SOUNDAR KUMARA

Allen E., and Allen, M., Pearce Professor of Industrial & Manufacturing Engineering

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Research Areas

Interdisciplinary – Addressing manufacturing, service and industrial engineering problems through theory and tools based on integrating operations research, physics, computer science, information technology and mathematics.

Specialization – AI and Machine Learning in Manufacturing, and Healthcare, Sensors, and sensor-based monitoring; Nonlinear Dynamical Systems Analysis as applied to Manufacturing, Complex Networks, Clustering in large-scale complex networks, Health Analytics, Internet of Things (IoT).

Academic Training

Ph.D. (Industrial Eng.), Purdue University, West Lafayette, IN, USA
M.Tech. (Industrial Eng.), I.I.T. Madras, India
B.Eng. (Mechanical Eng.), S.V.U. College of Engineering, Tirupati, India

Current Positions

11/06-current ***Allen E., and Allen, M., Pearce Professor***, Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, University Park, PA, USA.

08/2 -current ***Director (Interim)*** The Center for the Applications of AI & ML to Industry (AIMI), Penn State (08/15/2021-Current)

04/01-current ***Professor (Affiliate appointment)***, School of Information Sciences and Technology, The Pennsylvania State University, University Park, PA, USA

11/08-current ***Adjunct Professor***, C.R. Rao Institute of Advanced Mathematics and Computer Science, University of Hyderabad, India

Experience

Past Positions

01/03-11/06 ***University Distinguished Professor***, Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, University Park, PA, USA

08/96-12/02 ***Professor***, Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, University Park, PA, USA

08/96-12/16 ***Professor, (Joint appointment)***, Department of Computer Science and Engineering, The Pennsylvania State University, University Park, PA, USA

08/91-08/96 ***Associate Professor***, Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, University Park, PA, USA

01/94-08/96 ***Associate Professor, (Joint appointment)***, Department of Computer Science and Engineering, The Pennsylvania State University, University Park, PA, USA

01/86-08/91 ***Assistant Professor***, Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, University Park, PA, USA

08/01-12/01 ***Visiting Researcher***, Intelligent Automation Incorporated, Rockville, MD, USA.

May 2008 ***Visiting Professor***, Department of Industrial Engineering, Tsinghua University, Beijing, China

06/00-07/00 ***Visiting Researcher***, Korea Institute of Advanced Science and Technology, (KIST), Seoul, S. Korea

05/00-08/00 ***Visiting Professor***, Department of Manufacturing and Engineering Management, City University of Hong Kong, Hong Kong

01/95-08/95 ***Visiting Professor***, University of Tokyo, Research Center for Advanced Science and Technology, Tokyo, Japan

08/94-12/94 ***Visiting Associate Professor***, Department of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge, MA, USA

05/90-08/90 ***CSK Endowed Chair-Visiting Associate Professor***, University of Tokyo, Research Center for Advanced Science and Technology, Tokyo, Japan

08/79-12/81 ***Research Associate***, Indian Institute of Management, Ahmadabad, India

08/77-07/79 ***Lecturer***, Mechanical Engineering, S.V.U. College of Engineering, Tirupati, India

Advisory Positions

1. Technical Advisor: Pharmaacuity start-up in USA
2. Technical Advisor: nviipani.com start-up company in India
3. Technical Advisor: Medblaze start-up company in India
4. Technical Advisor, Guiltyspakai Inc., start-up in USA
5. Technology Evangelist, DIMAAG-AI Inc., start-up in USA
6. Member, Board of Studies for Mechanical Engineering, N.B.K.R.I.S.T., Vidyanagar, India
7. Overseas Expert, Northwestern Polytechnic University, Xi'an China, 2014-2016
8. Advisory Board Member, Centre for Interdisciplinary Mathematics, PSU, July 2013-Current
9. Advisory Board Member, AutoID Laboratory, MIT, January 2013 – 2018
10. Advisory Board Member, Quality Systems and Reliability Group, Institute for Operations Research and Management sciences (INFORMS) –July 2008 to 2016

11. Advisory Board Member, National College, Bangalore, India, since 2007

Awards and Honors *(All awards in reverse chronological order)*

1. ***Outstanding Industrial Engineer***, Purdue University 2022 (of 10,000 Alumni 155 are recognized with this award, and the number of academics recognized is less than 20)

2. ***ASME*** Computers & Information Engineering Division, ***Excellence in Research Award***, August 2021

3. ***IISE David F. Baker Distinguished Research Award***, May 2021.

4. ***20 Most Influential Academicians*** in Smart Manufacturing, ***SME***, June 2021. One nominator referred to Dr. Kumara as the Father of Smart Manufacturing.

5. ***IISE Magazine Coverage*** on the paper published in IySE Transactions in 2019, October 2019.

6. ***Invited Panel Member*** – AI in Manufacturing – Convened by US Congressional Manufacturing Caucus, June 11, 2019

7. ***Milestone Paper***, Near Linear time algorithm to detect community structures in large-scale networks, U.N. Raghavan, Reka Albert and Soundar Kumara, Phys.Rev. E 76, 036106 (2007). *Physical Review E* published its 50,000th paper in September 2015. To celebrate this, the journal presented a series of milestone papers that were published since its inception in 1993. This is an eclectic collection of papers that made significant contributions to their field, chosen by the editors.

8. ***Finalist Best Paper Award*** – *Sustainability division, Industrial Engineering Research Conference (IISE), May 2018, Orlando, FL* (Paper co-authored with graduate student Ning Liu)

9. ***Best Paper Award*** – *Sustainability division, Industrial Engineering Research Conference (ISERC), May 2016, Pittsburgh, PA* (Paper co-authored with graduate student Osama Alotaik)

10. ***Best Paper Award*** – *QSR division, Industrial Engineering Research Conference (ISERC), May 2016, Pittsburgh, PA* (Paper co-authored with graduate student Cheng-Bang Chen)

11. ***Best Paper Award*** – *Sustainability division, Industrial Engineering Research Conference (ISERC), May 2015, Nashville, TN* (Paper co-authored with graduate students Deepak Agrawal and Cheng-Bang Chen)

12. ***Best Paper Award*** – *Operations Research division, Industrial Engineering Research Conference (ISERC), May 2015, Nashville, TN* (Paper co-authored with Under Graduate student Shruthi Agrawal – IIT Bombay)

13. ***Best Paper Award*** *– Computers and Information Systems division, Industrial Engineering Research Conference (ISERC), May 2012, Orlando, Florida* (Paper co-authored with graduate student Akshay Ghuruye)

14. ***Best Paper Award*** *– Computers and Information Systems division, Industrial Engineering Research Conference (IERC), May 2011, Reno, Nevada* (Paper co-authored with graduate student LiYing Cui)

15. *Penn State Engineering Society* ***Outstanding Advisor Award***, April 1, 2011

16. ***First Place Award*** for Undergraduate Students (4) mentored on IE480W Project on Supply Chains conducted for The Vitamin Shoppe, Fall 2010 (1st place out of 43 Teams- 2 first place awards are given)

17. ***Finalist – Best Paper Award, Service Science Division, INFORMS 2010****, November 2010, Austin, Texas (Paper co-authored with graduate student* LiYing Cui*)*

18. ***Best Paper Award****, Industrial Engineering Research Conference 2009,* Computers, and Information Systems Division (Paper co-authored with graduate student Supreet Reddy Mandala)

19. ***Adjunct Professor,*** C.R. Rao Institute of Advanced Mathematics and Computer Science, University of Hyderabad, Hyderabad, India, since November 2008

20. ***Semifinalist Team (one of 12 teams)*** **at the Trading Agent Competition** – Supply Chain Management (TAC-SCM) held at CMU, 2008 (Graduate Students from Kumara's group)

21. ***2nd Runner-Up of Web Services Challenge Competition @ IEEE*** *ICEBE 2007 (architecture track)* (Team comprising of Kumara's student Jung Woon Yoo and IST colleague Professor Dongwon Lee)

22. ***2nd Runner-Up of Web Services Challenge Competition @ IEEE*** *ICEBE 2006* (Team comprising of Kumara's student Seogchan Oh and IST colleague Professor Dongwan Lee)

23. ***Best Paper Award***, Industrial Engineering Research Conference 2006, Computers and Information Systems Division (Paper co-authored with graduate student Seokcheon Lee)

24. ***Allen, E., and Allen M., Pearce Endowed Professorship***, November 2006

25. ***Best Paper Award***, Industrial Engineering Research Conference 2005, Computers and Information Systems Division (Paper co-authored with graduate student Nathan Gnanasambandham)

26. ***1st Runner-Up of Web Services Challenge Competition @ IEEE*** *ICEBE 2005* (Team comprising of Kumara's student Seogchan Oh and IST colleague professor Dongwon Lee)

27. ***Public Felicitation by Sri Venkateswara University***, Tirupati, India, August 2004

28. *Penn State* ***University Distinguished Professor***, January 2003- July 2006

29. ***Faculty Scholar Medal***, (Given at the university level for outstanding research), 2002 (Only one ever from the PSU IE Department to win this award till today)

30. ***Premier Research Award*** , Penn State Engineering Society (PSES), 2001 (First one from IE Department ever to win this award till 2007)

31. ***Certificate of Achievement***, Awarded by General Scales Jr., Army War College, 1998

32. ***Penn State University Graduate Faculty Teaching Award*** (Given at the university level for teaching and research at the graduate level), 1998 (Only one ever from IE Department to win this award)

33. ***Outstanding Research Award***, Penn State Engineering Society (PSES), 1994

34. ***Best Paper Award*****, (2nd place - applications),** *"Fractal Dimension Based Estimation of Tool Wear in Turning,"* by Bukkapatnam, S.T.S., S. Kumara., and Lakhtakia, A., *Artificial Neural Networks in Engineering 94, an International Conference*, St. Louis November 1994 (2nd place out of 184 Papers)

Research Awards and Honors for Graduate Advisees: At PSU Level

1. ***Third Place,*** M. Madireddy, and S. Kumara, Systems Approach to Drug target identification in T2DM, Poster Presentation at Network Science, Penn State, April 2010.

2. ***Honorable Mention-Graduate Research Exhibition***, PSU, 1995, "Intelligent Integrated Diagnostics," Lee, J. (Advisor: S. Kumara)

3. ***First Place in Engineering-Graduate Research Exhibition***, PSU, 1994, "Computational Cognitive Linguistics," Heinze, D. T. (Advisor: S. Kumara)

4. ***First Place in Engineering-Graduate Research Exhibition***, PSU, 1989, "Optical Neural Networks in Manufacturing," Kamarthi, V.S., Lu, T., and Rajan, S., (Three Electrical Engineering Students under the guidance of Yu, F., and One Industrial Engineering Student Under the guidance of S. Kumara)

Research Awards or Honors for Graduate Advisees: At the National & International Level *(best paper awards are not included which are listed above)*

1. ***Akshay Ghuruye****, First Place, Graduate Research* ***Award,*** Institute of Industrial Engineers, 2013 (Best M.S., Thesis award).

2. ***LiYing Cui, Best Intern*** *at Kimberley Clark Corporation*, May-August 2010

3. ***NRW Undergraduate Science Award for Production Logistics and Networks*** (One award given in a worldwide competition), 2005, Thadakamalla, H. (Co-Advisor).

4. ***Society of Manufacturing Engineers (SME) Young Manufacturing Engineer Award***, 2005, Bukkapatnam, S.

5. ***N. Gnansambandham, Doctoral Colloquium Scholarship,*** for Autonomous Agents and Multi-agent Systems Conference 2005 at the Netherlands. One of the 19 internationally selected.

6. ***Society of Manufacturing Engineers (SME)*** *Young Manufacturing Engineer Award*, 1999, Kamarthi, V.
7. ***Second Place in Graduate Research Award*** *for Ph.D thesis*, Institute of Industrial Engineers, 1995, Kamarthi, V.S.
8. ***Kao, C.Y., Second Place in Graduate Research Award for MS thesis,*** Institute of Industrial Engineers, 1992..

Professional Membership

1. Fellow of the American Society of Mechanical Engineers (ASME), April 2013
2. Fellow of American Association for Advancement of Sciences (AAAS), 2012
3. Fellow of Institute of Industrial Engineering (IIE), May 2006
4. Fellow of International Academy of Production Research (CIRP), August 1996
5. Associate Fellow of International Academy of Production Research (CIRP), January 1990-August 1996
6. Member, INFORMS
7. Member, Washington Academy of Sciences
8. Member, SME

Recent News Coverage

https://news.engr.psu.edu/2021/kumara-soundar-iise-baker-award.aspx

https://news.engr.psu.edu/2021/kumara-soundar-sme-influential-academic.aspx

https://news.psu.edu/story/530596/2018/08/10/academics/researchers-paper-complex-networks-honored-milestone-contribution

https://www.ime.psu.edu/news/2019/kumara-soundar-congressional-caucus-address.aspx

https://www.ime.psu.edu/news/2018/kumara-soundar-hospital-prediction.aspx

http://www.worldpharmanews.com/research/4977-ai-could-offer-warnings-about-serious-side-effects-of-drug-drug-interactions

https://news.engr.psu.edu/2020/kumara-soundar-illicit-pharmacy-algorithm.aspx

https://sciencex.com/wire-news/352118811/industrial-engineering-department-pivots-to-address-covid-19.html

https://www.ime.psu.edu/news-archive/2019/kumara-soundar-ics-seminar.aspx

https://www.ime.psu.edu/news-archive/2016/kumara-soundar-health-care-course.aspx

https://news.engr.psu.edu/2020/yang-hui-kumara-soundar-novel-algorithm.aspx

Invited Keynote Talks

1. *Intelligent Manufacturing Systems*, XII Brazilian Artificial Intelligence Conference, Brazilian Computer Society, Sao Paulo, October 1995

2. *Market Based Distributed Project Management*, Global Manufacturing: Seminar at Hong Kong, City Polytechnic University, Hong Kong, August 1997

3. *Intelligent Manufacturing Research*, on Felicitation by S.V.University, Tirupati, India, June 2004

4. *Complex Systems Research*, All India Manufacturing and Mechanical Engineering Conference, S.V. University, Tirupati, India, July 2005

5. *Agent Based Systems in Manufacturing*, The International Academy of Production Research (CIRP), Kobe, Japan, August 2006 (Co-authored Paper with Lazslo Monostori and Jozsef Vancza)

6. *Agent Based Systems in Manufacturing*, International Conference on Balanced Automation Systems (BASYS'06), Niagara Falls, September 2006

7. *Sensor Based Control*, International Conference on Research on Quality and Information technology, Organized by IIT Delhi and the Indian National Academies, December 2006

8. *Military Logistics*, Military Logistics Symposium, Stockholm, Swedish Military Academy, December 2008

9. *Network Mining*, Business Data Mining Conference, University of Hyderabad, Hyderabad, India, December 2008

10. *A Service based Platform Design Method for Customized Products*, International Conference on product Service Systems-2 (IPS2), Linkoping, Sweden, April 2010

11. *Cooperative and Responsive Manufacturing Systems*, CIRP Keynote address, paper co authored with J. Vancza, L. Monsotori, D. Lutters, M.Tsend, P. Valckenaers, and H. van Brussel, Budapest, Hungary, August 2011

12. *Why study complex networks?*, 18th International Conference on Industrial Engineering and Management sponsored by IEEE, Changchun, China, September 2011

13. *Network Analytics – Big & Cloudy Data*, Conference at MIT, November 2012

14. *Globalization through Learning (Innovation) Factory*, Federation of Indian Chamber of Commerce and Industries, Master class with Drs. Paul Griffin and Wayne Smutz, Education Summit, November 2012

15. *International Conference for Knowledge Intensive Service Industry*, Ministry of Industry and Commerce, S. Korea, Seoul November 7, 2013.

16. International Conference on Through life Engineering Services, Cranfield Institute of Technology, November 2015 (TES2015)

17. INFORMS Workshop on Data Mining and Analytics, INFORMS, Philadelphia, November 2015

18. Northeastern University, Boston, Workshop on Multimodal Data Fusion. Dinner Keynote Talk, March 2017.

19. Network Analytics for Urban data Science, Second International Workshop on Urban Data Science, July 2018, Bangkok.

20. AAAS Annual Symposium, AAAS, Washington, DC Smart Manufacturing - Resurgence of AI and ML," February 2019, Washington DC.

21. AI and ML in Manufacturing – Past, Present and Future, 2020 Twelfth International Conference on Contemporary Computing (IC3) Sponsored by IEEE, August 2019, Noida, India.

22. AI in Drug-to-Drug Interaction, Lunch Talk, Complex Systems Conference, November 2019, PSU Great Valley Campus.

23. AI in Drug-to-Drug Interaction, Workshop on Digital Health and Well Being, December 18-19, 2019, Institute of Science, Bangalore, India.

24. AI in Drug-to-Drug Interaction, Biomedical Innovations and Small Business Opportunities, Sri Venkateswara Institute of Medical Sciences (SVIMS), Jan 22-23, 2020, Tirupati, India.

25. AI in Healthcare, Dinner Talk, Biomedical Innovations and Small Business Opportunities, Sri Venkateswara Institute of Medical Sciences (SVIMS), Jan 22-23, 2020, Tirupati, India.

26. Artificial Intelligence and Machine Learning in Manufacturing, Conference Inauguration talk, International Conference on Advances in Material Science & Mechanical Engineering (ICAM SME-2020), N.B.K.R. Institute of Science & Technology, 7th to 9th Feb 2020, Nellore, India.

27. Artificial Intelligence and Machine Learning in Manufacturing, TE2020, 27th International Conference on Transdisciplinary Engineering, July 1-10 2020, Warsaw, Poland, Virtual Presentation.

28. ML + MANUFACTURING = Smart Manufacturing: Research and Education in the post COVID-19 Era: Some Personal Perspectives, DoD I – DREAM4D Outreach and Education Programs - July 28, 2020, Virtual Presentation

29. Kumara, S., ASOP Global 2020 All-Hands Meeting, Global Alliance for Safe Pharmacies, Virtual, "Online Accountability (Rogue Networks, Ry/Rr, Search and Social Platforms):Illicit Online pharmacies," 60 in attendance, Invited. (November 12, 2020 - November 13, 2020). International.

30. Kumara, S., Virtual International Conference on: Supply Chain Challenges of COVID-19 Vaccines: The Indian Imperative, Virtual, "PANEL: "Building Digital Infrastructure to Ensure Supply of Vaccines and Timely Vaccination," 700 in attendance, Invited. (November 20, 2020). International.

31. AI and ML in Healthcare, Kasturba Medical University, Manipal, India. Invited expert talk (125 in attendance, Virtual). March 2021.

32. Smart Manufacturing, National Institute for Training in Industrial Engineering (NITIE), Mumbai, India, March 2021. (40 in attendance- Virtual).

33. NSF/NIST Roundtable Discussion – 2, on – AI for the Factory Floor, Panelist, June 15, 2021 (one of the six panelists) (90 in attendance- Virtual).

34. NSF/NIST Roundtable Discussion – 3, on – AI for Industry-Wide Data Sharing, Panelist, June 15, 2021 (one of the six panelists) (90 in attendance- Virtual).

35. DoE AMO TRANSSFORM Workshop, September 10, 2021, Self Sufficiency and Resilient Supply Chains.

36. Ernest Young Tech Talk Series, December 2021, Self Sufficiency and Resilient Supply Chains.

37. 2nd International Conference on Industry 4.0 and Advanced Manufacturing (I4AM'22) at IISc Bangalore, "Resilient Supply Chains," January 10, 2022.

38. IISE, Data Analytics and Information Sciences (DAIS) division & IE Body of Knowledge (IE BoK) sponsored International Webinar on, " IIOT, AI&ML, and Network Science and the Future of Manufacturing," March 16, 2022.

Visiting Researchers

1. Professor Cho, Korean Military Institute, 2003 (One Year)
2. Professor Zvi Katz, Department of Mechanical Engineering, University of Stellenbach, South Africa, 2005 (6 Months)
3. Professor Fansen Kong, Head of the Department of Mechanical Engineering, Jilin University, Changchun, China, 2007-2008(6 Months)
4. Professor Xiomei Wang, Northeastern University, Xian, China, 2008-2009 (1 Year)
5. Professor Ravindranath, Principal, S.V. University College of Engineering, Tirupati, India, 2007 (3 Months)
6. Professor Chagwoo Lee, Department of Industrial Engineering, Inha University, Seoul, S. Korea (One year) -2008
7. Professor Dongmok Sheen, Department of Naval Architecture, Ulsan University, S. Korea, (One year) , 2009-2010
8. Professor Hongseob Lee, Department of Industrial Engineering, Inha University, Seoul, S. Korea, (One year) , 2009-2010
9. Dr. He Yanli, Department of Automation, North Eastern University, Xian, China (One year), 2009-2010
10. Dr. Kyoung Jong Park, S. Korea, (One year) 2010-2011
11. Professor Deng Xiuquan, Beijing University of Aeronautics and Astronautics, (One year) 2010-2011
12. Dr. Fescioglu Unver Nilgun, Turkey (One year) 2009-2010
13. Jiang Wei, Beijing University, Graduate Student, Fall 2010
14. Dr. Jun Soo Lee, Korea Agency for Technology and Standards, S. Korea, (One year) 2010-2011
15. Dr. Wen Peihan, Chongqing University, China (0ne year), 2013-2014
16. Dr. Lei Deng, Chongqing University, China (0ne year), 2014-2015
17. Dr. Bai Bing, Jiangsu Normal University, China 2016
18. Dr. Jingmin Li, Sichuan University, China, 2017

Publications

Edited Books & Monographs

1. Kumara,S., Chen, C-B., Griffin, P., Chonde, S., Foundation of Predictive Analytics for Engineers, Online Book (2017) Used in UG and Grad Course at Penn State.

2. Raghavan, U.N., Kumara, S., and Albert, R. 2008. Studies in the structure and function of complex networks with focus on Social, Technological, and Engineered Networks. Internet Monograph available at: http://www2.ie.psu.edu/Kumara/Research/lisq/index_files/papers/ComplexNetworks_Kumara.pdf

3. Prabhu, V., Kumara, S., and Kamath, M (Editors). 2003. *Scalable Extended Entreprises*. Kluwer Academic Press. Boston, MA.

4. Dagli, C., J. Ghosh, B. Fernandez, and S. Kumara, (Editors). 1993. *Intelligent Engineering Systems through Artificial Neural Networks*. New York, NY: ASME Press.

5. Dagli, C., S. Kumara, and Y. Shin, (Editors). 1991. *Intelligent Engineering Systems through Artificial Neural Networks*. New York, NY:ASME Press.

6. Shin, Y., N. Abodelmonem, and S. Kumara, (Editors). 1992. *Neural Networks in Manufacturing and Robotics.* New York, NY:ASME Press.

7. Kumara, S., and I. Ham, E. Watson, (Editors). 1990. *AI Based Product Design.* University Park, PA: CIRP International Working Seminar on AI Based Product Design. (Monograph).

8. Kumara, S., R. Kashyap, and A. Soyster, (Editors). 1989. *AI in Manufacturing Theory and Practice*. Atlanta, GA:Institute of Industrial Engineers.

Articles Published in Refereed Journals (Google Citations 13468: h-index: 46; i-10 index: 143)

1. Roh, BM., Kumara, S.R.T., Witherell, P. *et al.* Ontology-based Process Map for Metal Additive Manufacturing. *J. of Materi Eng and Perform* **30,** 8784–8797 (2021). https://doi.org/10.1007/s11665-021-06274-2

2. Kumar, V., Machine Learning based Suicide Prediction and Development of Suicide Vulnerability Index for US Counties, npj (Nature Open Access) Mental Health, Accepted (2022).

3. Kumar, V., Srinivasan, V., and Kumara, S. "Smart Vaccine Manufacturing Using Novel Biotechnology Platforms: A Study During COVID-19." ASME. J. Comput. Inf. Sci. Eng. August 2022; 22(4): 040903. https://doi.org/10.1115/1.4053273

4. Hui Yang, Ruimin Chen, Soundar Kumara, Stable matching of customers and manufacturers for sharing economy of additive manufacturing, Journal of Manufacturing Systems, Vol. 61, 2021, pp 288-299. https://doi.org/10.1016/j.jmsy.2021.09.013

5. R. Chen, Y. Lu, P. Witherell, T. W. Simpson, S. Kumara and H. Yang, "Ontology-Driven Learning of Bayesian Network for Causal Inference and Quality Assurance in Additive Manufacturing," in *IEEE Robotics and Automation Letters*, vol. 6, no. 3, pp. 6032-6038, July 2021, doi: 10.1109/LRA.2021.3090020.

6. Ankur Verma, Ayush Goyal, Soundar Kumara, Thomas Kurfess, Edge-cloud computing performance benchmarking for IoT based machinery vibration monitoring, Manufacturing Letters, Volume 27, 2021, Pages 39-41, ISSN 2213-8463, https://doi.org/10.1016/j.mfglet.2020.12.004.

7. N. Liu, S. Kumara and E. Reich, "Gaining Insights into Patient Satisfaction Through Interpretable Machine Learning," in *IEEE Journal of Biomedical and Health Informatics*, Volume 25, Issue 6, 2021, Pages 2215-2226, doi: 10.1109/JBHI.2020.3038194.

8. Hui Yang, Cheng-Bang Chen, Soundar Kumara, Heterogenous recurrence analysis of spatial data, Chaos **30**, 013119 (2020); https://doi.org/10.1063/1.5129959

9. Mehta M, Julaiti J, Griffin P, Kumara S, Early Stage Machine Learning–Based Prediction of US County Vulnerability to the COVID-19 Pandemic: Machine Learning Approach, JMIR Public Health Surveillence 2020;6(3):e19446, DOI: 10.2196/19446, PMID: 32784193

10. Zhao H, Muthupandi S, Kumara S, Managing Illicit Online Pharmacies: Web Analytics an Predictive Models Study, J Med Internet Res 2020;22(8):e17239, DOI: 10.2196/17239, PMID: 32840485

11. N. Liu, C. -B. Chen and S. Kumara, "Semi-Supervised Learning Algorithm for Identifying High-Priority Drug–Drug Interactions Through Adverse Event Reports," in *IEEE Journal of Biomedical and Health Informatics*, vol. 24, no. 1, pp. 57-68, Jan. 2020, DOI: 10.1109/JBHI.2019.2932740.

12. Q. Hu, R. Chen, H. Yang, and S. Kumara, "Privacy-Preserving Data Mining for Smart Manufacturing," *Smart and Sustainable Manufacturing Systems* 4, no. 2 (2020): 99-120. https://doi.org/10.1520/SSMS20190043

13. Hui Yang, Runsang Liu, Soundar Kumara, Self-organizing network modelling of 3D objects,, CIRP Annals, Volume 69, Issue 1, 2020, Pages 409-412, ISSN 0007-8506, https://doi.org/10.1016/j.cirp.2020.04.099.

14. Sung, Y.-S., Dravenscott, R., Darer, J. D., Devipriya, P., & Kumara, S. R.T, 2019, . SuperOrder: Provider order recommendation system for outpatient clinics. *Journal*. ISBN/ISSN #/Case #/DOI #: https://doi.org/10.1177/1460458219857383

15. Chen, C.-b.,Yang, H., & S. Kumara (2018). A Novel Pattern-Frequency Tree for Multi-sensor Signal Fusion and Transition Analysis of Nonlinear Dynamics. *IEEE Sensor Letters, 3*(1), 1-4. ISBN/ISSN #/Case #/DOI # 10.1109/LSENS.2018.2884241

16. Chen, C.-b., Yang, H., & S. Kumara. (2018). Recurrence network modeling and analysis of spatial data. *Chaos: An Interdisciplinary Journal of Nonlinear Science, 28*(8), 1-12. ISBN/ISSN #/Case #/DOI #: 10.1063/1.5024917

17. Yang, H. S. Kumara., Bukkapatnam, S. T.S., & Tsung, F. (2019). The internet of things for smart manufacturing – a review. *IISE Transactions, 51*(11), 1190-1216. ISBN/ISSN #/Case #/DOI #: 10.1080/24725854.2018.1555383

18. Kan, C., Yang, H, & S. Kumara. (2018). Parallel Computing and Network Analytics for Fast Internet-of-Things (IOT) Machine Information Processing and Condition Monitoring. *Journal of Manufacturing Systems, 46*, 282-293. ISBN/ISSN #/Case #/DOI #: 10.1016/j.jmsy.2018.01.010

19. Wu, D., Jennings, C., Terpenny, J., Robert Gao & Kumara, S., A Comparative Study on Machine Learning Algorithms for Smart Manufacturing: Tool Wear Prediction Using Random Forests, *J. Manuf. Sci. Eng*. Jul 2017, 139(7): 071018 **Paper No:** MANU-16-1567 https://doi.org/10.1115/1.4036350; **Published Online:** April 18, 2017

20. Wu, D., Jennings, C., Terpenny, J., Kumara, S., & Robert Gao, Cloud-Based Parallel Machine Learning for Tool Wear Prediction. *J. Manuf. Sci. Eng*. Apr 2018, 140(4): 041005; **Paper No:** MANU-17-1344 https://doi.org/10.1115/1.4038002; **Published Online:** February 12, 2018

21. Yahya, H., Kumara, S., & Saldana, C. A Material Information Modeling for Sustainable Manufacturing. Journal of Advanced Manufacturing and Technology. [Accepted August 2019].

22. Tuarob, S., Tucker, C. S., Kumara, S., Giles, C. L., Pincus, A. L., Conroy, D. E., and Ram, N., 2017, "How are You Feeling?: A Personalized Methodology for Predicting Mental States From Temporally Observable Physical and Behavioral Information," J. Biomed. Inf., 68, pp. 1–19. ISBN/ISSN #/Case #/DOI #: https://doi.org/10.1016/j.jbi.2017.02.010

23. Bukkapatnam, S., Iqbal, A. S., & Kumara, S. Planar random graph representations of spatiotemporal surface morphology: Application to finishing of 3-D printed components, CIRP Annals, Volume 68, Issue 1, 2019, Pages 459-462

24. Yoo, J. J.-W., Kumara, S., Ventura, J., Lee, D., & Rahmati, A. Mathematical Model for Parameter-Level Web Service Composition. Expert Systems, 2018.

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121. Juxihong Julaiti, Seifu Chonde, Soundar Kumara, 2016, Scenario-based Information Retrieval in Academic Articles: A Case Study on Machine Learning Techniques in The Manufacturing Domain, IIE Annual Conference. Proceedings.

122. Chonde, S. et al., 2016. Mapping Keywords within Smart, Green, and Sustainable Manufacturing Literature. IIE Annual Conference Proceedings.

123. Juxihong Julaiti, Soundar Kumara, 2017, Cluster Vector Space Model: A Dimensionality Reduction Method for Text Classifications Based on the Vector Quantization, IIE Proceedings.

124. Na, H. S., Aybat, N. S. and Kumara, S. 2017. Large-scale network flow model considering human behavior for efficient hurricane evacuation. In: IISE Annual Conference & Expo. Pittsburgh: IISE.

125. Polim, Rico; Hu, Qianyu; Kumara, Soundar. Blockchain in megacity Logistics, IIE Annual Conference. Proceedings; Norcross (2017): 1589-1594.

126. Liu, N., Kumara, S. & Reisch, E. (2017). "Explainable data-driven modeling of patient satisfaction survey data." " Big Data (Big Data), 2017 IEEE International Conference on, 2017.

127. Wu, D., Jennings, C., Terpenny, J., Gao, R., & Kumara, S. (2017). "Data-Driven Prognostics Using Random Forests: Prediction of Tool Wear." Proceedings of the ASME 2017 International Manufacturing Science and Engineering Conference,., Volume 3: Manufacturing Equipment and Systems . University Park: ASME. ISBN/ISSN #/Case #/DOI #: ISBN: 978-0-7918-5074-9

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133. Kumar, V, Srinivasan, V, & Kumara, S. "Towards Smart Vaccine Manufacturing: A Preliminary Study During COVID-19." Proceedings of the ASME 2021 International Mechanical Engineering Congress and Exposition. Volume 2B: Advanced Manufacturing. Virtual, Online. November 1–5, 2021. V02BT02A023. ASME. https://doi.org/10.1115/IMECE2021-70516

Papers in Conference Proceedings *(refereed by abstract)*

1. Kumara, S., R. Kashyap, and C. Moodie. 1985. Entity-Relationship Approach to Expert Systems Design. *Proceedings of the IEEE Conference on Systems, Man, Machine and Cybernetics, Arizona*. 495-501.

2. Ayyagari, A., S. Kumara, and I. Ham. 1987. Path Planning of a Robot Using a Modified Quad-Tree Representation of Free Spaces. *Proceedings of the IX International Conference on Production Research, Cincinnati, OH*. 172-178.

3. Kumara, S., and I. Ham. 1987. Database Considerations in an Integrated Factory Environment. *Proceedings of The International Conference on Manufacturing Science and Technology of Future, MIT, Cambridge, MA*. 124-127.

4. Nann, S., A. Ray, and S. Kumara. 1989. A Decision Support System for Real-time Control and Monitoring of Dynamical Processes. *Proceedings of the American Control Conference, Pittsburgh, PA*. 361-365.

5. Edwards, R., K. Lee, S. Kumara, and S. Levine. 1989. An Integrated Real-Time Diagnostic Concept Using Expert Systems, Qualitative Reasoning and Quantitative Analysis. *Proceedings of the U.S.-Korea Seminar on Application of Expert Systems to Power Systems and Industries, Seoul, Korea*. 281-312.

6. Anand, S., S. Kamarthi, P. Egbelu, and S. Kumara. 1990. Intelligent Robotic Spray Painting Using Machine Vision. *Proceedings of Vision '90 Conference, Sponsored by SME, Detroit*. 9:31-45.

7. Triantaphyllou, E., A. Soyster, and S. Kumara. 1990. Determining Logic Rules From Large Collections of Positive and Negative Examples. *Proceedings of the International Congress of Cybernetics and Systems, Hunter College of The City University of New York, New York, NY*. page 114. (Extended Abstract)

8. Triantaphyllou, E., A. Soyster, and S. Kumara. 1990. An Integer Programming Approach in Determining the Knowledge Base in Rule Based Systems From Sample Consultations. *Proceedings of the 12th Triennial Conference on Operations Research (IFORS' 90), Athens, Greece*. page 236. (Extended Abstract)

9. Sanvido, V., F. Grobler and S. Kumara. 1991. An Open Information Architecture to Integrate Construction Projects. *Proceedings of the First International Symposium on Building System Automation Integration, University of Wisconsin, Madison*. 4.5:1-20.

10. Merchawi, N., S. Kumara, and M. Thazhuthuveetil. 1991. A Neural Network Approach to Process Diagnostics. *Proceedings of CSK-RCAST Seminar, U. of Tokyo, Japan*. 140-181.

11. Kamarthi, S., V. Sanvido, and S. Kumara. 1992. A Connectionist Vertical Formwork Selection. *Proceedings of Eighth Conference on Computers in Civil Engineering, Dallas, TX*. 1171-1178.

12. Kumara, S., K. Chittayil, and P. Cohen. 1992. Application of Intelligent Multi Sensor Signal Processing to Metal Cutting. *ORSA/TIMS, Orlando, FL.* (Extended Abstract)

13. Kim, T., and S. Kumara. 1993. Knowledge-Based Object Recognition by Neural Networks. *ORSA/TIMS Joint National Conference, Chicago, IL*. (Extended Abstract)

14. Kumara, S., A. Lakhtakia, and S. Bukkapatnam. 1994. Application of Theory of Chaos to Machine Tool Monitoring. *Proceedings of the NSF Grantees Conference, Boston, MA.* 171-172.

15. Kumara, S., S. Kamarthi, S, Bukkapatnam, and J. Lee. 1994. Sensor Based Monitoring for Real-Time Quality Control in Manufacturing. *Proceedings of the AAAI 1994 Spring Symposium on Detecting and Resolving Errors in Manufacturing Systems, Stanford University, Palo Alto, CA.* 81-87.

16. Ma, H., D. Cannon, and S. Kumara. 1995. A Scheme Integrating Neural Networks for Real-Time Robotic Collision Detection. *IEEE International Conference on Robotics and Automation*. 1:881-886.

17. Ma, H., D. Cannon, and S. Kumara. 1995. Real-Time Robotic Collision Detection Using Neural Networks. *Proceedings of the Tenth International Conference on Mathematical and Computer Modeling and Scientific Computing, Boston, MA.*

18. Kumara, S., A. Lakhtakia, and S. Bukkapatnam. 1995. Chaos in a Turning Operation on a Lathe: Implications for Monitoring and Control. *Proceedings of the NSF Grantees Conference, San Diego, CA.* 393-394.

19. Kumara, S., A. Lakhtakia, and S. Bukkapatnam. 1997. Model of Turning Dynamics and Chatter Based on Chaos Theory. Proceedings of 1997 Joint ASME/ASCE/SES Summer Meeting IL.

20. Yi-Shan Sung, Akshay Ghurye, Supreet Mandala and Soundar Kumara. "Dealing with big data in online social networks' overlapping community detection algorithm." 2012 MOPTA Annual Conference, Bethlehem, PA, USA.

21. Yi-Shan Sung and Soundar Kumara. "Uncovering the effect of dominant attributes on community topology in Facebook networks." *2014 INFORMS Annual Meeting, San Francisco, CA, USA.*

22. Yi-Shan Sung, Ronald Dravenstott, Priyantha Devapriya and Soundar Kumara. "Anticipating provider orders in outpatient clinics." 2015 INFORMS Annual Meeting, Philadelphia, PA, USA.

23. Chonde, S. J., Storer, J. W., and S. Kumara. *Using Network Diversity in Analytics and Visualization*. Presentation at INFORMS 2015. Nov 1 – 3rd, 2015.

24. Chonde, S. J., Storer, J. W., Muller, K.T., and S. Kumara. *Methodology for machine learning in chemical design*. Presentation at 249th National Meeting of American Chemical Society. March 23 – 25, 2015.

Other Papers

1. Kumara, S., A. Soyster, and R. Kashyap. 1986. Artificial Intelligence: An Introduction. *Industrial Engineering*. 9-17.

2. Kumara, S., A. Soyster, and R. Kashyap. 1986. Editor's Note. *Industrial Engineering*. 9-17.

3. Kumara, S. 1988. AI Research at Penn State. *ORSA/TIMS AI Newsletter*. page 2

4. Kumara, S. R. T. 2002. Global Collaborative Manufacturing and the World – Wide Web. *Korean Scientist KSEA Newletters.*

5. Tang, K. and Kumara, S. R. T., Meta-heuristic Enabled Multi-Agent Optimization for Dynamic Transportation Planning. INFORMS, Denver, October 2004.

6. Raghavan U., Thadakamalla, H. P., and Kumara, S. R. T., Survivability of Large-Scale Networks: Topological Perspective, INFORMS, Denver, October 2004.

7. Thadakamalla, H. P., Raghavan, U. N. and Kumara, S. R. T., Decentralized Search Strategies in disordered Complex Networks. INFORMS, Denver, October 2004.

8. Madireddy, M. and Kumara, S. Systems based method for drug target identification for diabetes, INFORMS Annual Meeting, Austin, TX, Nov 2009.

9. Madireddy, M, Stanley, B.A., Lynch, C.J. and Kumara, S. Systems biology based drug target identification for T2DM. INFORMS Annual Meeting, San Diego, CA, Oct 2010.

10. Madireddy, M, Stanley, B.A., Lynch, C.J. and Kumara, S. Network science day, Systems Approach to Drug Target Identification for Diabetes, 16th April 2010 (Poster session-Secured 3rd Prize from among 70 participants)

Externally Supported Research Projects

1. Research projects in progress.

Date: September 2019 – August 2022
Title: Deep Science & AI in personalized medicine
Sponsor: National Institute of Standards and Technology
Amount: $270,000
Contribution: Principal Investigator
Date: September 2019 – August 2021
Title: Additive Manufacturing Sensing (AMASING)
Sponsor: National Institute of Standards and Technology
Amount: $93,000
Contribution: Co-Principal Investigator with Yang, Simpson, and Reutzel.

Date: October 2020 – March 2022
Title: Smart Manufacturing
Sponsor: CESMII
Amount: $1,077,800 ($540,000 Cash)
Contribution: Principal Investigator

2. Research projects completed.

Date: August 1986-August 1987
Title: Entity Relationship Approach for Knowledge Representation in Expert Systems- Research Initiation Grant
Sponsor: Pennsylvania State University
Amount: $5,000
Contribution: Principal Investigator

Date: August 1986-August 1987
Title: CAD/CAM State of the Art Survey
Sponsor: U.S. Army through Applied Research Lab, PSU
Amount: $18,200
Contribution: Co-Principal Investigator with Lehtihet, A (50%)

Date: August 1987-March 1988
Title: Tolerancing Analysis in Product Design and Manufacturing
Sponsor: AT&T Manufacturing Foundation
Amount: $150,000 (only during year 1)
Contribution: Investigator with Ham, I., and Lehtihet, A (16%)

Date: September 1987-August 1988
Title: Expert System for Mat Line Trouble Shooting
Sponsor: Owens/Corning Fiberglas and Ben Franklin Project
Amount: $60,000
Contribution: Co-Principal Investigator with Soyster, A.L., and Freivalds, A (70%)

Date: August 1987-August 1989
Title: An Open Information Flow Architecture for Construction Automation
Sponsor: National Science Foundation
Amount: $365,000 (for 2 years)
Contribution: During 1988-1989: Investigator with Sanvido, V., Medeiros, D.J., and Ham, I.(10%); 1987-1988: Co-Principal Investigator with Sanvido, V., Medeiros, D.J., and Ham, I. (16%)

Date: August 1988-August 1989
Title: Expert System for Mat Line Trouble Shooting
Sponsor: Owens/Corning Fiberglas and Ben Franklin Project
Amount: $40,000
Contribution: Co-Principal Investigator with Soyster, A.L., and Freivalds, A. (80%)

Date: August 1988-August 1989
Title: Standardization of Shop Floor Operations
Sponsor: Ford New-Holland and Ben Franklin Project
Amount: $60,000
Contribution: Co-Principal Investigator with Soyster, A.L. (90%)

Date: August 1989
Title: Qualitative Reasoning in Process Diagnostics: Research Equipment Grant
Sponsor: National Science Foundation
Amount: $70,559
Contribution: Principal Investigator with Cohen, P.

Date: August 1989-August 1990
Title: Expert System for Mat Line Trouble Shooting
Sponsor: Owens/Corning Fiberglas and Ben Franklin Project
Amount: $40,000
Contribution: Principal Investigator

Date: August 1989-August 1990
Title: Connection Management System
Sponsor: United States Department of Agriculture
Amount: $105,000
Contribution: Co-Principal Investigator with Saunders, M., and Foster, M. (Department of Entomology).

Date: July 1989
Title: Microprocessor Based Controllers: Research Equipment Grant
Sponsor: National Science Foundation
Amount: $134,083
Contribution: Co-Principal Investigator with Kenney, E.S., Ray, A., Lee, K., and Edwards, R.

Date: August 1989- August 1992
Title: Intelligent Distributed Control for Nuclear Power Plants
Sponsor: Department Of Energy
Amount: $450,000
Contribution: Co-Principal Investigator with Klevans, E., Edwards, E., Ray, A., Kenney, E and Lee, K. (5%)

Date: September 1991-August 1992
Title: Expert System for Writing Safety Evaluation Reports
Sponsor: PP&L, Grant-in-Aid
Amount: $60,000
Contribution: Co-Principal Investigator, with Levine, S.H. (50%)

Date: October 1992-September 1994
Title: The Development, Testing and Implementation of Expert Systems in Agriculture: Collaboration Between Egypt and the United States
Sponsor: U.S. Department of Agriculture
Amount: $396,199
Contribution: Project Team Member (2.5%)

Date: March 1993
Title: Multi Media Based Research in AI
Sponsor: Unrestricted Research Grant, Hoeaganes Ltd.
Amount: $25,000
Contribution: Principal Investigator

Date: September 1992-October 1992
Title: Automated Text Understanding System: Strategic Mobility Information System (SMIS): LOGMIS
Sponsor: US Army subcontract from Porter Associates
Amount: $14,844
Contribution: Principal Investigator

Date: October 1992-August 1993
Title: Automated Text Understanding System: SMIS: LOGMIS
Sponsor: US Army subcontract from Porter Associates
Amount: $104,000
Contribution: Principal Investigator

Date: January 1993-December 1993
Title: Theory of Chaos and Neural Network Based Monitoring System
Sponsor: National Science Foundation
Amount: $25,000
Contribution: Co-Principal Investigator, with Lakhtakia, A. (50%)

Date: September 1993-January 1994
Title: Support for Contingency Deployments: FLOWIT (Rapid Deployment Model and the Crisis Action Message Analyser CAMA
Sponsor: U.S. Army Subcontract from CACI Inc.
Amount: $91,580
Contribution: Principal Investigator

Date: February 1994-September 1994
Title: Support for Contingency Deployments: FLOWIT (Rapid Deployment Model and the Crisis Action Message Analyser CAMA)
Sponsor: U.S. Army Subcontract from CACI Inc.
Amount: $72,400
Contribution: Principal Investigator

Date: October 1994-December 1994
Title: Center for Intelligent Information Processing: CIIP-Interdisciplinary College of Engineering Center
Sponsor: HRB Systems, Inc.
Amount: $100,000
Contribution: Co-Principal Investigator, with Kasturi, R., and Camps, I.(33%)

Date: July 1994-August 1995
Title: Distributed Intelligent Architecture for Logistics (DIAL)
Sponsor: U.S. Navy
Amount: $94,000
Contribution: Principal Investigator

Date: May 1994-April 1996
Title: Device Independent Multimedia Universal Interface System for Medical Information Management
Sponsor: Department of Defense
Amount: $1,392,937 (Though funded PSU finally got only 150K approx.)
Contribution: Co-PI with Ebb, B.E., Paul, J., Mullineaux, J.J., and Emminger, D (Armstrong County Medical Hospital, Kittaning, PA), (5 PSU Faculty associated) (ACMH at 50%-50%), Co-PI from Penn State. (16.67%)

Date: October 1995-September 1996
Title: Crisis Action Message Analyzer
Sponsor: Rome Air Force Labs, Sub-contract from HRB Systems under CIIP
Amount: $25,000
Contribution: Principal Investigator

Date: May 1995-April 1996
Title: Meta Data Modeling Program
Sponsor: National Security Agency, Sub-contract from HRB Systems under CIIP
Amount: $67,414
Contribution: Principal Investigator

Date: June 1996
Title: Workshop on Real-World Problem Solving in Manufacturing Design
Sponsor: National Science Foundation
Amount: $15,000
Contribution: Principal Investigator

Date: October 1993-March 1997
Title: FMS Modeling and Control Via Extended Moore Machine Networks
Sponsor: National Science Foundation
Amount: $145,000
Contribution: Principal Investigator

Date: January 1995-December 1997
Title: Center for Intelligent Information Processing: CIIP-Interdisciplinary College of Engineering Center
Sponsor: HRB Systems, Inc.
Amount: $100,000
Contribution: Co-Principal Investigator, with Kasturi, R., and Camps, I.(33%)

Date: November 1997-August 1998
Title: Course Development on Internet using WWW
Sponsor: PSU: COE
Amount: $18,000
Contribution: Principal Investigator

Date: May 1996-April 1999
Title: Studies in Shape Analysis
Sponsor: Army Research Office
Amount: $280,000
Contribution: Investigator with Professor C.R. Rao, PI (12.5%)

Date: August 1998-August 1999
Title: Information Warfare
Sponsor: Army Research Office
Amount: $48, 000
Contribution: Principal Investigator

Date: October 1996-May 1999
Title: Multi-Agent Systems in Logistics
Sponsor: Army Research Office
Amount: $232,700
Contribution: Principal Investigator

Date: June 1997 -May 1999
Title: Integrated Process Diagnostics: sensor data fusion and automated reasoning
Sponsor: ARL (US Navy MURI Subcontract)
Amount: $ 150,000
Contribution: Principal Investigator

Date: June 1999 -May 2000
Title: Integrated Process Diagnostics: sensor data fusion and automated reasoning
Sponsor: ARL (US Navy MURI Subcontract)
Amount: $ 90,000
Contribution: Principal Investigator

Date: January 1999 - December 1999
Title: Data mining in the Internet
Sponsor: Raytheon Inc.
Amount: $ 58,000
Contribution: Principal Investigator

Date: July 2000 - August 2002
Title: OTD Process Simulation Framework using agents
Sponsor: General Motors
Amount: $ 118,000
Contribution: Principal Investigator

Date: April 1, 2001 - June 30, 2001
Title: Center for Manufacturing Enterprise Integration (CMEI)
Sponsor: Ben Franklin Program (State Agency)
Amount: $ 25, 200
Contribution: Co-Principal Investigator (With V. Prabhu)

Date: August 2000 - January 2002
Title: Scalable Extended Enterprises
Sponsor: National Science Foundation
Amount: $ 96,000
Contribution: Co-Principal Investigator (33% Summer) with V. Prabhu

Date: March 2001 – June 2001
Title: Center of Excellence – Center for manufacturing Enterprise Integration
Sponsor: Ben Franklin Technology Partnership
Amount: $ 25,200 (10%)
Role: Co-Principal Investigator (with V. Prabhu)

Date: July 2001 – June 2002
Title: Center of Excellence – Center for manufacturing Enterprise Integration
Sponsor: Ben Franklin Technology Partnership
Amount: $ 80,000
PSU Match: $ 95,576
Role: Co-PI (with V. Prabhu) (25% of the amount)

Date: July 2000 - August 2001
Title: Manpower Planning in HRD Process: An IT architecture development for Marine Corps
Sponsor: Marine Corps (MCRU)
Amount: $ 90,000 (Approx) Total project value $ 500,000
Contribution: Technical lead of the project

Date: August 2000 - January 2003
Title: Procurement Problem Solving Using Stochastic Programming, Game Theory and Software Agents
Sponsor: National Science Foundation
Amount: $ 116,000
Contribution: Co-Principal Investigator (33% Summer) with V. Prabhu

Date: July 2002 – June 2003
Title: Center of Excellence – Center for manufacturing Enterprise Integration
Sponsor: Ben Franklin Technology Partnership
Amount: $ 65,000
PSU Match: $ 44,057
Role: Co-PI (with V. Prabhu) (10% of the amount)

Date: May 2001 - April 2004
Title: Studies in Shape Analysis
Sponsor: Army Research Office
Amount: $280,000
Contribution: Investigator with Professor C.R. Rao, PI (12.5%)

Date: July 1, 2003 – August 31, 2004
Title: Enabling Logistics through Portable Wireless Study
Sponsor: US Marine Corps through USMC
Amount: $ 559, 076 (with IE funding of $229, 505)
Contribution: Co- Principal Investigator with David Hall (IST), Zolton Rado (PTI) and Barney Grimes (USMC)
Date: July 2001 - May 2003
Title: Reserve Manpower Management System: RMMS
Sponsor: Marine Corps
Amount: $296,000 (Approx)
Contribution: Technical lead of the project with three faculty members and 5 students

Date: July 1, 2003 – June 30, 2004
Title: Integrated Diagnostics of Ground Equipment Study (IDGE)
Sponsor: US Marine Corps through USMC
Amount: $ 554, 137 (with IE funding of $279, 409)
Contribution: Co- Principal Investigator with David Hall (IST) and Barney Grimes (USMC)

Date: January 1, 2001- July 1, 2005
Title: Chaos Theory based situation extraction, pattern extraction for robust control of cognitive agents
Sponsor: Defense Advanced Research Project Agency (DARPA)
Amount: $ 2.6 M (about $800K subcontracted to IAI)
Contribution: Principal Investigator

Date: September 1, 2003- August 15, 2005
Title: Real-Time Load Make-up and Planning Systems
Sponsor: General Motors
Amount: $150,000
Contribution: Principal Investigator

Date: September 1, 2005- May 15, 2006
Title: Vulnerability Mapping of PA for Homeland Security
Sponsor: Keystone Alliance Funding, PSU
Amount: $25,000
Contribution: Co- Principal Investigator with Reka Albert (50%)

Date: September 15, 2003 – August 31, 2006
Title: ITR: Collaborative Research – An Information Management Infrastructure for Product Family Planning and Mass Customization
Sponsor: National Science Foundation
Amount: $1,045,000
Contribution: Co- Principal Investigator (20%), with Tim Simpson (PI-PSU), Steven B. Shooter (Bucknell), Robert B. Stone (Univ. of Missouri-Rolla), and Janis P. Terpenny (VPI)

Date: August 15, 2003– August 14, 2006
Title: SST/Collaborative Research: Self-Supporting Wireless Sensor Networks for In-Process and In-Service Integrity Monitoring Using High Energy-Harvesting Nonlinear Modeling Principles
Sponsor: National Science Foundation
Amount: $ 800,000 (PSU- $196,657)
Contribution: Principal Investigator (Co-PIs at OK State, MIT and UC Berkeley)

Date: August 15, 2005– August 14, 2007
Title: Large Scale Engineered Complex Networks
Sponsor: National Science Foundation
Amount: $ 200,000
Contribution: Co-Principal Investigator with Reka Albert

Date: August 15, 2006– May 15, 2007
Title: Web services for Supply Chain Management
Sponsor: General Motors, Enterprise Systems Laboratory
Amount: $ 77,000
Contribution: Principal Investigator

Date: August 15, 2006– December 2010
Title: Systems Biology and Health Care Informatics
Sponsor: National Institute of Standards and Technology
Amount: $ 220,000
Contribution: Principal Investigator

Date: August 15, 2007– August 14, 2009
Title: CI- Engineering Design
Sponsor: National Science Foundation
Amount: $ 180,000
Contribution: Co-Principal Investigator with Tim Simpson

Date: August 15, 2008– August 14, 2010
Title: Robust optimal real-time control of multi-class queuing networks
Sponsor: National Science Foundation
Amount: $ 180,000
Contribution: Co-Principal Investigator with Constantino Lagoa and Alberto Bressan

Date: August 15, 2010– May 31, 2011
Title: Retail Analytics
Sponsor: Kimberley Clark Corporation
Amount: $ 53,000
Contribution: Principal Investigator

Date : July 2011 – June 2012
Title : Market Mechanism based iFab for Manufacturing parts
Sponsor: DARPA
Amount: $750, 000 (Approx.)
Contribution: Investigator (one graduate student support)

Date : December 2011 – December 2012
Title : Manufacturing Process Modeling Library
Sponsor: DARPA
Amount: $1, 700, 000 (Approx)
Contribution: Co-Principal Investigator (IE Budget approximately $350K)

Date: April 1, 2011– March 31, 2014
Title: Collaborative Patient Healthcare Networks
Sponsor: National Institute of Standards and Technology
Amount: $ 195,000
Contribution: Principal Investigator

Date: August 15, 2010– August 14, 2015
Title: Management of Supply Chain Networks with Dependent Disruptions
Sponsor: National Science Foundation
Amount: $ 345,000
Contribution: Co-Principal Investigator (42%) ((Dr. Susan Xu, PI)

Date: August 15, 2010– August 14, 2015
Title: Protein Interaction Networks in T2DM
Sponsor: National Institute of Standards and Technology
Amount: $ 165,000
Contribution: Principal Investigator

Date: June 2012 – May 2015
Title : iFAB Foundry
Sponsor: DARPA
Amount: $22,000,000 (Approx)
Contribution: Co-PI (Leading COE team; Main PI: Mark Traband ARL)

Date: October 1, 2012– August 30, 2016
Title: Material Information Modeling for Sustainable Manufacturing
Sponsor: National Institute of Standards and Technology
Amount: $ 250,000
Contribution: Principal Investigator

Date: September 2016– August 30, 2017
Title: Patient Satisfaction Analysis
Sponsor: CoE - Multidisciplinary Seed funding
Amount: $ 20,000
Contribution: Principal Investigator

Date: July 2014 -May 2018
Title: Collaboration Between the Geisinger Center for Healthcare Systems Reengineering and PSUIE
Sponsor: Geisinger Healthcare Systems, PA
Amount: $155, 134
Contribution: Principal Investigator

Date: January 1, 2015– December 31, 2018
Title: Meta Model Development to support additive manufacturing process simulation and analysis
Sponsor: National Institute of Standards and Technology
Amount: $345,760
Contribution: Co-Principal Investigator

Date: September 2015 – September 2018
Title: Investigating the Impact of Co-Learning Systems in Providing Customized, Real-Time Student Feedback
Sponsor: National Science Foundation
Amount: $345,760
Contribution: Co-Principal Investigator with Conrad Tucker

Date: September 2017 – August 2018
Title: Illicit Pharmacy Identification Software
Sponsor: CoE/Smeal College SCOR Seed Funding
Amount: $30,000
Contribution: Co-Principal Investigator with Hui Zhao (Smeal)

Advising and Supervision

Graduate Students Receiving Degrees and Supervised (MS & M.Eng) (76 students)

	Title of Thesis	Student Name	Type of Degree	Date Degree Granted (Mo/Yr) (anticipated date)	Faculty Member's Role (chair, co-chair, or supervisor)
1.	Knowledge Representation Schemes in AI Systems: A Comparative Study	Joo, S. H.	M. S. (IE).	12/88	Advisor & Chair
2.	Uncertainty Modeling in Rule Based Process Diagnostic System	Velou, M.	M. S. (IE).	12/88	Advisor & Chair
3.	The Design, Implementation and Comparison of a Diagnostic Expert System and a Diagnostic Expert Database System	Beardsley, P.	M. S. (IE).	12/88	Advisor & Chair
4.	A Group Technology Based Classification and Coding System for Reinforced Concrete Structures	Sacchetti, J. F.	M. S. (IE).	8/89	Co-Advisor & Chair
5.	An Investigation into the Application of Neural Nets for Component Design Data Retrieval	Kamarthi, V. S.	M. S. (IE).	1/90	Co-Advisor & Chair
6.	A model of conceptual design for mechanical fastener based on functional and causal reasoning	Al-Hamondo, M.	M. S. (IE).	8/90	Advisor & Chair
7.	An Object Oriented Approach for FMS Modeling and Control	Duan, N.	M. S. (IE).	12/90	Advisor & Chair
8.	Data Base Systems	Pattankar, A	M.S. (CS)	12/90	Co-Advisor
9.	Study of Reactive Learning Architecture for Path Planning	Berry, N.	M.S. (CS)	12/91	Co-Advisor
10.	Geometric Reasoning using Super Relation Graph Method for Manufacturing Feature Recognition	Kao, C. Y.	M. S. (IE).	5/92	Advisor & Chair
11.	Graphics Based Learning in Design	Govil, S.	M.S. (CS)	8/92	Co-Advisor

12.	Computational Implementation of Super Relation Graph Method for Interactive Feature Recognition	Gallagher, M.	M. S. (IE).	5/94	Advisor & Chair
13.	Theory of chaos-based machine tool monitoring and control	Bukkapatnam, S.	M. S. (IE).	12/94	Co-Advisor & Chair
14.	A neural network based model for powder injection molding process	Kumar, S.	M. S. (IE).	12/95	Advisor & Chair
15.	Causal Reasoning in Diagnostics	Rolling, R.	M. S. (CSE)	12/96	Advisor & Chair
16.	Intelligent Agent Architecture for Purchasing Management	Yeh, L.	M. S. (IE)	05/97	Co-Advisor & Chair
17.	Feature Selection in Neural Networks for Function Approximation	Ramachandran, V.	M. S. (IE)	08/97	Co-Advisor & Chair
18.	An application of software agents to internet based on-line customer order processing	Seshadri, T.R.	M. S. (IE).	08/98	Advisor & Chair
19.	A classification scheme for an online grocery store's customer using sequential pattern analysis	Cahya, S.	M. S. (IE).	12/98	Advisor & Chair
20.	Issues of representation, detection, prediction and classification in the context of machine condition monitoring and shape analysis	Shreesh, M.	M. S. (IE).	12/99	Advisor & Chair
21.	A Comparison between Fourier and wavelet representation schemes in shape analysis	Guza, K	M. S. (IE).	12/99	Co-Advisor & Chair
22.	Knowledge Representation using conceptual graphs for interactive map system	Walchli, J	M. S. (IE).	12/00	Co-Advisor & Chair
23.	A distributed multi-agent model for value nets	Dodd, C	M. S. (IE).	05/01	Advisor & Chair
24.	An approach to development of an e-commerce guideline for the small manufacturer	Ryans, N	M. S. (IE).	05/01	Advisor & Chair

25.	Information modeling through unified modeling language: application to small business manufacturing and service organizations	Wallace, J	M. S. (IE).	05/01	Advisor & Chair
26.	Study of wireless implementation for agent communication in value networks	Balasubramanian, A	M. S. (IE).	05/01	Advisor & Chair
27.	Geometric task decomposition in a multi-agent environment	Kaivan, K	M. S. (CSE)	05/01	Co-Advisor
28.	Image storage, transmission and recognition: fractal compression based approach	Tang, K.	M. S. (IE)	12/01	Advisor & Chair
29.	Load monitoring and prediction in multi-agent based supply chains: A data mining approach	Gupta, H	M. S. (IE)	12/02	Advisor & Chair
30.	Bio-informatics	Ding, X	M.S. (CSE)	05/04	Advisor
31.	Peer-to-peer networks	Mallikarjun, V	M.S. (CSE)	05/04	Advisor
32.	Decentralized search strategies in disordered complex networks	Thadakamalla, H	M.S. (IE)	08/04	Co-Advisor & Chair
33.	A Study on Systems Optimization of Supply Networks Using Evolutionary Algorithms	Pinto, E. G.	M.S. (IE)	12/04	Advisor & Chair
34.	Maintenance Scheduling	Hsiuh-Yun Liu	M.S. (IE)	12/04	Advisor & Chair
35.	Survivability of complex systems	Narayanan, V	M.S. (IE)	05/05	Co-advisor & Chair
36.	Decentralized topology control algorithms to maintain connectivity in distributed wireless sensor networks	Raghavan, U	M.S. (IE)	12/05	Advisor & Chair
37.	RFID in Manufacturing Systems	Burgoa, A	M.S. (IE)	05/06	Advisor & Chair
38.	Vulnerability Map Generation for Homeland Security	Chang, C	M.S. (IE)	05/06	Advisor & Chair

39.	Systems Biology	Sriram, P	M.Eng. (IE)	05/08	Advisor & Chair
40.	Creation and Analysis pf Purpose Driven Online Social networks- Applications to Parents of Gifted Children	Rai, A	M.S. (IE)	08/08	Advisor & Chair
41.	Data Mining and Network Mining Approach for Significant Protein Identification in Gastric Bypass Surgery	Madireddy, M	M.S. (IE)	08/09	Advisor & Chair
42.	Blood Inventory Simulation	Raman, A	M.S. (IE)	08/11	Advisor & Chair
43.	Optimization Driven Design Synthetic Genetic Circuits using Biobricks	Zomorrodi, A	M.S. (IE)	08/11	Co-Advisor
44.	Supplier Selection Under Product Breakdown structure constraints	Lawit, A	M.S. (IE)	05/12	Advisor & Chair
45.	Data Visualization and Pattern Identification Techniques: Application in Manufacturing	Lidstone, S	M.S. (IE)	05/12	Advisor & Chair
46.	Big Data Analytics: Clustering Applied to Retail Data	Shu-Fan, C	M.Eng (IE)	08/12	Advisor & Chair
47.	Design and Implementation of Automated Assembly Planning Methodology	Nallamothu, P	M.S. (IE)	05/13	Advisor & Chair
48.	Material Information Modeling for Sustainable Manufacturing	Tang, D	M.S. (IE)	05/14	Advisor & Chair
49.	Retail data Analytics	Palaniappan, A	M.S. (IE)	05/14	Advisor & Chair
50.	Colorectal Cancer Data Analysis	Gao, S	M.S. (IE)	05/15	Advisor & Chair
51.	New Graph Visualization Techniques	Juxihong, J	M.S. (IE)	12/16	Advisor & Chair
52.	Real-Time Supply Chain Analytics- Shipment Duration Prediction (Schreyer's IUG Honors Student)	Polim, R	M.S. (IE)	12/16	Advisor & Chair

53.	Movie – Actor revenue analytics (Schreyer's Honors Student Paper)	Wagura, D	B.S (IE)	05/16	Advisor & Chair
54.	Food Bank Distribution Center Analysis	Varun Chellappa	M.S. (IE)	12/16	Advisor & Chair
55.	Illicit Pharmacy Supply Chain Analytics	Sowmyasree, M	M.S. (IE)	07/16	Co-Advisor & Chair
56.	A mixed integer linear programming (MILP) approach for scheduling	Bharve, N	M.S. (IE)	08/17	Advisor (Paper)
57.	IMDB data analytics (Schreyer's Honors Student Paper)	Preston, S	BS (IE)	12/17	Advisor
58.	Meta Modeling in Additive Manufacturing	Rho, B	M.S. (IE)	12/17	Co-Advisor
59.	Clustering and Prediction Model for the Campus BBS Based on User Behavior	Tang, R	M.S. (IE)	12/17	Advisor (Paper)
60.	Patient Satisfaction Analysis	Hu, Q	M.S. (IE)	05/18	Advisor (Paper)
61.	Improve Food Supply Chain Traceability using Blockchain	Mohan, T	M.S. (IE)	05/18	Advisor
62.	Online Customer Analytics	Anu, A	M.S. (IE)	08/18	Advisor (Paper)
63.	Multivariate machine learning approach for agricultural equipment sales forecasting	Aggarwal, A	M.S. (IE)	08/18	Advisor (Paper)
64.	Prediction of Type II Diabetes Using Radial Basis Function Neural Network Model with Regularization	Kesarkar, S	M.S. (IE)	12/18	Advisor (Paper)
65.	Amazon Fine Food Reviews: Design and Implementation of an Automated Classification System	Sharedalal, R	M.S. (IE)	05/19	Advisor
66.	Online Customer Review Analytics	Visanu, C	M.S. (IE)	07/19	Advisor

67.	Analysis of Opioid Related Adverse Events and Signal Detection with Machine Learning	Dolzodmaa, D	M.S. (IE)	08/19	Advisor
68.	Blockchains in supply chain	Bansal	M.S. (IE)	05/20	Co-Advisor (Paper)
69.	Deep Learning	Handa, R	M.S. (IE)	05/20	Advisor (Paper)
70.	Deep Learning in Supply Chain	Navya, S	M.S. (IE)	05/20	Advisor
71.	Deep Learning	Seda, S	M.S. (IE)	05/20	Advisor
72.	Graph Analytics	Soumya, S	M.S. (IE)	05/20	Advisor
73.	Novel Biotechnology Platform Based Vaccine Manufacturing for Covid-19 and Beyond	Vishnu, K	M.S. (IE)	08/21	Advisor
74.	Blockchain Enabled Vaccine Supply Chain Provenance	Goda, M	M.S. (IE)	08/21	Advisor
75.	Data Visualization with Virtual Reality	Pranjali, Y	M.S. (IE)	08/21	Advisor
76.	State-of-the-Art Deep Learning for Multi-Product Intermittent Time Series Forecasting	Ronish Samir, R	M.S. (IE)	08/21	Advisor

Ph.D., Students (64 students)

1.	Learning Rules from Examples in Rule Based System via Mathematical Programming	Triantaphyllou, E.	Ph. D. (IE)	8/90	Co-Advisor With A.L. Soyster
2.	Continuous Process Diagnostics using Qualitative Reasoning	Lee, J. D.	Ph. D. (IE)	8/92	Advisor & Chair
3.	Automated Sequence Generation and Selection for Mechanical Assembly and Part Replacement	Lee, Y. Q.	Ph. D. (IE)	8/93	Advisor & Chair

4.	Process Design, Diagnostics, and Control in Manufacturing through Fuzzy Logic and Neural Networks	Chen, Y.-T.	Ph. D. (IE)	12/93	Advisor & Chair
5.	Extended Moore Machine Network Model for Discrete Event Control of Flexible Manufacturing Systems	Duan, N.	Ph. D. (IE)	12/93	Co-Advisor with Mike Saunders & Chair
6.	Computational Cognitive Linguistics	Heinze, D. T.	Ph. D. (IE)	5/94	Advisor & Chair
7.	Performance of Multilayer Neural Networks under Faulty Conditions	Merchawi, N. S.	Ph. D. (IE)	5/94	Co-Advisor with C.R. Das & Chair
8.	On-line Tool Wear Estimation in Turning through Sensor Data Fusion and Neural Networks	Kamarthi, V. S.	Ph. D. (IE)	12/94	Co-Advisor with P.H. Cohen & Chair
9.	Automated Visual Inspection and Classification by Neural Networks in Manufacturing	Kim, T.	Ph. D. (IE)	8/95	Advisor & Chair
10.	TRIO: A CAD Based 3-D Object Recognition System in Manufacturing	Kao, C.-Y.	Ph. D. (IE)	12/95	Co-Advisor with O. Camps & Chair
11.	Adaptive neural network control with inverse model: Application to the control of turning process	Sheen, D.	Ph. D. (IE)	12/95	Advisor & Chair
12.	Acoustic Emission Sensing for Tool Wear estimation and Control in Metal Cutting	Chittayil, K.	Ph. D. (IE)	5/96	Advisor & Chair
13.	Intelligent integrated diagnostics: Process monitoring and diagnosis for on-line quality control of powder injection molding	Lee, J.	Ph. D. (IE)	5/96	Advisor & Chair
14.	A replanning system for transportation/redistribution for use in a distributed environment	Moore, M. L.	Ph. D. (IE)	5/96	Advisor & Chair
15.	REAGERE: A Multi-Agent Architecture for Manufacturing Systems	Berry, N.	Ph. D. (IE)	5/97	Advisor & Chair

16.	Monitoring and Control Issues in Chaotic Processes: An application to turning process	Bukkapatnam, S.	Ph. D. (IE)	8/97	Co-Advisor with A. Lakhtakia & Chair
17.	Modeling and control of flexible manufacturing system using the timed extended Moore machine network model	Daltrini, A.	Ph. D. (IE)	12/98	Advisor & Chair
18.	Distributed and collaborative logistics planning and replanning under uncertainty: A multiagent based approach	Satapathy, G	Ph. D. (IE)	12/99	Advisor & Chair
19.	On-line machinery health diagnosis and prognosis for predictive maintenance and quality assurance of equipment functioning	Suh, J.	Ph. D. (IE)	12/01	Advisor & Chair
20.	Market-Based Dynamic Resource Control of distributed Multiple Projects	Lee, Y-H.	Ph. D. (IE)	08/02	Advisor & Chair
21.	A prosody based perspective for automated understanding of co-verbal gestures	Kettebekov, S.	Ph. D. (IE)	05/03	Co-Advisor with R. Sharma & Chair
22.	Multi-agent and market based dynamic optimization and its extensions to distributed supply chain procurement planning problems	Tang, K.	Ph. D. (IE)	05/05	Advisor & Chair
23.	Using topological constructs to model interactive information retrieval dialogue in the context of Belief, Desire, and Intention Theory	Nowack, C.	Ph. D. (IE)	05/05	Co-Advisor with C. Byrne& Chair
24.	Market-based model predictive control for survivable distributed information systems: resource allocation and algorithm selection	Lee, S.	Ph. D. (IE)	12/05	Advisor & Chair
25.	Queueing models for resource sharing in computer systems	Mahabhashyam, S.	Ph. D. (IE)	05/06	Co-Chair

26.	A study of repeat collaboration in social affiliation networks	Carrino, C	Ph.D. (IE)	12/06	Co- Advisor (with Reka Albert of Physics) &Chair
27.	Optimal control problems on stratified domains: application to single-station multiclass queueing systems with finite buffers and overflow costs	Hong, Y.	Ph. D. (IE).	12/06	Co-Advisor (with A. Bressen of Math)& Chair
28.	Performance and control of parallel multi-server queues with applications to web hosting services	Chen.Y	Ph. D. (IE).	12/06	Co-Advisor (with N.Gautam of IE) & Chair
29.	Double Action Mechanism in Supply Chain	Kim, J.	Ph. D. (IE)	12/06	Advisor &Chair
30.	Web services and intelligent search	Oh, Seogchen	Ph.D. (IE)	05/07	Co-Advisor (with Dongwon Lee of IST)&Chair
31.	Performance modeling and resource allocation for adaptive agent-based systems	Gnanasambandam, Nathan	Ph.D. (IE)	05/07	Advisor &Chair
32.	A Strategic Module-based Platform Design for Developing Customized Families of Products and Services	Moon, Seungki	Ph.D. (IE)	12/07	Chair & Co-Advisor
33.	Decentralized algorithms for search and routing in large-scale networks	Thadakamalla, H.	Ph. D. (IE).	08/07	Co- Advisor (with Reka Albert of Physics) & Chair
34.	Distributed Energy-Balanced Routing in Wireless Sensor Networks	Ok, Chang-Soo	Ph.D. (IE)	08/08	Advisor &Chair
35.	Clustering and connectivity problems in complex networks	Raghavan, U	Ph.D. (IE)	08/08	Co- Advisor (with Reka Albert of Physics) & Chair

36.	Dynamic Supply Chain Networks	Caliz, R	Ph.D. (IE)	08/09	Co- Advisor (with Constantino Lagoa) & Chair
37.	Integer programming aspects in metabolic networks	Satish, V	Ph.D. (IE)	08/09	Chairman (Advisor: Costas Maranas)
38.	Asset and Business Graphs	Cavdur, F	Ph.D. (IE)	08/10	Advisor & Chair
39.	Optimization in Web Service Composition	Yoo, J	Ph.D. (IE)	08/10	Advisor & Chair
40.	Agent Based Supply Chain Networks	Siruvanambood, S	Ph.D. (IE)	08/10	Advisor & Chair
41.	Efficient and scalable biologically plausible spiking neural networks with learning applied vision	Gupta, A	Ph.D. (CSE)	05/11	Chair
42.	Mathematical theory of service composition and service networks	Cui, L	Ph.D. (IE)	05/11	Advisor & Chair
43.	Supply Chain Disruptions	Masihtehrani, B	Ph.D. (IE)	08/11	Co-Advisor & Co-Chair
44.	Hard and Soft Sensor Information Fusion Using Cognitive Injection Process for Decision Making	Sudit, D	Ph.D. (IE)	08/12	Co-Advisor & Chair
45.	Scalable and robust algorithms for mining clusters in graphs	Mandala, S	Ph.D. (IE)	08/13	Advisor & Chair
46.	HCI in Health Analytics	Yang, H	Ph.D. (IE)	12/14	Advisor & Chair
47.	Blood Supply Chains	Choi, S	Ph.D. (IE)	08/15	Advisor & Chair
48.	Integrating Sustainability in Manufacturing Process Planning	Hatim, Q	Ph.D. (IE)	08/15	Co-Advisor & Chair

49.	Spectral Top-N: A Computationally Efficient Algorithm for Big Data Analytics	Hutchison, K	Ph.D. (IE)	08/15	Advisor & Chair
50.	Leveraging Social Networks for Efficient Hurricane Evacuation	Madireddy, M	Ph.D. (IE)	12/15	Advisor & Chair
51.	Graph Analytics in diversity analysis in text documents	Chonde, S	Ph.D. (IE)	05/16	Advisor & Chair
52.	Network Analytics and Machine Learning: Applications to Online Social Networks and Healthcare Systems	Yi-Shan, S	Ph.D. (IE)	08/17	Advisor & Chair
53.	Healthcare Modeling and Analysis	Agarwal, D	Ph.D. (IE)	08/17	Co-Advisor & Chair
54.	Evolving Intelligent Control Rules for a Collaborative Multi-Agent Manufacturing Cell	Latorella, M	Ph.D. (IE)	12/17	Advisor & Chair
55.	Dynamic network modeling and analysis of largescale internet of things with manufacturing and healthcare applications	Kan, C	Ph.D (IE)	5/17	Co-Advisor & Co-chair
56.	Disaster Evacuation Modeling	Hongseok, N	Ph.D. (IE)	12/18	Co-Advisor & Co-Chair
57.	Data-driven Modeling and Interpretable Machine Learning with Applications in Healthcare	Liu, N	Ph.D. (IE)	08/18	Advisor & Chair
58.	Nonlinear Dynamics in Health Analytics	Cheng-Bang Chen	Ph.D. (IE)	12/19	Co- Advisor & Chair
59.	Essays in Man Power Planning	Garza, A	Ph.D. (IE)	12/19	Advisor & Chair
60.	Interpretable artificial intelligence models to Detect chronic and infectious diseases	Zoakeinikoo, M	Ph.D. (IE)	08/20	Advisor & Chair

61.	Equitable food distribution – modeling and analysis of food banks supply chains using machine learning and recurrent optimization-based simulation	Alotaik, O	Ph.D (IE)	08/21	Advisor & Chair
62.	Condition-based maintenance policy optimization using genetic algorithms and gaussian markov improvement algorithm	Hoffman, M	Ph.D (IE)	08/21	Co-Advisor & Co-Chair
63.	Machine Learning in Scheduling	Julaiti, J	Ph.D. (IE)	12/21	Advisor & Chair
64.	Sustainable Planet: Site Suitability Analysis for Solar Photovoltaic Power Plants Using Fuzzy MCDM and Network Science Based Approaches	Abdullah, A	Ph.D. (IE)	5/22	Advisor & Chair

Current Thesis Students

1.	Megacity Logistics	Jo Jihyun	Ph.D. (IE)	05/22	Co-Advisor & Co-Chair
2.	Health Supply chain Analytics	Hostetler, S	Ph. D. (IE)	08/22	Advisor & Chair
3.	Blockchain in Healthcare Analytics	Hu, Q	Ph. D. (IE)	08/22	Advisor & Chair
4.	Solar Placement study for Saudi Arabia	Abdullah, A	Ph. D. (IE)	12/22	Advisor & Chair
5.	DDI in Health Crisis Management	Liu, M	Ph. D. (IE)	12/22	Advisor & Chair
6.	Manufacturing Real-time control	Verma, A	Ph. D. (IE)	05/24	Advisor & Chair
7.	Image Analysis in Tissue Analysis	Chen, Z	Ph. D. (IE)	05/24	Advisor & Chair
8.	Machine Learning in Manufacturing	Das, D	Ph. D. (IE)	05/25	Advisor & Chair
9.	Machine Learning in Healthcare	Ogidigben, M	Ph. D. (IE)	05/25	Advisor & Chair

10. Phone Usage and Mental Health Vulnerability	Feuer, B	B.S (IE)	05/22	Co-Advisor
11. NAS Vulnerability Index for Pennsylvania Counties	Haas, N	B.S (IE)	05/22	Co-Advisor

Membership on graduate degree candidates' committees (108) *(above names are not repeated)*

Student Name	Type of Degree	Student Name	Type of Degree
Hu, P.-C. (1989)	M. S. (IE)	Kim, M. (1990)	Ph. D. (Comp. Sci.)
Chen, Y.-T. (1990)	M. S. (IE)	Goodnow, K. J. (1990)	Ph. D. (EE)
Bouck, M. M. (1991)	M. S. (IE)	Lysak, D. (1991)	Ph. D. (EE)
Smith, M. (1994)	M. S. (IE)	Park, J. (1992)	Ph. D. (EE)
Yu, Z. (1994)	M. S. (IE)	Uang, C. M.(1993)	Ph. D. (EE)
Wu, D. S.-Y. (1987)	Ph. D. (IE)	Garga, A. K. (1994)	Ph. D.(EE)
Filho, E. V. (1988)	Ph. D. (IE)	Huang, C-Y. (1997)	Ph.D. (EE)
Manivannan, S. (1988)	Ph. D. (IE)	Cho, S. (1992)	Ph. D. (Comp. Eng.)
Jung, E. S. (1989)	Ph. D. (IE)	Yang, M. K. (1992)	Ph. D. (Comp. Eng.)
Mittal, R. (1990)	Ph. D. (IE)	Lai, C. P. (1993)	Ph. D. (Comp. Eng.)
Han, C. P. (1990)	Ph. D. (IE)	Choi, K. (1993)	Ph. D. (Comp. Eng.)
Lacksonen, T. A.(1991)	Ph. D. (IE)	Berrachard, A. (1994)	Ph. D. (Comp. Eng.)
Lin, R. (1991)	Ph. D. (IE)	Devadiga,S (1997)	Ph. D. (CS&E)
Qi, C. (1992)	Ph. D. (IE)	Kosiba, D (1998)	Ph.D. (CS&E)
Shih, C. (1992)	Ph. D. (IE)	Caplin, J. (1998)	Ph. D. (ME)
Lu, M. S. (1992)	Ph. D. (IE)	Khayyal, S. A. (1990)	M. S. (Arch. Eng.)
Wang, C. G. S. (1993)	Ph. D. (IE)	Kuntz, K. A. (1994)	Ph. D. (Arch. Eng.)
Chen, J. M. (1993)	Ph. D. (IE)	Riley, D. (1994)	Ph. D. (Arch. Eng.)
Grinde, R. B. (1993)	Ph. D. (IE)	Messner, J. I. (1994)	Ph. D. (Arch. Eng.)
Jeong, B. (1993)	Ph. D. (IE)	Suh, S. J. (1989)	Ph. D. (Nucl. Eng.)
Kesavadas, T. (1994)	Ph. D. (IE)	Edwards, R. M. (1991)	Ph. D. (Nucl. Eng.)

Kim, K. (1994)	Ph. D. (IE)	Nicholas, T. C. (1987)	M.Engg. (CE)
Kuo, R. J. (1994)	Ph. D. (IE)	Raynar, K. A. (1990)	M. S. (CE)
Han, Y. G. (1995)	Ph. D. (IE)	Hanna, A. (1990)	Ph. D. (CE)
Joo, Y. S. (1995)	Ph. D. (IE)	Syal, M. G. (1993)	Ph. D. (CE
Ma, H. (1996)	Ph. D. (IE)	Sravanapudi, P.A.(1990)	M. S.(Bus. Adm.)
Park, K (1996)	Ph.D. (IE)	Chin, P. O. (1990)	M. S. (Bus. Adm.)
Gunesena, U. (1997)	Ph.D. (IE)	Bhatia, U. (1992)	M. S. (Bus. Adm.)
MacDonald, P. (1997)	Ph.D. (IE)	Lin, S. (1993)	M. S. (Arch.)
Owino, T. (1998)	Ph.D. (Ag. Eng)	Engiles, M. (1993)	M. S. (Bus. Adm.)
Suryavanshi, S (1996)	Ph.D. (Stats)	Menon, S.(1995)	Ph.D. (E.Sci&Mech)
Oommen, M.P.(1994)	Ph.D. (Ming.Eng)	Chatfield, D. (1998)	Ph.D. (Bus. Adm)
Martin, M(1999)	Ph.D (IE)	Yan, M(1999)	Ph.D. (EE)
Kosiba, D.(1999)	Ph.D(CSE)	Gargi, U. (1999)	Ph.D. (EE)
Owino, T. (1999)	Ph.D. (Ag. Eng)	Pittman, J.(2000)	Ph.D.(Stats)
Ramanujan, T.(2001)	Ph.D. (IE)	Subramanian V. (2000)	M.S (IE)
D'souza, G. (2001)	M.S. (IE)	Nanda, J. (2003)	M.S. (IE)
Singh, A. (2004)	M.S. (IE)	Sengupta, S (2005)	M.S. (IE)
Bhandarkar, D (2005)	M.S. (IE)	Rao, A (2005)	M.S. (IE)
Satish, A (2005)	M.S. (ME)	Deepak, J (2005)	M.S. (IE)
Nanda , J (2006)	Ph.D. (IE)	Thevenot, H., (2006)	Ph.D. (IE)
Serken, Y (2005)	Ph.D.(Nucl Eng)	Yukish. M. (2004)	Ph.D. (ME)
Chen, Z (2006)	Ph.D. (CSE)	Ajay, N (2007)	Ph.D. (IE)
Damodar, B(2007)	Ph.D. (IE)	Atul Rangarajan(2007)	Ph.D. (IE)
Yin, J (2007)	Ph.D. (IE)	Tiwari, A(2007)	Ph.D. (EES)
Gupta, A (2008)	Ph.D. (CSE)	Bilsel, U (2007)	Ph.D. (IE)
Kim, Tae Il (2008)	Ph.D. (IE)	Feng, B (2008)	Ph.D. (IE)
Nathan, S (2015)	Ph. D. (IE)	Suchitra, R (2016)	Ph. D. (IE)

Bhaskar Padala(2015)	Ph. D. (CSE)	Slota George. (2016)	Ph. D. (CSE)
Andrew, G (2014)	Ph.D. (CE)	Kang, P (2016)	Ph. D. (IE)
Fangle Chang(2016)	Ph.D. (AE)	Kasheng Ma (2017)	Ph. D. (CS)
Adam Meyers (2021)	Ph.D. (IE)	Ruimin Chen (2021)	Ph. D. (IE)
Zacharie Idriss (2021)	Ph.D. (EE)	Sun Yeiwei (2021)	Ph.D.(CS)
Noor Felembaum (2022)	Ph.D. (CS)	Mishra Cyan (2023)	Ph.D. (CS)

Membership on National or International Committees Related to Area of Research

1. International Institute of Production Research (CIRP) Related

CIRP Task Group on AI in Manufacturing Engineering- *Secretary*, August 1994-August 1995 and *Member*, August 1995-August 1997. (To define the role of Artificial Intelligence in Manufacturing and charter future research directions)

CIRP Working Group on CIRP Information Super Highway- *Secretary*, August 1995-Current. (To define, design and implement Internet based activities, home pages and digital library for CIRP community)

2. World Federation on Information Processing (WFIP)Related

WFIP Working Group 5.8 on Product Design Information Specification , Member August 1996 -1998 (one of the 12 members worldwide)

3. Panel Memberships (parts are repeated under workshops)

Invited as a panel member consisting of six experts nationally for a round table discussion held at Boston, MA, by the Institute of Industrial Engineers, *to discuss AI in Manufacturing*, December 1986

Invited to participate in the Indo-US workshop on Image Processing, Sensor Integration and Sensor Data Fusion organized by Center for Development of Advanced Computing, India and Office of Naval Research, USA, December 1993

Invited to Participate in the Panel *to Discuss Intelligent Process Monitoring* at the American Association of Artificial Intelligence Symposium on Error Recovery in Manufacturing, AAAI Spring Symposium, at Stanford University, March 1994

Panel Member – discussion on Intelligent Systems. Brazilian AI conference. 1996.

Panel member – discussion on distributed sensing. INFORMS 2003. Atlanta, GA.

QSR Education in IE – Panel Member INFORMS 2007

IT Role in IE – Panel Member, ISERC 2012

Data Analytics – Panel Member, ISERC 2015

IoT – Panel Member, ISERC 2015

IoT and Big Data Panel Member, INFORMS 2015

IEEE Big Data in Manufacturing Symposium Panel Member, 2016

4. Founding and Organizing International Research Meetings

Co-Chairman and Co-Organizer, with Ham, I., *CIRP International Working Seminar on AI Based Product Design*, The Pennsylvania State University, USA, May 1990

Co-Chairman and Co-Founder, with Dagli, C.H., and Shin, Y.C., *International Conference on Neural Networks in Engineering (ANNIE '91*), St. Louis, Missouri, November 1991

Co-Chairman and Co-organizer with Shin, Y.C., and Abdelmonem, M., *Neural Networks in Manufacturing and Robotics, ASME Winter Annual Meeting*, Anaheim, CA, December 1992

Co-Chairman and Co-Organizer, with Dagli, C.H., Fernandez, B.F., and Ghosh, J.P *International Conference on Neural Networks in Engineering (ANNIE '94*), St. Louis, Missouri, November 1994

Co-Chairman, 4th International Conference on Internet of Things, MIT Cambridge, October 6-8, 2014.

5. International Research Meetings: Organizing Committee Membership

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '92), St. Louis, Missouri, November 1992

Member-Organizing Committee, Robotics and Automated Manufacturing-2nd International Conference, Robotics and AI Institute, Bangalore, India, January 1993

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '93), St. Louis, Missouri, November 1993

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '94), St. Louis, Missouri, November 1994

International Program Committee Member, Symposium of Brazilian Artificial Intelligence, October 1995

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '95), St. Louis, Missouri, November 1995

International Program Committee Member, Symposium of Brazilian Artificial Intelligence, October 1996

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '96), St. Louis, Missouri, November 1996

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '97), St. Louis, Missouri, November 1997

Member-International Organizing Committee, 3rd World Congress on Intelligent Manufacturing Systems, Hungary, June 1997

Member-Organizing Committee, Intelligent Manufacturing Systems : SPIE Workshop, Pittsburgh, October 1997

Member-International Organizing Committee, 4rd World Congress on Intelligent Manufacturing Systems, Beograd, Yugoslavia, June 1998

Member-International Organizing Committee, CIRP Seminar on Manufacturing Systems, Berkeley, USA, May 1998

Member-International Organizing Committee, 6th Symposium on Condition Based Monitoring, Warsaw, Poland, May 1998

Member-International Organizing Committee, Computational Methods in Manufacturing Engineering, Naples, Italy, Nov 1998

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '98), St. Louis, Missouri, November 1998

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE '99), St. Louis, Missouri, November 1999

Member-International Organizing Committee, CIRP Manufacturing Systems Seminar, Brussels, Belgium, 2000.

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE 2000), St. Louis, Missouri, November 2000

Member-International Organizing Committee, Manufacturing Conference of China, Hong Kong, July 2000

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE 2001), St. Louis, Missouri, November 2001

Member-International Organizing Committee, Manufacturing Conference of China, Hong Kong, October, 2002

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE 2002), St. Louis, Missouri, November 2002

Member-Organizing Committee, Industrial Engineering Research Conference (IERC), 2003

Member-Organizing Committee, International Conference on Neural Networks in Engineering (ANNIE 2003), St. Louis, Missouri, November 2003

Member- Program Committee, Industrial Engineering Applications of Artificial Intelligence- 14th Conference, Budapest, Hungary, June 2003.

Member- Program Committee, Industrial Engineering Applications of Artificial Intelligence- 16th Conference, Ottawa, Canada, June 2004.

Member- Program Committee, Open Cougaar Conference, *August 2004.*

International Federation of Automatic Control (IFAC) Conference on Manufacturing, Modeling, Management and Control, Athens, Greece, October 2004.

Member- Program Committee, Industrial Engineering Applications of Artificial Intelligence- 17th Conference, Bari, Italy, June 2005.

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Member- Program Committee, IEEE Conference on Automation Science and Engineering (CASE) 2005, Ontario, Canada, August 2005.

Member- Program Committee, Open Cougaar Conference, *August 2005.*

Member- Program Committee, IEEE Multi Agent Systems and Simulation, Drexel University, August 2004.

Member- Program Committee, IEEE Multi Agent Systems and Simulation, Drexel University, August 2005

Member- Program Committee, 13P^{thP} International Conference on Advanced Computing and Communication, ADCOM 2005, December 14-17, Amrita Viswa Vidya Peetam, Coimbatore, India, Dec 2005.

Member- Program Committee, IEEE International Conference on Service Operations and Logistics, and Informatics, Beijing, Shanghai, China, June 2006.

Member- Program Committee, 3rd International Conference on Quality, Reliability and Inforcom Technology (ICQRIT 2006) , New Delhi, India, Dec 2006.

Member- Program Committee, Semantic Sensor Networks Workshop, November 5-9, Athens, Georgia, November 2006.

Member- Program Committee, IEEE Conference on Automation in Science and Engineering (IEEE CASE), 2007, 2009.

Member- Program Committee, Integrated Product Service Systems (IPS2): Conferences in Likoping, Sweden (2010), Germany (2011), and Tokyo, Japan (2012), UK (2014), UK (2015), (2016) and (2017)

Member - *Program Committee, CIRP Design Conference, Northwestern University, May 2020*

6. International Research Meetings: Session Chairman Role (partial list)

Session Chairman, International Conference on Neural Networks in Engineering (ANNIE '91), St. Louis, Missouri, November 1991

Session Chairman, International Conference on Neural Networks in Engineering (ANNIE '92), St. Louis, Missouri, November 1992 .

Session Chairman, International Conference on Neural Networks in Engineering (ANNIE '93), St. Louis, Missouri, November 1993 .

Session Chairman on Neural Networks in Manufacturing, ORSA/TIMS, April 1992

Session Chairman on Neural Networks in Manufacturing, ORSA/TIMS, April 1993

Session Chairman, International Conference on Neural Networks in Engineering (ANNIE '94), St. Louis, Missouri, November 1994

Editorships/advisory boards to journals

Editorial Board Member, Frontiers of Information Systems, since January 1999.

Editorial Advisory Board: International Journal of Smart Systems and Engineering, March 1997 – August 1999.

Editorial Board Member, International Journal of Production Research, January 1997 through December 2000

Consulting Editor, International Journal of Industrial Engineering: Applications and Practice, January 1997-January 2004

Area Editor, *Computational Intelligence*, International Journal of Industrial Engineering: Applications and Practice, 1994-January 1997

Editorial Board Member, International Journal of Computational Intelligence and Organizations, September 1995-March 1997

Editorial Board Member, International Journal of Advanced Manufacturing Technology, January 1996 through January 2002

Editorial Advisory Board Member, International Journal of Advanced Manufacturing Technology, January 2002-December 2005.

Editorial Board Member, IEEE Transactions on Automation Science and Engineering, 2006-2009

Editorial Board Member, CIRP Journal of Advanced Manufacturing Systems, 2008-Current.

Associate Editor, ASTM Journal of Smart and Sustainable Manufacturing, 2016-current

Departmental Editor, IISE Transactions on Design and Manufacturing Systems, Smart and Cyber Manufacturing Systems, 2018-Current.

Journal Guest Editor Role

Co-Editor, ASTM Journal of Smart and Sustainable Manufacturing, AI in Manufactuirng, (along with Stephan Biller (IBM), Subbarao (ONL)), 2018

Co-Editor, with Soyster, A.L., and Kashyap, R.L., *Series in AI in Manufacturing*, Industrial Engineering, Institute of Industrial Engineers, December 1986-December 1987

Co-Editor, with Ohsuga, S., and Ham, I., *Special issue on AI in Manufacturing*, Applied Artificial Intelligence, an International Journal, Published by the Austrian Institute of AI, 1992

Co-Editor, with Ohsuga, S., and Shin, Y.C., *Special issue on Neural Networks in Manufacturing*, Journal of Intelligent Manufacturing, 1992

Other Research Contributions

1. Research Center and Lab founded

Founder, *Intelligent Design and Diagnostics Research Laboratory (currently LISA)* Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, University Park, PA, 1987. (current name: LISA)(Laboratory for Intelligent Systems and Analytics).

Founder and Technical Co-Director, *Center for Intelligent Information Processing-CIIP*, An Interdisciplinary - Industry Based ***College of Engineering Center***, The Pennsylvania State University, University Park, PA, R. Kasturi (Comp.Sci &Eng.) and O.I. Camps (EE) were involved, December 1995-1999.

Technical Co-Director, *Center for Manufacturing Enterprise Integration (CMEI)*, with V. Prabhu, June 2001-June 2002.

2. Interdisciplinary Research Involvement

Faculty Associate, Powder Injection Molding Research Consortium and Particulate Material Center, Pennsylvania State University, University Park, PA, 1993 through 1998.

Faculty Associate, Computer Vision Research Group, Department of Computer Science and Engineering, The Pennsylvania State University, University Park, PA, 1987-2003.

Faculty Associate, Machining Research Laboratory, Department of Industrial and Manufacturing Engineering, The Pennsylvania State University, University Park, PA, 1993-Current.

3. Research Activity: Recognition of Importance

Multimedia based Diagnostics Expert Systems: Feature article about diagnosis research in Mac Week Magazine, January 1990.

Research conducted on Distributed Intelligent Architecture for Logistics implemented in USAEUR Command, 1997.

Defensive Information Warfare System implemented in US Army War College, Carlisle, PA.

Community Detection by Label Propagation Algorithm developed in 2007, now is a part of R, Python, Java and iGraph Library

4. International Examiner Role

National University of Singapore, Ph.D. Theses External Examiner
City Polytechnic University, Hong Kong, Ph.D. Theses External Examiner.
Ph.D. Theses External Examiner, Several Indian Universities.
Ph.D. Theses External Examiner, Catholic University, Belgium
Ph.D., Theses External Examiner, Melbourne University
Several Indian Universities.

5. Reviewer Role

- Served as a Proposal Review Panel Member and External Reviewer for National Science Foundation
- Reviewed Proposals for Regents of several state universities
- Reviewed Proposals for Universities in Singapore, Hong Kong and Belgium
- Served as *a Review Committee Member* for the following Archival Journals:
  Association for Computing Machinery: Transactions
  ASME Journal of Engineering in Industry
  ASCE Computing in Civil Engineering
  Applied Artificial Intelligence
  Computers in Industrial Engineering
  Computers and Operations Research
  Computers in Industry
  IEEE, Computer
  IEEE Transactions on Pattern Recognition and Machine Intelligence
  IEEE Robotics and Automation
  IIE Transactions
  International Journal of Advanced Manufacturing Technology
  International Journal of Production Research
  International Journal of Production and Operations Management
  Journal of Intelligent Manufacturing Systems
  Manufacturing Systems
  Naval Logistics Quarterly
  Nature
  ORSA Journal of Computing
  Speculations in Science and Technology

6. Participation in Seminars and Workshops

Seminar/Workshop Title	Dates	Sponsor	Role
Role of AI in Industrial Engineering	12/86	Institute of Industrial Engineering	Panelist (One of six nationally invited members)
CIRP International Working Seminar Artificial Intelligence Based Product Design:	05/90	International Institute of Production Research (CIRP)	Co-Chairman and Co-Organizer

Error Recovery in Manufacturing Systems	03/94	American Association of Artificial Intelligence	Panelist (One of six internationally invited members)
Indo-US Workshop on Parallel and Distributed Signal and Image Integration Problems	12/93	National Science Foundation	Invited Speaker
XII Brazilian Artificial Intelligence Seminar	10/95	Brazilian Computer Society	Invited Keynote Speaker
Real-World Problem Solving in Manufacturing: Workshop	5/96	National Science Foundation	Co-Organizer
Global Manufacturing: Seminar at Hong Kong	8/97	CIRP and city Polytechnic of Hong Kong	Invited Keynote Speaker
Computer Vision: Workshop	10/97	Dept. of Stats, PSU	Organizing Committee Member
Workshop on Soft computing	1/98	Indian Statistical Institute	Invited Tutorial Speaker
3-D Micro-Nano Manufacturing	5/00	National Science Foundation/NIST	Invited Participant
e-Manufacturing	5/01	National Science Foundation	Invited Participant
Decision making Error Recovery, Monitoring and Diagnosis	3/02	American Association of Artificial Intelligence	Invited Speaker
INFORMS PANEL On Distributed sensing for Quality and Productivity Improvement	10/03	Atlanta, GA	Invited Panelist
Large Scale Network Research and Cyber Infrastructure	3/05	NSF-Workshop on Product Design and CI	Invited Speaker and Group lead
Committee on Next Decade of Industrial Engineering (CONDIE)	5/06	NSF-University of Michigan Workshop	Invited Participant (one of 25 internationally invited)
IEEE International Conference on Autonomic Computing, Dublin, Ireland	6/06	Tutorial on Self Healing Computers	Tutorial speaker
DARPA Workshop on Disaster Relief reconstruction	05/07	Washington, DC	Invited Participant
DARPA Workshop on Disaster Participant Relief and reconstruction	08/08	Washington, DC	Invited Participant

INFORMS PANEL On QSR Future Education	10/08	INFORMS, Washington, DC	Invited Panelist
NSF Workshop on Sensing, Diagnosis and prognosis in nano manufacturing	11/09	NSF, NEU, Boston	Invited Participant/ Group Leader
DARPA Workshop on CyberGenome	12/09	Washington, DC	Invited Participant
UbiCrowd – Ubiquitous Crowd Sourcing Workshop	09/10	UbiComp, Copenhagen, Denmark	Co-organizer
NSF Workshop on Multidisciplinary Design Optimization (MDO)	10/10	NSF, Fort Worth, TX	Invited Speaker
WWW2011, Workshop on Information Integration	03/11	Hyderabad, India	Invited Speaker
UbiCrowd2011 – Ubiquitous Crowd Sourcing, Workshop	09/11	Beijing, China	Co-Organizer
DARPA Cybersecurity Future Directions	11/11	Alexandria, VA	Invited Participant
WWW2012, Workshop on Social Media in disaster management	04/12	Lyon, France	Co-Organizer
ISERC 2013 Tutorial on Big Data	05/13	Puerto Rico	Presenter
ISERC 2013 Panel on Smart Manufacturing	05/13	Puerto Rico	Presenter
ISERC 2014, Panel Member on Big Data	05/14	Montreal	Presenter
NIST Panel on Smart Manufacturing	05/14	DC	Presenter
ISERC 2015 Panel on Data Analytics	05/15	Nashville, TN	Presenter
ISERC 2015, Panel Member on IoT	05/15	Nashville, TN	Presenter
INFORMS 2016, Data Mining Workshop	11/16	Philadelphia, PA	Key Note
DARPA, 2050 and Beyond Research WS	08/17	New York, NY	Invited Participant
\NEU, Multisensory data fusion	03/18	Boston, MA	Invited Speaker

Speaking Engagements *(Keynote Talks are not included)*

1. *Syntactic Pattern Recognition and Its Applications to Manufacturing*, UOR Colloquium, The Pennsylvania State University, University Park, PA, February 1986

2. *AI in Manufacturing*, USME Local Chapter, The Pennsylvania State University, University Park, PA, March 1986

3. *AI: an Introduction*, UIIE Local Chapter, The Pennsylvania State University, University Park, PA, April 1986

4. *AI in IE: Panel Discussion*, UIIE Conference, Boston, December 1986

5. *AI in IE and Manufacturing: Panel Discussion*, UOR Colloquium, The Pennsylvania State University, University Park, PA, November 1987

6. *Neural Networks in Manufacturing*, UOR Colloquium, The Pennsylvania State University, University Park, PA, March 1989

7. *AI in Manufacturing Process Diagnostics*, Allegheny Ludlum SteelUA, Pittsburgh, April 1989

8. *AI in Engineering*, US.V. University-Department of Mechanical Engineering, Tirupati, India, June 1989

9. *AI in Business*, US.V. University-Department of Management, Tirupati, India, June 1989

10. *AI in Business*, Rotary Club, Tirupati, India, June 1989

11. *Diagnostic Expert Systems*, Training Sessions at UOwens/Corning FiberglasU, Huntingdon, PA, February 1990

12. *AI and Neural Networks in Manufacturing*, URCAST-University of TokyoU, Tokyo, Japan, May 1990

13. *AI and Neural Networks Based Research in Manufacturing at Penn State*, Toshiba Manufacturing Center, Tokyo, Japan, June 1990

14. *AI and Neural Networks Based Research in Manufacturing at Penn State*, Hitachi Basic Research Center, Tokyo, Japan, July 1990

15. *AI and Neural Networks Based Research in Process Diagnostics*, Applied Artificial Intelligence Research Institute, Vienna, Austria, September 1990

16. *Neural Networks in Process Diagnostics*, RCAST-University of Tokyo, Tokyo, Japan, June 1991

17. *EMM Modeling in FMS Control*, Korean Advanced Institute of Science and Technology (KAIST), Seoul, S. Korea, June 1991

18. *Neural Networks in Design Data Retrieval*, Korean Institute of Science and Technology (KIST), Seoul, S. Korea, June 1991

19. *Neural Networks in Diagnostics*, Seoul National University, Department of Mechanical Engineering, Seoul, S. Korea, June 1991

20. *Neural Networks in Diagnostics*, Pohong Institute of Science and Technology, Pohong, S. Korea, June 1991

21. *AI in Diagnostics*, HRB SystemsU, State College, PA, USA, December 1991

22. *Mind and Machines*, IE Graduate Seminar Series, The Pennsylvania State University, University Park, PA, November 1992

23. *EMM Modeling in FMS Control*, Department of Industrial Engineering-University of Pittsburgh, Pittsburgh, USA, November 1992

24. *Neural Networks and Fuzzy Logic in Manufacturing*, Department of Mathematics, The Pennsylvania State University, University Park, PA, November 1993

25. *Neural Networks in Manufacturing*, Department of Statistics, The Pennsylvania State University, University Park, PA, January 1994

26. *Intelligent Integrated Diagnostics*, RCAST-University of Tokyo, Tokyo, Japan, February 1995

27. *Manufacturing Automation for Future*, TELCO, Lucknow, India, May 1995

28. *How to Make Good Presentations*, RCAST, University of Tokyo, Tokyo, Japan, June 1995

29. *Intelligent Integrated Diagnostics: System Descriptions*, Hong Kong University of Science and Technology, Hong Kong, June 1995

30. *Intelligent Integrated Diagnostics: Use of Theory of Chaos*, City Polytechnic University, Hong Kong, June 1995

31. *Intelligent Manufacturing Research at IDDRL*, UCIRP O-Group: Scientific and Technical Committee Meeting, The Netherlands, August 1995

32. *A Gentle Introduction to Neural Networks*, OR Colloquium, The Pennsylvania State University, University Park, PA, January 1997

33. *Intelligent Software Agents for Manufacturing*, DaiNippon Screen Mfg. Co., Kyoto, Japan, November 1997

34. *Global Collaborative Manufacturing*, Rutgers University, October 2000.

35. *Nonlinear Dynamics and Manufacturing*, City University of Hong Kong, July 2000.

36. *Agent Based e-Manufacturing*, Hong Kong University of Science and Technology, Aug. 2000.

37. *Multiagent Systems in Manufacturing with Applications*, Korea institute of Science and Technology, South Korea, August 2000.

38. *Intelligent Diagnostics and Prognostics*, SUNY Buffalo, April 2004

39. Survivability of Large Scale Networks, S.V.University, Tirupati, August 2004.

40. Large Scale Networks and Chaos, Amrita Institute, Coimbatore, India, July 2004.

41. *Intelligent Diagnostics and Prognostics*, Texas A&M, October 2004.

42. *Survivability of Large Scale Networks*, PSU OR Colloquium, December 2004.

43. *Recent Advances in Computing*, S.V.University, Tirupati, India, July 2005

44. *Intelligent Diagnostics and Prognostics*, University of Wisconsin, Madison, February 2006.,

45. *Intelligent Diagnostics and Prognostics*, University of Illinois, Chicago, March 2006.

46. *Intelligent Diagnostics and Prognostics*, University of Michigan, Ann Arbor, April 2006.

47. *Manufacturing Automation for Future*, Association of Business Management, Tirupati, India, July 2006.

48. Complex Networks, Department of Mechanical Engineering, MIT, 2006.

49. Complex Networks, Department of Mechanical and Industrial Engineering, North Eastern University, 2007.

50. Agent Based Manufacturing, Department of Mechanical Engineering, Jilin University, Changchun, China, May 2008.

51. Complex Networks in Manufacturing –I and II, Department of Industrial Engineering, Tsinghua University, Beijing, China, May 2008.

52. Complex Networks – National Science foundation, 2009

53. Complex Networks – Drexel University, Department of Computer Science, February 2011

54. Complex Networks – USC, Department of Industrial Engineering, March 2011

55. Complex Networks – UTA, Department of Industrial Engineering, March 2011

56. Clustering in Large Scale Networks – University of Pittsburgh, March 2012

57. Complex Networks – Purdue University, April 2013

58. Big Data – Ministry of Korea Science and Technology, November 2013.

59. Clustering in Complex Networks and Big Data, Texas A&M, March 2014

60. Big Data and Graph Analytics, Stevens Institute of Technology, December 2015

61. Future Research Directions for DARPA, 08/17, DARPA Workshop

62. Multisensor Data Fusion, Northeastern University, Workshop on Multimodal Fusion, March 2018.

Service-related activities

1. Membership on departmental committees

1987-1989:	Member, Computer Committee
1989-1990:	Chairman, Computer Committee
1989-1994:	Member, Graduate Admissions Committee
1991-1992:	Member, Candidacy Exams Revision Committee
1992-1993:	Member, Promotion, and Tenure Committee
1993-1994:	Member, Graduate Student Advisory Committee
1994-1997:	Member, Climate Committee
1995-1996:	Member, Faculty Recruitment Committee
1996-1997:	Chairman, Faculty Recruitment Committee
1996-1997:	Member, Promotion, and Tenure Committee
1996-2000:	Member, Executive Committee
1997-1998:	Member, Awards, and Scholarships Committee
1997-1998:	Chairman, Promotion, and Tenure Committee
1997-1998:	Member, Professional Masters Committee
1998-1999:	Chairman, Graduate Policy Committee
1997-2000:	Advisor, IEGA
2000-2001:	Member, Graduate Admissions
2000-2001:	Chairman, Industry Liaison
2001-2001:	Member, Strategic Planning Committee
2002-2003:	Member, IE Executive Committee
2002-2004:	Member, IE Promotion, and Tenure Committee
2002-2004:	Member, Graduate Admissions Committee
2004-2006:	Member, IE Curriculum Revision Committee
2004-2005:	Member, IE Executive Committee
2006-2008:	Member, IE Executive Committee
2006-2008:	Chairman, Promotion, and Tenure Committee

2007- 2009:	Member, Strategic Planning Committee
2008-2009:	Chairman, Internationalization of Research Task Force
2008-2009:	Chairman, Faculty Search Committee
2009-2010:	Chairman, Faculty Search Committee
2009-2010:	Member, Faculty Search Committee
2009-2011:	Member, IE Executive Committee
2010-2012:	Member, Promotion, and Tenure Committee
2012-2014:	Member, IE Executive Committee
2013-2015:	Member, Promotion, and Tenure Committee
2015-2016	Member, Graduate Admissions Committee
2016-2017	Faculty Search Committee
2016-2017	Awards Committee
2019-2021	Member, Promotion, and Tenure Committee
2020-2022	Member Executive Committee

2. College of Engineering committees

1989-1990	Member, Computer Committee
1989-1990	Member, Ben Franklin Projects Review Committee
1993-1994	Member, Committee to Revise Computer Science 201 (CS 201)
1992-1993	Member, CQI Committee to study Proposal Preparation and Processing
1993-1994	Member, CQI Committee to study Proposal Preparation and Processing
1994-1997	Member, Climate and Diversity Committee
1996-1997	IE Department Head Search Committee
1999-2000	Member, ICCTC
2003,'05,'07	PSES Premier Research Award Selection Committee
May 2009-2014	Standing Committee on Global Leadership through Engineering Education (GLEE), College of Engineering

3. University Level Committees

1990-1991	Member, Research Initiation Grants Evaluation Committee
1987-1996	Advisor to the AI laboratory- Entomology Department
2000	Member-Undergraduate Curriculum Committee, Information Sciences, and Technology School
2004-2005	Member, Sensor Networks Committee
2005-2007	Faculty Scholar Award Selection Committee
2005-2006	Homeland Security Committee (S4R)

2007-2008	VP of Research taskforce on Globalization of PSU Grad Education and Research
Spring 2009	AD-14, College of Engineering Dean's Review – Member of the Committee appointed by Provost.
2009- 2010	Task Force on India as a Global Engagement Node Committee Member
12/2010-08/ 2012	India as a Global Engagement Node Faculty Implementation Committee: Co-chairman
09/2012-May 2017	India as a Global Engagement Node: IIT Madras Faculty Implementation Committee: Chairman
10/2016-Aug 2017	Member, Dean Search Committee
12/2018 – Current	Member, Coordination Committee, Institute of Cyber Sciences

4. Other activities

1993	Instrumental in founding of "Association of Asian American Engineers, a PSU Student Organization - First Faculty Co-Advisor; First Faculty Advisor (1995-1996)
1995- 1996	Faculty Advisor, IE Graduate Student Association
1997- 2000	Faculty Advisor, IE Graduate Student Association
2000	Co-Founder, International Organization for Developing Universities
2012- 2016	Faculty Advisor, Hindu Student Council, PSU
2013- 2017	Election Officer, State College Borough