

## CV

Shamsnaz Virani Bhada (formerly Shamsnaz Virani)  
Assistant Professor, Systems Engineering Program, Dept. of ECE, WPI

## EDUCATION

1999 B.S.E., Electrical Engineering, University of Pune – India  
2002 M.S., Human Factors Engineering, Wright State University --Dayton OH  
2008 Ph.D., Systems Engineering, University of Alabama-- Huntsville

## SCHOLARSHIP

**Peer-Reviewed Journal Papers (Accepted and Published)** (\* Graduate Student)(\*\* UG student)(in Systems Engineering the Author order is based on the amount of contribution to the paper)

- J1. Krishnan, R\*and Bhada, S “Integrated System Design and Safety Framework for Model-Based Safety Assessment,” in IEEE Access, vol. 10, pp. 79311-79334, 2022, doi:10.1109/ACCESS.2022.3193495
- J2. Kryszkiewicz, P., Canfield, C., Bhada, S., and Wyglinski, A., “A Systems Approach for Solving Inter-Policy Gaps in Dynamic Spectrum Access- Based Wireless Rural Broadband Networks,” IEEE Access, vol. 10, pp. 25165-25174, 2022, doi: 10.1109/ACCESS.2022.3156106.
- J3. Krishnan, R.\*, and Bhada, S., An Integrated System Design and Safety Framework for Model-Based Safety Analysis. IEEE Access 2020 ---- Impact Factor : 3.745  
Evidence: <https://ieeaccess.ieee.org/about-ieee-access/learn-more-about-ieee-access/>
- J4. Bhada, S., and Krishnan, R\*., A Model Centric Framework and Approach for Complex Systems Policy. IEEE Systems Journal 2020---- Impact Factor :3.978  
Evidence: <https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=4267003>
- J5. Wang, X.\*, Ceberio, M., Virani, S., Garcia, A., & Cummins, J. A Hybrid Algorithm to Extract Fuzzy Measures for Software Quality Assessment. Journal of Uncertain Systems, 7(3), 2013, 219-237.
- J6. Yao, H., Etkorn, L., Virani, S., Automated Classification and Retrieval of Reusable Software Components, Journal of the American Society for Information Science and Technology, 59(4), February, 2008, pp.613-627.
- J7. Gall, C. (Stein), Lukins, S., Etkorn, L., Gholston, S., Farrington, P., Utley, D., Fortune, J., Virani, S., Semantic Software Metrics Computed from Natural Language Design Specifications, Institute of Engineering and Technology Software (formerly IEE Proceedings Software), 2008, 2(1): p. 17-26.
- J8. Carpenter, S., Delugach, H., Etkorn, L., Farrington, P., Fortune, J., Utley, D., Virani, S., A Knowledge-Modeling Approach to Evaluating Student Essays in Engineering Courses, Journal of Engineering Education, July 2007: p. 1-13.
- J9. Gall, C. (Stein), Cox, G., Etkorn, L., Gholston, S., Virani, S., Farrington, P., Utley, D., Fortune, J., Exploring the Relationship Between Cohesion and Complexity, Journal of Computer Science, 2005. 1(2): p. 137-144.L.

### **Journal Papers Under Review**

- J10. Campagna, J.\*, and Bhada, S., " Enterprise Adoption of Digital Engineering: A Literature Review and Recommendations" Special Issue on Digital Engineering by Systems Journal Submitted 01/07/2022
- J11. Raso, S.\*\*, Bhada, S., and Wyglinski, A. " Systems Modeling Language Application for IoT Team Collaboration" IEEE Access Submitted 01/12/2023

### **Journal Papers In Preparation 1**

- J1. Shams Bhada , Erika Palmer, Dana Polojärvi, A systematic literature review of Policy Analysis and Modeling in Systems Engineering
- J2. Bhada, S., and Palmer, E., Contemporary Systems Engineering Education for United Nations Sustainability Goals. Systems Journal ( RnR Due April 2023) ---
- J3. Dynamic policy content modeling for complex systems--- Bhada, and deWinter
- J4. Rural Broadband Scio-Technical Reference Architecture , for IEEE Systems , Javier\* Bhada, Canfield and Ellis\*\* Due April 2023

### **Non-Peer Reviewed Publication**

- NP1. Bhada, S., "Exploring Digitization of Human Bias: CSER 2020 Panel Report." published in the INCOSE Newsletter 2020 quarter 4. .
- NP2. Scalfani, R\*\*, Bhada, S. Health insurance and its impact on the survival rates of breast cancer patients in Synthea. Risk Manag Insur Rev. 2020; 1– 23

### **Conference Papers Accepted and Published (Peer-Reviewed)**

- C1. Ouzzif, Z. \*, Bhada, S., Wilson, B., "Leading Indicators Trends link to Technical Debt Types in Test and Evaluation Phase of Systems Engineering Lifecycle," 25th Annual Systems & Mission Engineering Conference, National Defense Industrial Association , Orlando, FL 2022
- C2. Akther, A.\*, Bhada, S., Golemi, K., Murphy, J., Wyglinski, A., Pincioli, C., and Chin, K. "Towards Articulating Failures for Building Resilience in Robot Swarms: A Case Study in Model-Based Systems Engineering" 8th IEEE International Symposium on Systems Engineering Vienna, Austria | October 24-26, 2022.
- C3. Chen, M. \*, and Bhada, S. " Converting natural language policy article into MBSE model," 19th International Conference for Systems Engineering Research March 24-26 Accepted
- C4. Campagna, J\* and Bhada, S., "A Capability Maturity Assessment Framework for Creating High Value Digital Engineering Opportunities" 2021 IEEE International Conference of Systems, Man, and Cybernetics, doi: 10.1109/SMCS2423.2021.9659037I October 17-20, 2021. Melbourne, Australia
- C5. Martin, E. \*\*, Raso, S. \*\*, Rogozinski, Y. \*\*, Starr, R. \*\*, Bhada, S. and Wyglinski, A., "A Systems Approach to Developing an Outdoor IoT Network for Wildlife Image Capture," in 2021 IEEE International Symposium on System Engineering, doi: 10.1109/ISSE51541.2021.9582539
- C6. Bhada, S., Canfield, C and Wyglinski, A., "A Transdisciplinary Socio-Technical Systems Approach: Wireless Solutions for the Digital Divide" The 15th Annual IEEE Systems Conference (SYSCON 2021) doi: 10.1109/ISSE51541.2021.9582539 April 15-May 15 2021

- C7. Legaspi, J.\*, Bhada, S., Mathisen, P., and DeWinter, J., "Smart City Transportation: A Multidisciplinary Literature Review" 2020 IEEE International Conference on Systems, Man and Cybernetics (SMC) October 11-14, 2020, Toronto, Canada -- acceptance rate
- C8. Krishnan, R.\*, and Bhada, S. "Identifying Cyber-Physical Vulnerabilities in Additive Manufacturing Systems using a Systems Approach " 2020 IEEE International Conference on Systems, Man and Cybernetics (SMC) October 11-14, 2020, Toronto, Canada acceptance rate
- C9. Legaspi, J.\*, Canfield, C., Gill, K.\*, Wyglinski, A., and Bhada, S., "Integrating ns-3 and Netlogo to Model Broadband Resource Allocation Strategies," The 2020 IEEE 91st Vehicular Technology Conference: VTC2020-Spring 25 – 28 May, Antwerp, Belgium acceptance rate 50%
- C10. Scalfani, R\*., Bhada, S. and Lieberthal, R. " Health Insurance and Its Impact on the Survival Rates of Breast Cancer Patients in Synthea" 2020 Annual Research Meeting for the Academy of Health Boston MA on June 13-16 2020 acceptance rate
- C11. Legaspi, J\*., and Bhada, S. " Introducing digital doppelgängers for health care policy analysis" 18th Annual Conference for Systems Engineering Research (CSER) Redondo Beach Los Angeles on March 19-21 2020 --Acceptance Rate 55%
- C12. Bhada, S., and Walonoski, J., " Modeling Health Policy with Digital Humans," INCOSE International Conference on Human Systems Integration, HSI2019, Biarritz, France on September 11-13 acceptance rate
- C13. Krishnan, R.\* and Bhada, S. "Systems thinking approach to hazard analysis for complex robots" 5th IEEE International Symposium on Systems Engineering, Edinburgh, Scotland on Oct 1-3 acceptance rate 63.1%
- C14. Krishnan, R.\*, Bhada, S., "A Systems Approach towards Developing a Diagnostic System for Complex Robots," 28th annual INCOSE International Symposium, Washington DC, July 7-12 2018
- C15. Krishnan, R.\*, Virani, S., and Gasoto, R., "Discovering toxic policies using MBSE," 15th Annual Conference on Systems Engineering Research, Los Angeles, CA March 23-25, 2017
- C16. Williams, K.\*, Agloro, A., and Virani, S., "Alternate Reality Games in the Systems Engineering Classroom" 27th annual INCOSE International Symposium, Adelaide, Australia July 15 -20, 2017 ([Best Paper Award](#))
- C17. Virani, S., and Rust, T., "Using Model Based Systems Engineering in Policy Development: A Thought Paper," 14th Annual Conference on Systems Engineering Research Huntsville, AL March 22-24, 2016
- C18. Adcock, R., Squires, S., Gannon, T., Virani, S. "Systems Engineering Education for all Engineers," The first IEEE International Symposium on Systems Engineering (ISSE) Rome, Italy on September 28-30, 2015
- C19. Cipolloni, J.\*, Looft, F., Virani, S., "Equipped-Human Reference Architecture," 13th Annual Conference on Systems Engineering Research Hoboken, NJ, March 17-19, 2015
- C20. Virani, S. and Stolzar, L., "A Hybrid System Engineering Approach for Engineered Resilient Systems: Combining Traditional and Agile Techniques to Support Future System Growth," 12th Annual Conference on Systems Engineering Research Redondo Beach, CA, March 21-22, 2014

- C21. Bar-On, I., Rosen, A. B., Chiam, T., Konrad, R., Pavlov, O., Saeed, K., & Virani, S. (2014). Systems Science and Health: Using Analytical Approaches to Evaluate Healthcare Policy Decisions.
- C22. Virani, S. and Sangwan, R., "Architectural Tactics Addressing Quality Concerns In Complex System Architecture," 33rd International Annual Conference of the American Society for Engineering Management Virginia Beach, VA, October 17-20, 2012
- C23. Virani, S., and Burnham, I., "Innovative Curriculum for Engineering in High School (ICE-HS)—Status Update," 119th Annual Conference & Exposition, American Society for Engineering Education in San Antonio, TX, June 10-13, 2012
- C24. Wang, X.\*, Ceberio, M., Virani, S., Del Hoyo, C., Gutierrez, L. "Fuzzy Measure Extraction for Software Quality Assessment as a Multi-Criteria Decision-Making Problem," The 11th International Conference on Software Engineering Research and Practice SERP'12: July 16-19, 2012, USA.
- C25. Virani, S., Burnham, I., Gonzales, V., Bura, M., Andrade, S., "Work in Progress: Designing Innovative Curriculum for Engineering in High School (ICE-HS)," 118th Annual Conference & Exposition, American Society for Engineering Education in Vancouver, BC, Canada, June 23-25, 2011
- C26. Espino, N.\*, Virani, S., "Experiential Learning While Working on Engineering Education," Industrial Engineering Research Conference, Institute of Industrial Engineers, Reno, Nevada, May 21-25, 2011
- C27. Osbeck, J.\*, Virani, S., Roden, P., "Investigation of Automatic Prediction of Software Quality", North American Fuzzy Information Processing Society 2011, March 18-20, 2011
- C28. Virani, S., Burnham, I., "Integrating Customizable PBL to Increase High School Students' Interest in STEM" Proceedings of the Industrial Engineering Research Conference, Institute of Industrial Engineers, Cancun, Mexico, June 5-9, 2010.
- C29. Carpenter, S., Delugach, H., Etkorn, L., Fortune, J., Utley, D., Virani, S. "The Effect of Shared Mental Models on Team Performance" Proceedings of the Industrial Engineering Research Conference, Institute of Industrial Engineers, Cancun, Mexico, June 5-9, 2010
- C30. Virani, S., Etkorn, L., Gholston, S., Farrington, P., Utley, D., Fortune, F., "Investigation of Domain Effects in Software," Proceedings of the 47th ACM Southeast Conference, Clemson SC, March 2009.
- C31. Carpenter, S., Delugach, H., Etkorn, L., Fortune, J., Utley, D., Farrington, P., Virani, S., "Determining Team Shared Mental Models," Proceedings of the 3rd ACM International Conference on the Pragmatic Web (ICPW '08), Uppsala, Sweden, Sept. 29-30, 2008.
- C32. Virani, S., Messimer, S., Roden, P., Etkorn, L., "Software Quality Management Tool for Engineering Managers," Proceedings of the Industrial Engineering Research Conference, Institute of Industrial Engineers, Vancouver, B.C., Canada, May 17-21, 2008, pp.1401-1406.
- C33. Roden P., Etkorn L., Virani S., Messimer S., Vinz B., "A Validation of the Entropy-Based SDIe Metric," Proceedings of the 11th International Conference on Software Engineering and Applications, 2007.
- C34. Roden, P., Virani, S., Etkorn, L., Messimer, S., "An Empirical Study of the Relationship of Stability Metrics and the QMOOD Quality Models over Software Developed Using Highly Iterative or Agile Software Processes," Proceedings of the 7th IEEE International

Working Conference on Source Code Analysis and Manipulation (SCAM '07), Sept. 30-Oct 1, 2007, pp.171-179

### **Peer Reviewed Panel Sessions**

- C35. Bhada, S., Agloro, A., Palmer, E., Leonard, B., Gupta, S., “ Investigating Transdisciplinary Systems Approaches for Health Care Access” 31st Annual INCOSE International Symposium - System Engineering July 17-22 2021
  
- C36. Bhada, S., Rhodes, D., Haskins, C., McDermott, T., McKelvin, M., “ Exploring Digitization of Human Bias” 18th Annual Conference for Systems Engineering Research (CSER) Redondo Beach Los Angeles on March 19-21 2020

### **Conference Abstracts Accepted and Published (Peer-Reviewed)**

- A1. Valentín-Sívico\*, J., Canfield, C., Bhada, S. and Wyglinski, A., “ Evaluating Social Impact and System Design of a Wireless Rural Broadband Network,” Institute of Industrial and Systems Engineering Annual conference and Expo 2022 May 21-24
- A2. Bhatt, V\*, and Bhada, S., “ Policy Modeling using iterative feedback from simulations,” 2021 INCOSE New England 3rd Annual Fall Workshop 22-23 October 2021
- A3. Campagna, J\* and Bhada, S. “ The Origins of the Digital Engineering Ecosystem and its Place in the Fourth Industrial Revolution” American Society for Engineering Management 2021 International Annual Conference and 42nd Annual Meeting , Virtual Conference, October 27<sup>th</sup>-30, 2021
- A4. Virani, S., and Rust, T. “Moving policies from documents to models a VA case study ,” Proceedings of The Industrial and Systems Engineering Research Conference, Institute of Industrial Engineers, Anaheim May 21-24, 2015
- A5. Virani, S., “Innovative curriculum for engineering in High School,” Proceedings of the Industrial Engineering Research Conference, Institute of Industrial Engineers, Nashville, TN May 30-June 2, 2015 .
- A6. Virani, S., “Mapping Systems Engineering tools with effective leadership behaviors,” 16th Annual Systems Engineering Conference, National Defense Industrial Association, Arlington, VA, October 29-31, 2013
- A7. Virani, S., and Ergin, N., “Developing and implementing a domain independent graduate level systems Integration verification and validation course,” Proceedings of the Industrial Engineering Research Conference, Institute of Industrial Engineers, San Juan, Puerto Rico, May 18-22, 2013
- A8. Virani, S., and Burnham, I., “Evolution of Innovative Curriculum for Engineering in High School (ICE-HS)” Proceedings of the Industrial Engineering Research Conference, Institute of Industrial Engineers, San Juan, Puerto Rico, May 18-22, 2013.
- A9. Virani, S., Burnham, I., Espino, N., Gonzales, V., “Innovative Curriculum for Engineering in High School (ICE-HS), an infrastructural commitment to engineering education at all levels,” The International Sun Conference on Teaching and Learning, El Paso March 10-11 2011
- A10. Virani, S., Burnham, I., “Innovative Curriculum for Engineering –High School (ICE-HS),” The 14th Texas Charter Schools Associations State Conference, San Antonio TX, November 29-December 1, 2010
- A11. Virani, S., Burnham, I., “Looking at Engineering from Design Perspective,” FRAME THE FUTURE Using Best Practices, STEM-Science, Technology, Engineering and Math, K-16 Educators and Administrators, Lubbock TX, February 8-10, 2010
- A12. Virani, S., Messimer, S., Roden, P., Etkorn, L., “Proposed Solutions to Software Product Quality Estimation Issues,” Proceedings of the Industrial Engineering Research Conference, Institute of Industrial Engineers, Miami, May 30-June 03, 2009

- A13. Virani, S., "Comparison of Software Quality as Perceived by Different Demographics," American Society of Engineering Management, Oct 25-28, 2006, Huntsville, AL

### **Invited Presentation**

- IP1. IEEE Systems Councils Women in Systems Engineering (WISE) 2022 Webinar Series Presentation Date 04/27/2022 " A Model Centric Framework for Complex System Policy" Speaker Shamsnaz Bhada <https://iceesystemscouncil.org/wise-2022-webinars>
- IP2. International Council for Systems Engineering (INCOSE) New England Chapter. Presentation Date 06/16/2021 "A Policy Content Modeling Framework and Process for Engineered Systems." Speaker: Shamsnaz Virani Bhada, Ph.D, Assistant Professor in Systems Engineering, Worcester Polytechnic Institute
- IP3. International Council for Systems Engineering (INCOSE) India Chapter. "A Model Centric framework and Approach for Complex Systems Policy" - Shamsnaz Virani Bhada, Ph.D, Assistant Professor in Systems Engineering, Worcester Polytechnic Institute
- IP4. Illinois Institute of Technology. "Great Problems, Great Minds: Engineering Humanitarian Missions with Shamsnaz Bhada
- IP5. Invited Talk at University of Massachusetts Research Spotlight Presentation on Modeling Healthcare policy using Digital Humans
- IP6. Invited Talk at MITRE Bedford Campus, "Moving policies from documents to models a VA case study"

### **Professional Presentation and Panels**

- P1. Moderated Panel on "Intersections of Human Systems, Social Systems and Social Justice ( with INCOSE Social SystemsWG)" at INCOSE HSI 2022 Human Systems Integration workshop November 15-18 with Panelist: Alexandrina Agloro, Maya Ellis and Catherine Whittington
- P2. Panelist for " Exploring the Synergies between Social Systems and Human Systems Integration" Panel at 2021 Human Systems Integration Conference November 16-19 Panel Discussion lead by Grace Kennedy and Panelists : Avigdor Zonnenshain, John Gill and Shamsnaz Bhada
- P3. Panelist for " Mobilities Justice at In Light of a Future We Have Yet to Make," WPI's Social Justice Summit keynote by Mimi Sheller and roundtable with Shamsnaz Bhada, Jennifer deWinter, Andrew Trapp, Geri Dimas, John Galante and Katherine Foo -- 09/30/2021 [https://www.wpi.edu/news/calendar/events/social-justice-summit-0?\\_ga=2.189073323.1662194985.1643639856-1091745814.1608221111](https://www.wpi.edu/news/calendar/events/social-justice-summit-0?_ga=2.189073323.1662194985.1643639856-1091745814.1608221111)
- P4. Moderated a Panel on " 21st Century Leaders tackling Unconscious Bias" at 10th Asia Oceania Conference on Systems Engineering 9-11 November 2016 Bangalore, India
- P5. Lead one session at INCOSE Systems Engineering and Architecting Doctoral Student Network (SEANET) Workshop March 23,2017 at University of Southern California
- P6. Panelist for "The Power of Convergence through Diversity of Resources: Empowering Women as Leaders in Systems Engineering" panel at CSER17 (on Saturday Mar 25th 10:30am – noon)
- P7. New England Science Education for New Civic Engagements and Responsibilities (SENCER) Center for Innovation Fall 2014 Meeting
- P8. Panelist for " Systems Engineering Education ," 23rd Annual INCOSE International Symposium June 24-27, 2013
- P9. Invited Presentation American Society of Engineering Management Conference Nov 12-15, 2008

## Fellowships and Grants Awarded

- G1. “Integrating IRB and Ethics Pedagogy for Emergent and Applied Research Areas.”  
Investigators: deWinter (PI), Bhada (Co-PI), McKeogh, Riddick, Smith, Stanlick and Telliell . Sponsor: WPI: Morgan Teaching and Learning Center, Professional Learning Community Grants. Amount Awarded \$2,000.00
- G2. “Robustness and Resilience in Operations Involving Swarms of Intelligent Drones,”  
Investigators Bogdan (PI), Bhada (Co-PI, Team lead), Pincioli, and Wyglinski.  
Sponsor: Northeastern University/ Department of the Army, Amount Awarded to WPI \$5, 283,619.00 Amount awarded to my team \$333,333.00, performance period 01/22-01/23
- G3. Selected a Panel Fellow in the 2022 cohort of the National Science Foundation (NSF) Division of Civil, Mechanical, and Manufacturing Innovation’s (CMMI) Game Changer Academies for Advancing Research Innovation (CGCA).For 2022 cohort NSF received 600 applications submitted for the 200 available positions this year.
- G4. “OVERCOME21: A Systems Approach to Scaling Rural Coop Efforts to Expand the Fiber Edge” Investigators: Canfield (PI MUST), Bhada (PI WPI) and Wyglinski,  
Sponsor US-Ignite,NSF Amount awarded to WPI 99,312.00, performance period 04/21-06/22
- G5. “Integrated Millimeter Wave Backhaul/WiFi Last-Mile Connectivity for Broadband” .  
Investigators: Wyglinski (PI) and Bhada Sponsor: Zoom Tel Inc Amount Awarded \$293,000.00, Performance Period 10/20- 10/21
- G6. “Smart Technologies and Community Engagement to Address Data Gaps in Birth Outcomes Reporting” Lead PI at WPI. Sponsor: NSF Planning Grant. WPI Amount Awarded: \$149,990 over 1 year WPI amount \$30,000.00 (estimated)
- G7. “Complex Simulations for Local Environmental Policy: Digitization, Analysis, and Activism,” Investigators : Bhada (PI), DeWinter, Mathisen and Clark , Sponsor: WPI Internal Triad Grant, Performance Period: 03/20-07/22
- G8. “Policy Modeling for Health Care Systems” Investigators: Bhada (PI), Sponsor: MITRE ,Award Amount, \$58,000 Performance Period: 06/2019-08/2019
- G9. “Goat Tank: Maximizing Value Creation for Humanity ,”Investigators: Virani (PI), Abel, Dodson, Sponsor: Women’s Impact Network, Award Amount: \$50,000, Performance Period: 10/17-Present(ongoing grant)
- G10. “Integrative Urban Humanities Instructional Cluster at Worcester Polytechnic Institute (WPI),” Investigators: Cullon (PI), Virani, Boudreau, Agloro, DiBiasio, Eddy, Samson, Sponsor: National Endowment for the Humanities, Award Amount: \$100,000, September 2017- Ongoing
- G11. “Integrating the Liberal Arts through the Grand Challenges Scholars Program Framework, ” Investigators: Team of Faculty Across WPI, Sponsor Teagle Foundation, Award Amount:\$92,000, Performance Period: July 2015- July 2017
- G12. “VHA Procurement and Logistics Policy Optimization,” Investigators: Virani (PI), Sponsor: The Department of Veteran’s Affairs, Award Amount:\$134,862, Performance Period: May 2016- May 2017
- G13. “Systems Engineering Analysis of VHA Investigators,” Investigators: Virani (PI), Sponsor: The Department of Veteran’s Affairs, Award Amount:\$76,576, Performance Period : May 2015- January 2016

- G14. “Engineering Curriculum Design for the Da Vinci High School,” Investigator: Virani(PI), Sponsor: DaVinci School District, El Paso, Award Amount:\$15,000, Performance Period: August 2010-August 2011
- G15. “Master of Science in Software Engineering,” Investigators: Roach (PI), Virani; Sponsor: The National Science Foundation, Award Amount: \$700,000 Performance Period: August 2010- August 2011
- G16. “Transportation Engineering, Advancement, and Mentoring Program Investigators,” Investigators: Leonard (PI), Taconi, Virani; Sponsor: The University Transportation Center for Alabama, Award Amount: \$42,041, Performance Period: January 2009- January 2010

### **Pending Fellowship and Grant Applications**

1. NRT-QISE: QA-CWINS: Quantum-Aware Complex Wireless Intelligent Networks PI Alexander Wyglinski (ECE/RBE/CS), Co-PIs: Bashima Islam (ECE/CS), Savo Glisic (PH),Raisa Trubko (PH), Reza Zekavat (PH/DS), Senior Personnel: Padmanabhan K. Aravind (PH),Shamsnaz Bhada (ECE/SYS), Kathy Chen (STEM), Kaveh Pahlavan (ECE/CS)External Evaluator Theresa Bruckerhoff

### **Declined Fellowship and Grant Applications**

1. Summer 2022 “Birthing in Displacement,” Lead WPI PI Bhada, Sponsor: The Patchwork Collective.
2. Summer 2022 “ Codesign of a digitized postpartum survey with birthworkers and develop an axiom of trust for how to equitably engage in community partnerships,” Lead WPI PI Bhada, Sponsor New America Foundation
3. Spring 2022 “Collaborative Research: SAI-R: Designing Wireless Broadband Infrastructure for Rural Community Resilience” WPI PI Bhada, Sponsor NSF, \$500,000—Denied
4. Summer 2022“Calculating Toxicity: Water Toxicity, Policy Modeling, and Resilient Green Infrastructure,” Bhada (WPI), deWinter (WPI), Mathisen (WPI), and Joy Winbourne (UMass Lowell). Seed grant for WPI-UMass Lowell collaboration
5. Spring 2020 “Transforming STEM Graduate Education to Researching, Co-Designing and Implementing Solutions to Hyper-Complex Problems” Investigators Krueger (PI) Bhada, Mensah, and Elgert, Sponsor NSF: Innovations in Graduate Program, Amount Requested \$499,953 36 Months
6. Spring 2020“Collaborative Research: SWIFT: SMALL:Broadband Connectivity 2.0 – Repurposing Flexible Electro space Access for Rural Communities” Investigators: Wyglinski (PI),Bhada and Canfield, Sponsor: NSF:SWIFT-Spectrum Innovation Future Technology , Amount Requested \$ 360,042 12 Months--- Denied
7. Spring 2020 “ SCC\_PG: Smart Technologies and Community Engagement to Investigate Transdisciplinary Systems’ Approach to Transportation Policies and Community Access to Healthcare” Investigators: Bhada (PI), deWinter, and Mathisen, Sponsor NSF: Smart Connected Communities, Amount Requested : \$149,000--- Denied
8. Spring 2020 “ Collaborating Research DASS: Ontology, Methodology and Systems Designing for Accountability Definition and Testing in Software Systems,” Investigators: Bhada (PI), Smith (WPI), Agloro (ASU), Etzkorn(UAH) and Menon (UAH), Sponsor: NSF: DASS program, Amount Requested \$ 750,000.00--- Denied



9. Fall 2019 “Smart Technologies and Community Engagement to Investigate Transdisciplinary Systems’ Approach to Transportation Policies and Community Access to Healthcare,” Investigators: Bhada (PI), deWinter and Mathisen. Sponsor Richardson Smith Foundation Inc. Amount Requested :\$144,237.00
10. Summer 2019 “Cloud-Based Digital Human Modeling via Secure Smartphone Data form Machine Learning-Based COVID-19 Testing” Investigators : Wyglinski,PI, and Bhada NSF RAPID ---- Denied
11. Summer 2019 “Cloud-Based Digital Human Modeling via Secure Smartphone Data form Machine Learning-Based COVID-19 Testing” Investigators : Wyglinski,PI, and Bhada COVID 19 Rapid funding from Airforce ---- Denied
12. Summer 2019 “Co-Design paradigm for increasing adoption of smart devices among the communities of color” Investigators : Bhada (PI) , Facebook CFP on Explorations of Trust in AR, VR, and Smart Devices Amount \$75,000 ---- denied
13. Summer 2019 “ Policy Content Modeling for Public Interest Engineered Systems” Developed a concept for Public Interest Technology -- but was not aligned
14. Summer 2019“ Developing a flexible public transportation for evolving public needs during COVID-19” Developed White paper for NSF STS ---- was not aligned
15. Summer 2019 Applied for NSF Operations and Systems Engineering Extreme Event Research (OSEER) network, in an Early Career Mentoring (ECM) program for pre-tenure, tenure-track faculty in Operations Engineering (OE). --- denied
16. Spring 2019 Developed concept systems engineering in AM security and presented it to the AM faculty and students
17. Spring 2019 “ Policy digitization for safe and secure engineered systems” White paper and applied to Lincoln Labs --- Did not reach the right program manager
18. Spring 2019 “ PRISM: Photonically-linked Robust Indoor Swarm Mosaic,” Investigators: Bhada, Wyglinski and Pincioli (WPI Team), Sponsor: DARPA or ARL, Amount Requested: \$226,093 over 1 year
19. Fall 2018 “Improving Mission Effectiveness through Human Process and Technology framework for Model Based Systems Engineering (MBSE) at NSWC,” Investigator: Bhada (PI), Sponsor: Naval Surface Warfare Center, Amount Requested : \$542,749 over 3 years
20. Fall 2018“Future of Women and Families 2026 IDEA Machine 2026,”Lead WPI PI, Sponsor: NSF

#### **Awards and Honors**

1. 2017 WPI Board of Trustee Faculty Recognition Award
2. Best Paper Award at the 27th annual INCOSE International Symposium, Adelaide, Australia July 15 -20, 2017 Williams, K.\*, Virani,S., and Agloro, A., “Alternate Reality Games in the Systems Engineering Classroom”
3. Texas STEM Award for Leadership in Engineering Education 2015

## TEACHING

### Undergraduate Courses Taught at WPI

Course Number	Title	Enrollment	Term/Semester	Ratings	
				Overall	Instructor
GOV 210X	Engineering and Public Policy	50	D-Term 2023		
IQP	IQP New Zealand	24	C-Term 2023		
PQP	New Zealand	24	B-Term 2022		
GOV 210X	Engineering and Public Policy -1	33	D-Term 2022	4.2	4.1
ECE 2799	Electrical and Computer Engineering Design	33	B-Term 2021	4.5	3.9
ES3501	Project Based Introduction to Systems Engineering	8	A-Term 2020	3.8	3.7
ECE 2799	Electrical and Computer Engineering Design	31	B-Term 2020	4.1 and 3.7	3.9 and 4.1
ES 3501	Project Based Introduction to Systems Engineering	7	A-Term 2019	4.3	4.3
ECE 2799	Electrical and Computer Engineering Design	38	B-Term 2019	4.3	4.2
ES 3501	Project Based Introduction to Systems Engineering		A-Term 2017	4.8	4.67

## Graduate Courses Taught at WPI

Course Number	Title	Enrollment	Term/Semester	Ratings	
				Overall	Instructor
SYS 501	Concepts of Systems Engineering	22	Fall 2022	3.8	3.9
SYS 501	Concepts of Systems Engineering	38	Spring 2022	3.8	3.5
SYS 501	Concepts of Systems Engineering	2	Spring 2019	5	4.5

### Course Development

- Designed, Developed and Delivered new course GOV 210X “ Engineering and Public Policy 1” in D-Term 2022
- Developed and proposed a new course GOV 210X " Engineering and Public Policy 1" This course GOV 210X, Approved by COA January 2022, will be delivered in D-Term 2022
- Developed Just in time Systems Engineering Modules for Large Inter-Disciplinary MQP teams Spring 2021
- Converted ES3501 from face to face to online course including components of active learning such as break out rooms and Poll Everywhere
- Developed online material for the ECE 2799 course introducing online voting for the class project and zoom-canvas integration
- Proposed a Minor in Systems Engineering for the Undergraduate Electrical and Computer Engineering Department. Fall 2020
- Developed a guideline for Systems Engineering PhD exams timelines and evaluation criteria with other Systems engineering faculty

### MQPs Supervised

1. E-Textile Software Interface –team of three students Noelle Morgan, Jenna Kyle Mikolajczyk Co-Advising with Prof Smith in CS ( Fall 2021-Spring 2022) ([Winner of 5th Annual Andrew P. Sage Memorial Capstone Design Competition](#))
2. Rural Broadband -- team of two students Alexandra Maslen and Mara Nunez, Co-Advised with A. Wyglinski ( Fall 2020- Spring 2021)
3. mmWave IOT network --- Team of four students, Ethan Martin, Yael Rogoszinski, Serena Rosu, Robert Starr , Co-Advised with A. Wyglinski (Fall 2020- Spring 2021)
4. Zachary Bergquist, Olivia Hanson, Jonathan Lee, Quincy Rhodes, Brandon Terry, Timothy Vermilyea “ Atwater Kent Sustainable Modular Display System,” (Spring 2020) (Co-Advised with A. Wyglinski)
5. Lauren Conroy: “ Failure Mode and Effects Analysis of Atwater Kent Sustainable and Modular Display System ,” (Fall 2019) (Co-Advised with A. Wyglinski)
6. Robert Scalfani: “Health Insurance and its impact on the Survival Rates in Breast Cancer Patients in Synthea” MITRE --- Resulted in One Journal Paper J1, a conference paper C1 and Undergraduate research poster. (Fall 2019)

7. Cara Seely. “Validating Synthea (Synthetic Healthcare Records),” MITRE (Fall 2017)

### **ISPs Supervised**

Noelle Morgan ( Spring 2022)  
Ozzuif Zakaria ( Summer 2022)  
Krishnan Rahul (A Term 2019)

### **Directed Research /PhD Credits**

Krishnan Rahul: Spring 2021 -1 and Fall 2021—1  
Campagna Jose: Spring 2021, 22 – 1 Credits , Summer 2021 –1 , Fall2021,2022 –1  
Ouzzif Zakaria: Spring 2021, 2022 – 1 Credits , Summer 2021 –1 , Fall2021,2022 –1  
Tiffany Jackson-Henderson Spring 2023 -1

### **Ph.D. Students Graduated**

Rahul Krishnan (completed PhD Area Exam, Expected Graduation in 2021) – Graduated 12/01/2021

### **Ph.D. Students Supervised**

Arsalan Akther ( New PhD Student on Boarded Summer 2022)  
Joseph Campagna (PhD student, on track Completed Area Exam May 2022. Completed Qualifying exam Completed and passed May 2021)  
Zakaria Ouzzif ( 2<sup>st</sup> Year PhD student, Completed Qualifying Exam May 2022)  
Tiffany Jackson-Henderson (2<sup>st</sup> year PhD student)

### **Co-advised PhD students**

1. Jed Richards --- completed area exam
2. Kristen Osterwood--- third year PhD—Completed Qualifying Exam Fall 2021
3. Jonathon Miller--- complete Area Exam
4. Francis Fofie---- fourth year PhD
5. Sam Williams--- fourth year PhD
6. Claire Reppucci--- third year PhD
7. John Schneider --- third year PhD

### **Masters Students Supervised**

Galahad Wernsing (Co-Advised with A. Wyglinski)

### **SERVICE**

- **Service to Profession**
  - 2022- IEEE Systems Councils member of Women in Systems Engineering (WiSE)
  - 2021-, Co-Chair for the Social Systems Working Group at INCOSE
  - 2020-Present, New Faculty Support Lead with Empowering Women as Leaders in Systems Engineering at INCOSE—developed a faculty list-serve, gave presentation at FEB 2021 INCOSE IW Academic Council
  - Technical Program Chair 27th Annual INCOSE International Symposium

- Assistant Director of Student Division for International Council of Systems Engineers (INCOSE) 2017
- Represented WPI Systems Engineering Program and EWLSE at Society of Women Engineering Conference 2020
- Founding leadership member of “Empowering Women As Leaders in Systems Engineering” (INCOSE) since 2015
- Chair of Online Steering Committee at WPI Fall 2016
- Organizing INCOSE Spring 2016 Academic Forum “Systems Education for All Engineers”
- Organizing INCOSE Spring 2015 Academic Forum “Systems Education for All Engineers”
- Member of INCOSE Academic Council
- **Member of organizing committee**
  - INCOSE Spring Academic Forum (2015)
  - American Society of Engineering Management Conference (2006):
- **Member of professional society**
  - American Society of Engineering Education (ASEE)
  - International Council of Systems Engineering (INCOSE)
- **Reviewing and Referencing**
  - INCOSE Insight (2021)
  - IEEE Systems Journal (2020, 2021)
  - Local Environment : The International Journal of Justice and Sustainability by Taylor and Francis(2020)
  - Annual Conference for IEEE System Man Cybernetics Conference (2020)
  - American Society of Engineering Education Annual Conference (2016)
  - The Industrial and Systems Engineering Research Conference (2016)
  - International Journal of Computer Integrated Manufacturing (Summer 2010)
  - Advances in Software Engineering Journal (Fall 09)
  - ACM Southeast Conference (2009)
  - International Journal of Computers and Application (2007)
  - Conference for Systems Engineering Research (2014)

#### **Service to WPI**

- Judge for the " Winter 2022 WPI Social Innovation Challenge"
- Faculty member of the Fringe Benefits Committee Fall 2022-
- Co-Director of the Smart World Initiative –Contributed in creation on Industry PhD program. developed a collective theme for the spring 2021 summit on digital health (Oct 2020-
- Hosting a Fulbright scholar to develop spectrum policy optimization using systems modeling language (Feb 2021-May 2021) .
- Co-Director MITRE Project Center (2019-
- WECE Faculty Advisor 2019-2022
- Graduate Program Committee member (2019-
- Chair of Online Steering Committee at WPI Fall 2016
- Affiliate faculty appointment with Interactive Media and Game Design program
- Affiliate faculty appointment with Social Sciences and Policy Studies department