000. (International Paper)
2. Dr. Thais H. Sydenstricker Costa, “Searching Large Material Databases based on Process Needs,” Universidade Federal do Parana – UFPR, Brazil.
3. Dr. Kuiyang Lou, “Scaling up a Reconfigurable Search System,” January, 2004 – January, 2005. (General Electric, Apple since 2016)
4. Dr. Mimi Boutin, “Weighted Graphs for Shape Representations,” April 2005 – August 2005. (Associate Professor, Electrical and Computer Engineering, Purdue University)
5. Dr. Pu Jiantao, “New Methods for Decomposing, Representing and Searching,” August 2004 – December 2005. (Associate Professor, University of Pittsburgh)
6. Dr. Yu Shen Liu, “Protein Search Algorithms,” August 2006 – August 2009. (Associate Professor, Tsinghua University).
7. Dr. M. Ramanathan, “New Decomposition Methods of 3D objects Using Morse Theory,” August 2006 – August 2008. (Associate Professor, Indian Institute of Technology, Madras)
8. Dr. Subramani Sellamani, “Topo-Geometric Methods for Decomposition using Virtual Scanning,” 2006-2009.
9. Dr. Dongxing Cao, “Computational Support for Early Design,” February 2009 – February 2010. (Visiting Professor from Heibei University of Technology)
10. Dr. Ramy Harik, “Heat Kernel based Methods,” 2010 -2011. [Full Bright International Scholar] (Assistant Professor University of South Carolina)

39. Dr. Will Yunbo Wang, “Sketch-based Normal Operations for Reconstruction,” August 2014 - Present.
40. Dr. Jing Bai, “Interaction for fabrication with metal wires,” August 2015 – August 2016. (Assistant Professor in China)

A number of graduate and undergraduate students have taken independent study project courses (ME 497 and ME 597) directed by Dr. Ramani. Many of them utilized his laboratory facilities and contributed to his research projects. The indicated undergraduates were supported through a National Science Foundation Research Experiences for Undergraduates.

M.S. Students

1. Mike Smith, M.S., “Thermoplastic Composite Bonding to Wood: Manufacturing Process and Machine Design”, June, 1999.
2. Verhoff Jon, M.S., “Durability of Thermoset Composite-Steel and Aluminum Interphases,” August, 1999. (Owens Corning)
3. Iyer Natraj, M.S., “High Performance Aluminum Alloy Production Tooling for Injection Molding: Mold and Process Design,” April, 2000.
4. James Nerone, M.S., “High Performance Aluminum Alloy Production Tooling for Injection Molding: Mold and Process Design,” April, 2000.
5. Abhishek Agarwal, M.S., “CADDAC: Multi-Client Collaborative Shape Design System with Server-Based Geometry Kernel,” (Jointly supervised with Professor Christoph Hoffman, Computer Science Department), August, 2002. (MBA Wharton, Consultant at Health and Life Sciences at Accenture)
6. Shrimanth Uppuluri, M.S., “Laser Micro-Part Manufacture,” (Jointly supervised by Professor Xu), December, 2002.
7. Karthik Sitaram, M.S., “A Tooling Advisory System,” 2003. (Industrial Engineering). (Oracle, India)
8. Aliasgar Ganiji, M.S., “Sketch-Based Design Interface,” 2003. (Software developer, Epics Systems Corporation)
9. Mahendra Babu, M.S., Computer Science, , Project: “ToolingNET System Architecture: Information Flow,” 2003. (Computer Science, Non Thesis, Co-Advisor Chris Hoffmann) (Senior Software Engineering, Imaginestics)
10. Nikhil Joglekar, M.S., “Engineering Advisory System Architecture: Integrating Net Shape Part Geometry,” May 2004. (Parametric Technology Corporation/PTC).
11. Vineet Agarwal, M.S., “ToolingNET: Database Architecture,” 2003.
12. Ajoy Radhakrishnan Raj, M.S., “ToolingNET: System Architecture: Customer-Supplier Interactions,” 2003.
13. Joon Hong, M.S., “Net Shape Part Tooling Feature Recognition for Early Design Advice,” May 2004. (Samsung)

14. Harshal Patwardhan, M.S., "Managing Product Interfaces in Distributed Enterprises," 2004. (Industrial Engineering)
15. Manish Agarwal, M.S., "Signature based representation and similarity searching for protein binding sites," December 2004. (Co-Advised By Professor Kihara) (Founder PicsSquare)
16. Srinivasan Tiruvekere, M.S., "Geometric Methods and Algorithms for Binding Site Identification and Alignment in Proteins," August 2004. (Amazon)
17. Christopher Hoyle, M.S., "Manufacture of Thermoplastic Powder Impregnated Composites," March, 1994. (Manager Motorola/Ph.D. NWU)
18. Aparna Vaidyanathan, M.S., "Microstructure based Determination of Thermal Conductivity of Composite Materials," May, 1995. (MBA University of Chicago, Consultant ZS Associates)
19. John Tagle, M.S., "Characterization of Poly(EtherKetoneEtherKetoneKetone) (PEKEKK) as a Thermoplastic Adhesive in Metal-to Metal Joints," December, 1995. (Gore Tex).
20. Daniel E. Woolard, M.S., "Design and Development of an Electrostatic Powder Spray Process for Manufacturing Fiber Reinforced Thermoplastic Composites," December, 1995. (Lexmark)
21. Cynthia Ingram, M.S., "Thin Film Thermoplastic Joining with Induction Heating and Anodization," August, 1996. (Lexmark)
22. Keith Miller, M.S., "Inductively Heated Compression Molding Process and Tooling," August, 1997. (Applied Materials)
23. Bill Weidner, M.S., "Durability Issues and Surface Modifications in Thermoplastic Bonding of Metals," December, 1997.
24. Brendan Moriarty, M.S., "In-situ Joining of Thermoplastics to Metals in Injection Molding," December, 1997.
25. Vinayak Labade, M.S., "Classification of Large Shape Databases," 2006. (Business Intelligence Consultant at Fair Isaac)
26. Kaushik Mantri, M.S., "Supply chain integration in early design," 2006. (Ernst and Young)
27. Amit Jain, M.S., "Indexing 3D parts using view-based methods," 2008. (Yahoo)
28. Manish Goyal, M.S., "Robust Determination of Salient Loops on Meshed Objects," started August 2008.
29. Luis Elizondo, M.S., "Innovation Dimensions in Design," September 2010.
30. Elkin Toborda, M.S., "Sketch-based design thinking," October 2011.
31. Jasjeet Singh Seehra, M.S. "Handimate," July 2014.
32. Vinh Nguyen, M.S., "Gestronics: gesture controlled electronics," July 2014.
33. Ansh Verma, M.M., "Handimate," August 2015.
34. Yanke Tan, Gestural Interfaces for Bicycles, 2017.

35. Tarun Thomas George, Studies on: Design-Build-Play for Children, 2017.

Graduate Student Projects Directed

1. Brian Hood, ME 597 Project, "Polymer Bonding to Metals," Spring 1993.
2. Doug Schneider, ME 597 Project, "Anodization to Improve Thermoplastic-Metal Bond Durability," Summer 1994.
3. Vincent Lenoir, ME 597 Project, "In-situ Measurement of Displacement during Polymer Bonding," Fall 1994.
4. David Stone, ME 597 Project, "Accelerated Testing of Ultra-High-Molecular-Weight-Polyethylene," Fall 1994.
5. David Cole, ME 597 Project, "Advanced Design for Manufacture," Spring 1995.
6. Dan Vandersluis, ME 597 Project, "Parametric Design," Spring 1995.
7. Charles Adam, ME 597 Project, "Solid State Processing," Fall 1995.
8. Kareem Rasmy, ME597 Project, "Polymer Bonded Systems," Summer 1997.
9. Cory Sauls, ME597 Project, "Manufacturing Polymeric Systems," Fall 1997.
10. Eric Hernandez, ME597 Project, "Manufacturing Polymeric Systems," Fall 1997.
11. Charlie Baxter, ME597 Project, "Advanced Computer-Aided Design," Fall 1997.
12. Bayyari, M. K., ME597 Project, "Climbing Wheel-chair Design," Fall 2000.
13. Henry Robinson, ME597 Project, "Climbing Wheel-chair Design," Fall 2000.
14. Anand Raj Krishnamurthy, ME587 Project, "Stair Descending Wheel Chair," Fall 2002, Spring 2003.
15. Srivatsan, ME597 Project, "Haptics Review for Synthetic Environments," Fall 2002.
16. Tanuj Siddharth, ME597 Project, Tangible Interfaces, 2014.
17. Drupad, Gesture Glove, 2015.
18. Adil Can Dai, ME597 Project, Animatronics, 2016.
19. Diogo Nazetta, ME597 Project, Working with Cardbaord, 2017.
20. Luis, ME597 Project, Cardboardization, 2017.

Professional Engineering Education

He has also been on the chair of the advisory committee of over 300 students in the engineering professional education plans (M.S.E. Master of Science in Engineering) of distance students since 1998. A short list is included below.

Andrew Brown, Brian V Castillo, Reena Datta, Genevieve Fabela, Alfred E Green, Eric E Hallberg, Ryan Harrington, Matthew Johnston, Darla Kroeger, Anthony Lyscio, John F Moore, Jeanette Pfefferle, Kevin T Quinn, Randal E Riebel, Daniel E Rivera, John J Salvato, Marco Scodeller, Gheorghe Serbanescu, Johnny Williford, Phillip C Storck, Charles B Totten, Jason C Treece, Patrick Webster, Robert J Joseph, Christine Kong, Robert D Sharpe, Scott Wanamaker.

Undergraduate Student Projects

1. Mike Tryfonidis, ME 497 Project, "Impregnation of Thermoplastic Powder in a Filament Winding Process," Spring 1992.
2. Ku-Kuang, ME 497 Project, "Data Acquisition for Composites Manufacture using Lab-View," Fall 1992.
3. Fouzi Al-Essa, ME 497 Project, "Development of Micro-fiber Forms for Enhanced Properties," Fall 1992.
4. Mike Gaines, ME 497 Project, "Use of CAD Techniques for the Design of the Solar Car," Spring 1993.
5. Matthew Gagliardi, ME 497 Project, "Composite Machine Design," Spring 1993.
6. Dean Geiger, ME 497 Project, "Shape Optimization Using Parametric Design Software and Finite Element Method," Fall 1993.
7. David Offenberg, ME 497 Project, "Design and Manufacture of a Die to Process Long Glass Fiber Tapes," Fall 1993.
8. Tim Stone, ME 497, "Parametric Design and Analysis using ANSYS and Pro/Engineer," Fall 1993.
9. Mark Bays, ME 497 Project, "Design and Fabrication of In-situ Consolidation Device," Fall 1994. (NSF-REU)
10. Frederic Caillat, ME 497 Project, "Design, Fabrication of In-situ Consolidation Device," Fall 1994. (NSF-REU)
11. Mark Bays, ME 497 Project, "Processing using Electrostatic Spray and In-situ Consolidation Device," Fall 1995. (NSF-REU)
12. Frederic Caillat, ME 497 Project, "Processing using Electrostatic Spray and In-situ Consolidation Device," Fall 1995. (NSF-REU)
13. Chris Stringer, ME 497 Project, "Injection Mold Design and Manufacture for In-situ Joining," Spring 1995. (NSF-REU)
14. Nana Tzeng, ME 497 Project, "Design of Chopper for Coated Tows and Injection Molding," Fall 1996. (NSF-REU)
15. Ramakrishna Arvind, ME497 Project, "Computer-Aided Industrial Design," Fall 1997.
16. Eddie Chou, ME497 Project, "Inductively Heated Rivet Insertion and Testing," Fall 1997.
17. Jon Anderson, ME497 Project, "Inductively Heated Rivet Insertion and Testing," Fall 1997.
18. Felipe Roman, MARC/AIM Student, "Rapid Prototyped Tooling for Injection Molding," Summer 1998.

19. Jason Todd Bauer, “Rapid Prototyping for Reverse Engineering,” Spring 1998.
20. Barret, ME497, “Prototyping Experiments for Injection Molding Tooling,” Summer 1998.
21. Krishnamurthy., P., “Process Design,” Spring 1999.
22. Brian Joseph Butrico, “Product Prototyping,” Fall 1999.
23. Melvin Kimhoong Lee, “Computer-Aided Design,” Fall 1999.
24. Joule Ouyong Sze, “Polymeric Tooling Design,” Fall 1999.
25. Halil Berberoglu, ME498 Honors Thesis, “Micro-part Manufacture: Preliminary Prototyping,” Spring 1999 – Fall 1999.
26. Balamurugan Ganesan, “Advanced CAD,” Spring 2000.
27. Matt Holmes, ME Honors Thesis, “Rapid Tooling Design,” started Fall 2001.
28. The Jun, ME Honors Thesis, “Rapid Tooling Cases Studies,” started Fall 2001.
29. Hui, ME Honors Thesis, “Micro-Mold and Part Prototyping,” started Fall 2001. (Jointly supervised by Professor Xu)

Professional Organization Student Supervision:

Professor Ramani was the founder and faculty advisor for the Society for the Advancement of Materials and Process Engineering (SAMPE) student chapter at Purdue University. The Purdue SAMPE chapter was the largest chapter in the country with a membership of 50 students from several schools of engineering (ME, MSE, CHE, IE, AA) and technology. SAMPE has broad goals that serve graduates and undergraduates to expose them to materials and process engineering through various activities. Such activities have included industrial seminars (Intel, Zimmer, Allied Signal, EG Composites, etc.), technical presentations (Rapid Prototyping, Effective Technical Presentations, Unusual Behavior of Composites, Chargeable Battery Technology, etc.) and industrial visits. SAMPE’s homepage presented job opportunities, useful material processing links, as well as courses offered by the various schools in Purdue that are related to materials processing. SAMPE had also successfully organized a design competition through sponsorship with industry (Better Way Products). The Undergraduate Awards in all the Schools of Engineering for SAMPE students in the yearly national competition has totaled over \$10,000. Sampe has since been working with aviation technology leadership at Purdue. He also has been supervising senior design projects for teams in ME463 since 2011. One of the teams mentored by him won the Malott Innovation Award. He is also an advisor for the Purdue Makers club. He mentored the team (S3D) that won the business plan for Indiana SoyBean competition. He also mentored two winning teams for the Burton Morgan Business plan competition from his research group.

Courses Designed To Help Students Learn

Dr. Ramani has a strong track record integrating learning and discovery. Over the years, he has received multiple teaching awards, has published in engineering education and learning sciences areas, and has spoken at multiple engineering education settings including a distinguished lecture at NSF in 2014. He developed new courses such as Computer-Aided Design and Prototyping

(ME444), Product and Process Design (ME553), and co-developed Intellectual Property (ME554). These courses draw upon his unique blend of expertise in product design, manufacturing processes, intellectual property and information science and technologies. These technical electives have been a core part of the Purdue University curriculum well over the past decade. Both are award-winning courses with consistently high ranking of students.

Current Courses:

Computer-Aided Design and Prototyping (70 students each semester, 1993-Present)
Product Design and Innovation (100+ students yearly, 70 off-campus, 2000-Present)

Previous courses:

Composites and Polymer Processing (with laboratory development) (1993-2000)
Introduction to Design (Sophomore Required Course 1998)
Intellectual Property (Initiated and now taught by John McNett)

SERVICE

PROFESSIONAL

- International Editorial Board, Journal of Computer-Aided Design, Elsevier. (2005 – Present)
- International Editorial Board, Journal of Mechanical Design, ASME. (2008 – 2014)
- Program Committee, Association of Computing Machinery, Solid and Physical Modeling Symposium [ACM-SPM] (2006-present)
- International Editorial Board, Concurrent Engineering Research and Applications (2006 – Present)
- International Editorial Advisory: Computer-Aided Design and Applications (2010 – Present)
- International Editorial Advisory Board: Tools and Methods for Competitive Engineering (TMCE 2006 - 2009)
- International Editorial Advisory Board: Computer-Aided Design and Applications (2006-2009)
- Program Committee, IEEE, Shape Modeling International [IEEE_SMI] (2006-2009)
- Program Committee, Sketch-based Interfaces and Modeling [SBIM] (2006-2009)
- International Advisory Board: European Configuration Workshop (ECAI 2006)
- International Advisory Board; Conference on Product Lifecycle Management (PLM 06)
- Guest Editor, Computer Aided Design, Special Issue on Computer Support for Conceptual Design, 2008.
- Guest Editor, Journal of Advanced Engineering Informatics, Special Issue on Design Informatics, 2009. [with Professor Liu, Mc Mohan and Schaefer]
- Guest Editor, ASME Journal of Mechanical Design, Special Issue on Sustainable Design, 2009. [with Professor Skerlos and Slocum]
- American Society of Mechanical Engineers, Computers in Engineering and Design Engineering Technical Conferences, Organizing Committee, 2004 – 2006.
- Chair: American Society of Mechanical Engineers, Materials Division, Polymer Committee, 1997-2001
- Chair: Internet-Aided Design, Manufacturing and E-Commerce Technical Committee, 2004– 2006. In charge of organizing a minimum of 4 sessions each year.
- Advisor, NASA, Digital Space and Universal Modeling Repository, 2005- 2007.
- Advisor, National Institute of Health, High Performance Computation for 3D Medical Imaging and Diagnostics, 2006.
- Appointed to the National Science Foundation Committee of Visitors to oversee and advise the of Small Business Innovative Research program (SBIR), 2006-2008
- Advisory Board to National Science Foundation – Small Business Innovation Research Program, Industrial Innovation and Partnerships (IIP), Subcommittee to the Engineering Advisory Committee, 2007-present
- Advisory Board to National Science Foundation – Industrial Innovation and Partnerships (IIP), Subcommittee to examine Industry University Relationships, 2007-2008.
- Conference Chair, U.S.A., Product Lifecycle Management, Seoul, Korea, July 2008.

- Organizing Committee, Association of Computing Machinery (ACM), Solid and Physical Modeling (ACM-SPM), 2006.
- Organizing Committee, Association of Computing Machinery, Solid and Physical Modeling (ACM-SPM), 2007.
- Organizing Committee, Association of Computing Machinery, Solid and Physical Modeling (ACM-SPM), 2008.
- Organizing Committee, IEEE, Solid Modeling International (IEEE-SMI), 2008.
- Mini-Symposium Organizer, Association of Computing Machinery (ACM), Bio-Geometry, University of Stony Brooke, 2007.

Technical Sessions Organizer and Chairing:

He has been extensively involved in professional societies in leadership roles and more recently serving at the national level advisory boards. His involvement with the American Society of Mechanical Engineers has been extensive. He has served on the Polymer processing group of the Materials Division as chair and conducted several symposia. In addition in the past 5 years he served in the Computers and Information in Engineering Division, organizing several sessions through his chairmanship of the Internet-Aided Design, Manufacturing and Commerce committee. He then continued his active involvement in ASME International Design Engineering Technical Conferences in Computer-Aided Product and Process Design (CAPPD), Design for Manufacturing and Lifecycle (DFMLC), Systems Engineering & Information and Knowledge Management (SEIKM) Technical Committee and hence more broadly through the computers and information in engineering division (CIE). He co-organized several sessions in Design Informatics from 2009-13. He also served on the executive committee for CIE 2010-11 in his quest to make broader contributions to ASME. He also contributed to the design automation committee by bridging the gaps created between CIE and DAC divisions. He has been involved through organization of several symposia and conferences in IDETC.

His major recent contributions were in helping organize several sessions in the sustainable design and manufacturing areas, bringing together researchers outside the community into ASME. He also co-organized a special issue in ASME Journal of Mechanical Design in a synchronous manner actively help creating an entire community in ASME-IDETC that is growing. This special issue with co-organizers (Skerlos and Slocum) has made ASME JMD known for its proactive involvement in sustainable design area.

- Symposium Organizer, 15th Design for Manufacturing and Lifecycle Conference, Symposium on Sustainable Design, with ASME IDETC'2010.
- Symposium Organizer, CIE-16: Design Informatics: Advances of Intelligent Information Processing and Knowledge Management in Engineering Design, a special session with the 30th Computers and Information in Engineering Conference (CIE), with ASME IDETC'2010-2013. (continuing to co-organize with Ying Liu as lead)
- Symposium Organizer, 29th Computers and Information in Engineering (CIE-18), Design Informatics: Advances of Intelligent Information Processing and Knowledge Management in Engineering Design, with ASME IDETC'2009.

- ASME, Design Engineering Technical Conference, Computers and Information in Engineering, Philadelphia, PA, 2006. (session chair 2 sessions)
- ASME, Design Engineering Technical Conference, Computers and Information in Engineering, Philadelphia, PA, 2006. (organizing 4 sessions)
- ASME, Design Engineering Technical Conference, Computers and Information in Engineering, Long Beach, CA, 2005. (organized 4 sessions)
- ASME, Design Engineering Technical Conference, Computers and Information in Engineering, Salt Lake City, Utah, 2004. (organized 4 sessions)
- ASME, Design Engineering Technical Conference, Computers and Information in Engineering, Chicago, IL, 2003.
- ASME, Materials Division, Polymeric Systems, Nashville, TN, ASME Materials Division, November, 1999.
- ASME, Materials Division, Composites and Functionally Graded Materials, International Mechanical Engineering Congress and Exposition, Dallas, Texas, ASME Materials Division, November, 1997.
- ASME, Materials Division, Processing, Design and Performance of Composite Materials, Proceedings of the 1994 International Mechanical Engineering Conference and Exposition, Chicago, Illinois, ASME Materials Division, November, 1994.
- Symposium Co-Chair, Symposium on Intelligent Processing of Materials, ASME International Mechanical Engineering Conference and Exposition, Chicago, Illinois, November 1995.
- Symposium Chair, Symposium on Product Realization Through Processing, ASME International Mechanical Engineering Conference and Exposition, Atlanta, Georgia, November 1996.
- Symposium Co-Organizer, "Processing, Design and Performance of Composite Materials," ASME International Mechanical Engineering Congress and Exposition, Chicago, Illinois, November 1994.
- Lead Symposium Organizer, "Dissimilar Material Systems: Manufacturing Processes, Design and Mechanics," ASME International Mechanical Engineering Congress and Exposition, Dallas, November, 1997.
- Symposium Co-organizer, "Polymeric Systems", ASME International Mechanical Engineering Congress and Exposition, Nashville, Tennessee, November 1999.

Reviewer:

As a National Science Foundation reviewer he has served over 50 panels including Design and Manufacturing Division, Information Technology Research panels, Career Award Panel, and CISE Medium ITR Panel, CISE Information and Intelligent Systems Panels, Partnership for Innovation Panels (PFI), design and innovation panels.

Computer-Aided Design
ASME Journal of Mechanical Design
ASME Journal of Computers and Information Sciences in Engineering
ACM Transactions of Graphics
ACM Solid and Physical Modeling
Computers and Graphics
IEEE Transactions on Automation Science and Engineering
Pattern Recognition
Sketch-Based Modeling
Computer Aided Design and Application
Product Lifecycle Management
Artificial Intelligence in Engineering Design and Manufacture (AIEDAM)
Polymer Composites, Polymer Engineering and Science, Composites Part A: Applied
Science and Manufacturing, Journal of Composite Materials
ASME Journal of Engineering for Industry, ASME Journal of Applied Mechanics
IEEE Transactions on Industrial Applications, Polymer and Polymer Composites
Journal of Electrostatic Technology

Major Editorial and Advisory Boards

Editorial Board, Computer-Aided Design (CAD), Elsevier	2005-2015
Editorial Board, Journal of Mechanical Design (ASME-JMD)	2008-2014
Executive Committee, ASME Computers and Information in Engineering	2011-2012
Advisory Board, NSF, Small Business Innovation Research (SBIR)	2007-Present
NSF – Sub-committee on Industry University Partnerships	2007-08
NSF - Sub-committee on Innovation Metrics	2009-10
NSF – Sub-committee on Entrepreneurial Education	2013 - Present
Committee of Visitors NSF, Industrial Innovation and Partnerships	2006-07

He played an important role in development frameworks and performing a gap analysis for the flow of knowledge from early discovery through small business innovation programs. In this capacity he also served on a sub-committee on University Industry Partnerships. He served on a sub-committee that is developing innovation metrics for assessing the progress of research to realization in the small business research programs. His sub-committee appointed by NSF Engineering Directorate, reviewed NSF's role in knowledge transfer and assessed the need for a more proactive approach. The statutory landscape for industry-university partnerships were analyzed, especially the regulations on how licensing rights to federally funded inventions can be transferred for purposes of commercialization. Specifically the team identified structures and processes that Engineering can implement in order to increase access by industry and other research customers to NSF-supported discoveries.

Technical Assistance Program

1. Rieke Corporation, Auburn, Cost reduction of a polymer part, 6/1/98.
2. Shadow Cruiser Corporation, Bristol, Development of a low cost composite lamination process for large panels, 8/26/98.

3. Lafayette Plastics, Lafayette, Analysis of material properties of reprocessed polymer materials, 9/29/98.
4. Crown Abrasive Company, Inc., Hebron, Development of composites to replace fiberglass reinforced compounds, 12/1/98.
5. Ventura Group, Inc., Fort Wayne, Solution to a color deterioration problem in polymer parts, 12/2/98.
6. Ventura Group, Inc., Fort Wayne, Development of imitation bones for use in orthopedic surgical training, 12/4/98.
7. Indiana Precision Plastics, Williamsport, Modify a polymer composite to meet a conductivity standard, 2/17/99.
8. Bio Innovation Inc., Fort Wayne, Development of polymer orthopedic products, 2/19/99.
9. Stone City Products, Inc., Bedford, Saw guide redesign, 3/9/99.
10. CEO Visions, W. Lafayette, Development of a internet braille display, 3/12/99.
11. Stone City Products, Inc., Bedford, Saw clamp redesign, 4/5/99.
12. Med Institute, W. Lafayette, Measurement of the molecular structure of a polymer, 4/9/99.
13. Bio Innovation Inc., Fort Wayne, Assistance with an experiment on a polymer-based orthopedic prototype, 6/9/99.
14. CEO Visions, W. Lafayette, Assistance with the development of an Internet braille display prototype, 6/9/99.
15. Seymour Manufacturing Company, Seymour, Solve a failure problem with a plastic handle, 7/20/99.

Other Service Projects

Professor Ramani directed a team for writing proposals to Purdue University for an additional \$108,000 for academic computing for the School in 1997, \$97,000 for academic computing for the School in 1998, and \$210,000 for Product/Process Design within the Design Center in 1998.

“Academic Computing and Multimedia Delivery for Instruction in Mechanical Engineering,” Purdue University, \$108,000, December 1997 - November 1998. (with C. Krousgrill, A Bajaj, R. Evans, F. P. Incropera)

“A Hands-on Design Environment for Product and Process Design using Information Technologies in the Mechanical Engineering Curriculum,” Purdue University, Special Allocation of the Engineering Student Differential Fees, \$210,000, July 1998 - November 1998. (with R. Cipra, F.P. Incropera)

“Instructional Computing for Concurrent Computer-Aided Product and Process Realization in Mechanical Engineering Curriculum,” Purdue University, Instructional Computing Proposal, \$48,500, July 1998 - November 1998. (with K.H. Hawks, R. Cipra, R. Evans, F.P. Incropera)

Professional Society Memberships

Society for Advancement of Materials Process Engineering (past)

Society for Automotive Engineers (past)

Society for Plastics Engineers (past)

Society of Manufacturing Engineers (past)
American Society of Engineering Education (past)
American Society of Mechanical Engineers (present)
Association of Computing Machinery (present)

Academic Service

Coordinator Product Engineering and Realization Laboratory, Proposals and Acquisitions (1997-1999)
Graduate Committee, School of Mechanical Engineering (1994-1997)
Advisory Committee, School of Mechanical Engineering (1995-1996)
Design Committee, School of Mechanical Engineering (1991-present)
Materials and Manufacturing Processes Committee, School of Mechanical Engineering (1993-present)
Deans Research Advisory Committee (1997 - 1998)
Search Committee, Federson Chaired Professor in Information Technologies (1998 - 1999)
Search Committee, Faculty in Design/Mechanics (1997-1998)
Search Committee, Faculty search (2001 – 2002)
Web Task Force (2001- 2002)
Involved in two cluster proposals and in the search committees for:
Search Committee, Global Sustainable Industrial Systems (GSIS) (2003-2006)
Search Committee, Information, Communications and Perception Technologies (ICPT) (2003-2008)
Manufacturing Area Chair, Mechanical Engineering, 2004 – present.
Search Committee Chair, Cyber and Information Systems, 2006 – 2007
Search Committee Chair, Design Search, 2009 – 2013 (chaired committee that hired five faculty in the design, robotics and manufacturing areas)
Deans Strategic Plan Execution Team on “Creativity/Innovation Development,” 2009
Design-Innovation Development, School of Mechanical Engineering, 2009 – present
Mechanical Engineering Head Search Committee 2010-11
Maker Spaces Initiative, 2014 – Present
Mechanical Engineering Leadership Team (MELT), 2004-present
Mechanical Engineering Search Committee, 2014-2016 (to support Purdue College Engineering to add 100 faculty position and Mechanical Engineering Expansion Plans, hired three women faculty and aided in hiring four key faculty into mechanical engineering)
Mechanical Engineering Strategic Planning Committee 2017 (January – June)

ENTREPRENEURIAL ACTIVITIES

Chief Scientific Officer (2005-08) and Technical Advisor (2008 – Present) Imaginestics LLC: Imaginestics is a pioneer and leader in visual shape search technology for the manufacturing supply chain to connect buyers and suppliers. Imaginestics developed a new business model centralizing on shape search technologies originating from Purdue University at Professor Ramani's group. Imaginestics is located in Purdue Research Park in Indiana. Imaginestics has also developed manufacturing communities around the search technology. Imaginestics shape search commercial platform and engine have won Indiana Entrepreneurial Award for Innovation in 2007, National Business Incubation Association's 2007 Outstanding Incubator Graduate Award in the technology category, and the Tibbets Award in 2007 named after the founder of the Small Business Innovative Research (SBIR) program at NSF. Imaginestics was the 2004 *Indiana Growth 100 Awardee*. He also guided *Imaginestics SBIR Phase I and Phase II* awards from the *National Science Foundation*. The shape search technology was licensed from Purdue University and the world's first commercial shape search engine was launched in August 2006. Purdue University has a direct profit interest in the company, which are convertible to shares prior to Imaginestics receiving outside investment. He also headed the team for another win for an ARMY SBIR for Phase I (\$100 k) based on the licensed technology. Imaginestics has funded over \$380 K of research at his labs through SBIR subcontracts, National Center for Manufacturing Sciences (NCMS) and the 21st Century matches. Imaginestics employs computer science and engineering graduates. Imaginestics now has over 30 employees in both West Lafayette and also the new office in Chicago. It has since focused its business model on the search technology for the manufacturing supply chain (www.vizseek.com).

Chief Scientific Officer (2012 – Present): ZeroUI

ZeroUI is in a semi-stealth mode. ZeroUI (<http://www.zeroui.com>), is a developer of gesture applications, platforms and interfaces for 3D camera enabled devices such as Microsoft Kinect, and unveiled world's first gesture based hands free 3D modeling technology at the Techcrunch Disrupt Conference in San Francisco on September 10, 2012. At the core of ZeroUI's technology is GENIUS, gesture enabled natural user interface (NUI) driven 3D shape creation framework. It is the convergence of state-of-the art scientific advancements in machine learning, computer vision, computational geometry and human computer interaction. ZeroUI's technology is based on award winning and patent pending National Science Foundation funded research at Purdue University. It enables people to create three-dimensional objects with their bare hands by using a depth-sensing camera and advanced software algorithms to interpret hand movements and gestures. ZeroUI is currently developing a hardware based toy gesturally controlled toy platform (Handimate). Handimate allows any child to use everyday material such as cardboard and duct tape to be transformed into a robot. A glove then can control the robot that is just made using modular building blocks connected to the materials using Velcro. Handimate was funded by an NSF SBIR recently and Purdue Research Foundation together with Elevate Venture supported ZeroUI with matching funds.

Media Recognitions

Research in Shape Search:

Profiled in Business Week, CNN, USA Today, DesignNews, Sify, Computer.org, MSNBC, YahooFinance, ReDiff, The Hindustan Times, The Hindu, INDOlink.com, CNet.com., ScienceDaily Magazine, Innovations report, NewsWise, and IEEE Computer Society (March–July 2004). Over 14,000 unique visitors that have accessed our website in 2004-2006 alone from around the world. A Special News Release by the National Science Foundation covered the “Doodle Search.” Also Covered by Discovery Channel, 2006.

FEAsy: Analysis of Design From Raw Sketches: National Science Foundation News from the Field, ScienceDaily 2009.

Research in Hands-free and Gesture-based Shape Creation:

CNET, IEEE Spectrum, Design News, Live Science (NSF), Design News, Yahoo News, Selected for TechCrunch 2012, NPR Radio, Inside Indiana Business News. NSF LiveScience. Huffington Post, Phys.org.

Educational Research

7 Cyberlearning Technologies Transforming Education

http://www.huffingtonpost.com/aaron-dubrow/7-cyberlearning-technolog_b_6988976.html

Commercialization of research (from Handimate to Ziro): <https://www.ziro.io>

Ziro was named the best of CES finalist by Engadget.

<http://www.engadget.com/2016/01/07/introducing-the-best-of-ces-2016-finalists/>

ZeroUI was also named one of the top 3 companies at CES by Boston Consulting Group

<https://medium.com/@BCGDV/top-3-companies-at-ces-65397c5b2298#.s9ixaaytu>

Ziro got on to several other top tech/gadget lists

7 gadgets that will make us genuinely better people

http://www.huffingtonpost.co.uk/2016/01/05/ces-2016-7-gadgets-that-will-genuinely-make-us-better-people_n_8914332.html

15 Robots that will do the thinking for us (this includes Google car and iRobot Roomba)

<http://www.inc.com/john-brandon/15-robots-that-will-do-the-thinking-for-us.html>

What's hot in the world of gadgets - CTV News Canada

<http://www.ctvnews.ca/sci-tech/ces-2016-what-s-hot-in-the-world-of-gadgets-and-technology-1.2726483>

Top tech products revealed so far by ZDNet

<http://www.zdnet.com/pictures/top-tech-products-revealed-at-ces-2016-so-far/18/>

30 insane products at CE

<http://www.crn.com/slide-shows/mobility/300079260/30-insane-products-from-the-ces-unveiled-show-floor.htm/pgno/0/1>

Gadget to lookout for in 2016

<https://7days.ae/gadgets-look-2016/78837>

Coollest newest gadgets rom the 2016 CES

<http://www.twcc.com/entertainment/galleries/2016/01/2016-international-consumer-electronics-show-gadgets#60>

Ziro was well covered by the leading media across the world. Here is a selected partial list.

Verge:

<http://www.theverge.com/2016/1/4/10712894/ziro-zeroui-motion-controlled-robotics-kit-ces-2016>

Engadget:

<http://www.engadget.com/2016/01/04/ziro-lets-you-build-your-own-gesture-controlled-robots/>

Wired

<http://www.wired.co.uk/news/archive/2016-01/06/zeroui-ziro-gloves-robots>

PC Magazine

<http://www.pcmag.com/article2/0,2817,2497455,00.asp>

LA Times

<http://www.latimes.com/business/technology/la-fi-tn-ces-2016-unveiled-20160105-htmlstory.html>

Fox News (We were on Live TV across the US on the morning show)

<http://www.fox4news.com/good-day/71066796-story>

Huffington Post

http://www.huffingtonpost.co.uk/2016/01/05/ces-2016-7-gadgets-that-will-genuinely-make-us-better-people_n_8914332.html

ZDNet

<http://www.zdnet.com/pictures/top-tech-products-revealed-at-ces-2016-so-far/18/>

Inside Indiana Business with Gerry Dick

<http://www.insideindianabusiness.com/story/30934576/purdue-developed-robotics-toy-becomes-ces-standout>

<http://www.insideindianabusiness.com/story/31150868/purdue-developed-robot-toy-primed-for-market>

BBC Worldwide Coverage

100s of media articles including Techcrunch, Verge, Engadget etc.

Coverage in ASME Magazine and ASME.org

Patents

1. Miller, A.K., Ramani, K., and Gur, M., "Apparatus for Forming Fiber Composite Materials," number 4955803, issued September, 1990.
2. Miller, A.K., Ramani, K., and Gur, M., "Process for Forming Fiber Composite Materials," number 5102609, issued April, 1992.
3. Devanathan, T. N. C., and Ramani, K., "Inert Gas Heated Compression Molding Process," number 5,741,455, issued April, 1998.
4. Devanathan, T. N. C., and Ramani, K., "Inert gas heated compression molding apparatus," 5,863,570, issued April, 1998.
5. Ramani, K., and Woolard, D.E., "Electrostatic Corona Wire Charged Powder Deposition on Continuous Fibers," 5,895,622, issued April 20, 1999.
6. Chan W. C., and Ramani, K., "Three Dimensional Object Fabrication Techniques," 6,627,835, issued September 30, 2003.
7. Ramani, K., Babu, M., Joglekar, N., and Ganiji, A., "Systems and Methods for Collaborative Shape Design," 7,337,093, issued February 26, 2008.
8. Ramani, K., Jiantao, Pu, "Methods for Retrieving Shapes and Drawings," 7,583,272, Issued September 1, 2009. [Shape search technology has been licensed. The worlds first commercial 3D parts search engine was launched in August 2005. www.vizseek.com]
9. Ramani, K., Devanathan, S., Jayanti, S., Cunningham, B., and Peters, C., "Multi-tier and Multi-domain distributed rapid product configuration and Design System," 7,725,299, Issued May 25, 2010.
10. Ramani, K., Jayanti, S., Kuiyang, L., Methods, Systems, and data structures for performing searches on three-dimensional objects," Japanese Patent# 4516957, Issued May 21, 2010.
11. Cecil Kumar Piya, Vinayak, and Karthik Ramani, TAICHI: Tangible Assisted Interfaces for Computer Human Interactions, USPTO Application No 61992888
12. You Wu, Vinayak, Michael McCoy, Karthik Ramani, and Raja Jasti, Wireless Haptic Feedback Apparatus, 9,229,530, January 2016.

13. Vinayak, Cecil Kumar Piya, Karthik Ramani, and Raja Jasti, Methods and Systems for Collaboratively and Interactively Producing Shapes in Three-Dimensional Space, USPTO Application No 13886546
14. Vinayak, Hairong Liu, Karthik Ramani, and Raja Jasti, Methods and Systems for Interactively Producing Shapes in Three-Dimensional Space, US9383895, July 2016.
15. Vinayak, Karthik Ramani, and Raja Jasti, Methods and Systems for Interactively Producing Shapes in Three-Dimensional Space, USPTO Application No 13886732
16. Ramanujan, D., Bernstein, W. Z., Ramani, K., Kulkarni, D., Tew, J. (2014) Collaborative, multi-modal exploration of metadata from design repositories for sustainability based decision making. USPTO Application No 62/034,466.
17. Bernstein, W. Z., Ramanujan, D., Ramani, K., Kulkarni, D., Tew, J. (2014) Collaborative, multi-modal exploration of product and supply chain metadata for sustainability based decision making. USPTO Application No. 62/034,030
18. Several others patents pending.

Other

Bechtel International Center, Host Couple, Stanford University, wide programming responsibilities, 1989-91.

Badminton, Ping Pong, Tennis, Sketching (caricature and products)

National Math-Counts Competition, Coordinator, Purdue University, 2015 - 2017.