

SARA BEHDAD

Assistant Professor

Mechanical and Aerospace Engineering

Industrial and Systems Engineering

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a. Professional Preparations

University of Illinois, Champaign, IL	Industrial and Enterprise Systems Engineering	PhD/2013
University of Illinois, Champaign, IL	Energy and Sustainability Engineering (EASE)	Certificate/2011
Tehran Polytechnic University,	Industrial Engineering, System Analysis	MSc/2006
Tehran Polytechnic University,	Industrial Engineering, Planning & System Analysis	BS/2003

b. Appointments

2013-Present **Assistant Professor**, Director of Green Engineering Technologies for Community of Tomorrow (GETCOT) Research Lab, Mechanical and Aerospace Engineering Department, Industrial and Systems Engineering Department, <http://getcot.eng.buffalo.edu/>

2008-2013 **Research Assistant**, Decision Systems Lab, University of Illinois at Urbana-Champaign

c. Teaching Experiences

- **Advanced Manufacturing Enterprise**, Coursera Online Teaching, 2017
- **MAE 421 / IE 421 / MAE 521 / IE 521**, Sustainable Manufacturing, Graduate/Undergrad, Spring 2017 (enrollment: 76), Spring 2015, Spring 2014
- **MAE 526/IE 500**, Decision-Based Design, Graduate, Fall 2017 (enrollment: 39), Fall 2016 (enrollment: 34), Fall 2015, Fall 2014, Fall 2013
- **MAE 451** Design Methods and Processes, Fall 2017 (enrollment: 92), Fall 2016 (enrollment: 96)

d. Sample of Publications

Books

- B4. Book Chapter on "Sustainable Manufacturing", **Behdad, S.**, Sabbaghi, M., and Nagel, J., in "Advances in Manufacturing and Processing of Materials and Structures", CRC Press/Taylor & Francis Group, LLC. Editor: Yosep Bar-Cohen.
- B3. MSc. Thesis titled "The Role of Information Technology in Business Process Re-engineering" in Helfert, M., Thi, T. T. P., Ducan, H., Cases and Projects in Business informatics, Logos-Verlag, Berlin, 2007.
- B2. Sakhavi, M. and **Behdad, S.**, 2005, "The Guide for Six Sigma Black Belts," Hiva Publisher, Tehran, Iran. (Language: Farsi) ISBN: 964-7970-11-0.
- B1. **Behdad, S.**, 2003, "The Step-by-Step Instructional Guide for Six Sigma Green Belts," Hamoun Publisher, Tehran, Iran. (Language: Farsi) ISBN: 964-6538-26-6.

Journal Papers

*The papers that I am the corresponding author are denoted by *.*

- J24. Raihanian, A., and **Behdad*, S.**, 2017, "Environmental Impact Assessment of the Heterogeneity in Consumers' Usage Behavior: An Agent Based Modeling Approach," *Journal of Industrial Ecology*, doi:10.1111/jiec.12622. [**Won the International Life Cycle Academy Award**]
- J23. Sabbaghi, M., **Behdad*, S.**, 2017, "Environmental Evaluation of Product Design Alternatives: The Role of Consumer's Repair Behavior and Deterioration of Critical Components," *ASME Journal of Mechanical Design*, 139(8):081701-081701-10.
- J22. Oh, Y., **Behdad*, S.**, 2017, "Simultaneous Reassembly and Procurement Planning in Assembly-To-Order Remanufacturing Systems," *International Journal of Production Economics*, 184, 168–178.

- J21. Raihanian, A., and **Behdad***, **S.**, 2017, "Optimal Sorting Policies in Remanufacturing Systems: Application of Product Life-Cycle Data in Quality Grading and End-of-Use Recovery," *SME Journal of Manufacturing Systems*, Volume 43, Part 1, Pages 15–24.
- J20. Sabbaghi, M., **Behdad***, **S.**, and Zhuang, J., 2016, "Managing Consumer Behavior toward On- Time Return of Electronic Waste: A Game Theoretic Approach," *International Journal of Production Economics*, <http://dx.doi.org/10.1016/j.ijpe.2016.10.009>. Volume 182, Pages 545–563.
- J19. Sabbaghi, M., Cade, W., **Behdad***, **S.**, Bisantz, A., 2017, "The Current Status of the Consumer Electronics Repair Industry in the U.S.: A Survey-based Study," *Resources, Conservation & Recycling*, 10.1016/j.resconrec.2016.09.013. Volume 116, Pages 137–151.
- J18. Raihanian, A., **Behdad***, **S.**, and Zhuang, J., 2016, "Agent Based Simulation of Waste Electrical and Electronic Equipment Recovery," *ASME Journal of Manufacturing Science and Engineering*, 2016; 138(10):101007-101007-11., doi: 10.1115/1.4034159.
- J17. Raihanian, A., Esmailian, B., Cade, W., Wiens, K., and **Behdad***, **S.**, 2016, "Mining Consumer Experiences of Repairing Electronics: Product Design Insights and Business Lessons Learned," *Journal of Cleaner Production*, doi:10.1016/j.jclepro.2016.07.144.
- J16. Raihanian, A., Esmailian, B. and **Behdad***, **S.**, 2016, "Simulation Modeling of Consumers' Participation in Product Take-Back Systems," *ASME Journal of Mechanical Design*, 138(5), 051403, doi:10.1115/1.4032773.
- J15. Sabbaghi, M., Esmailian, B., Cade, W., Wiens, K., and **Behdad***, **S.**, 2016, "Business Outcomes of Product Repairability: A Survey-Based Study of Consumer Repair Experiences," *Resources, Conservation and Recycling*, Volume 109, May–June 2016, Pages 114–122, doi: 10.1016/j.resconrec.2016.02.014.
- J14. Esmailian, B. and **Behdad***, **S.**, Wang, B., 2016, "The Evolution and Future of Manufacturing: A Review," *SME (Society of Manufacturing Engineers) Journal of Manufacturing Systems*, *In press*. doi:10.1016/j.jmsy.2016.03.001, Volume 39, April 2016, Pages 79–100.
- J13. Deka, A., Hamta, N., Esmailian, B. and **Behdad***, **S.**, 2016, "Predictive Modeling Techniques to Forecast Energy Demand in the United States: A Focus on Economic and Demographic Factors," *ASME Journal of Energy Resources Technology* 138 (2), 022001.
- J12. Sabbaghi, M., Esmailian, B., Raihanian, A., Cade, W., and **Behdad***, **S.**, 2015, "Reusability Assessment of Lithium-ion Laptop Batteries Based on Consumers Actual Usage Behavior," *ASME Journal of Mechanical Design*, 137 (12), 124501. doi: 10.1115/1.4031654 (Impact factor: 1.56)
- J11. Hamta, N., Akbarpour Shirazi., M., **Behdad**, **S.**, Fatemi Ghomi, S.M.T., 2015, "A bi-Modeling and measuring the structural complexity in assembly supply chain networks," *Journal of Intelligent Manufacturing (JIMS)*, 10.1007/s10845-015-1106-9.
- J10. Raihanian, A., Esmailian, B., **Behdad***, **S.**, 2015, "Uncertainty Management in Remanufacturing Decisions: A Consideration of Uncertainties in Market Demand, Quantity and Quality of Returns," *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B. Mechanical Engineering*, 1(2), 021007, doi:10.1115/1.4029759.
- J9. Hamta, N., Akbarpour Shirazi., M., Fatemi Ghomi, S.M.T., **Behdad**, **S.**, 2015, "Supply Chain Network Optimization Considering Assembly Line Balancing and Demand Uncertainty," *International Journal of Production Research*, Volume 53, Issue 10, DOI:10.1080/00207543.2014.978030.
- J8. Sabbaghi, M., Esmailian, B., Raihanian, A., **Behdad***, **S.**, Cade, W., 2014, "An Investigation of Used Electronics Return Flows: A Data-driven Approach to Capture and Predict Consumers Storage and Utilization Behavior," *J. of Waste Management*, doi:10.1016/j.wasman.2014.11.024.
- J7. Berg, L., **Behdad**, **S.**, Thurston, D., and Vance, J., "Disassembly Sequence Evaluation: A User Study Leveraging Immersive Computing Technologies," *Journal of Computing and Information Science in Engineering*, 15(1), 011002, DOI: 10.1115/1.4028857.

- J6. **Behdad, S.**, Berg, L., Thurston, D., and Vance, J., "Immersive Computing Technology to Investigate Tradeoffs Under Uncertainty in Disassembly Sequence Planning," J. of Mechanical Design, 2014; 136(7):071001-071001-9.
- J5. **Behdad, S.**, Berg, L., Vance, J., and Thurston, D., "Leveraging Virtual Reality Experiences With Mixed-Integer Nonlinear Programming Visualization of Disassembly Sequence Planning Under Uncertainty," J. Mech. Des.. 2014; 136(4):041005-041005-8.
- J4. **Behdad, S.**, and Thurston, D. "Disassembly and Reassembly Sequence Planning Tradeoffs under Uncertainty for Product Maintenance," ASME Journal of Mechanical Design, 134(4), 2012.
- J3. **Behdad, S.**, Williams, S. A. and Thurston, D., "End of Life Decision Making for Used Products with Uncertain Quantity of Return," ASME Journal of Mechanical Design, 134(10), 2012.
- J2. Kwak, M., **Behdad, S.**, Zhao, Y., Kim, H.M. and Thurston, D., "E-waste Stream Analysis and Design Implications," ASME Journal of Mechanical Design, 133(10), 2011.
- J1. **Behdad, S.**, Kwak, M., Kim, H. M. and Thurston, D. "Simultaneous Selective Disassembly and End-Of-Life Decision Making For Multiple Products," ASME Journal of Mechanical Design, 132(4), 2010.

Sample of Peer-Reviewed Conference Papers

- C27. Raihanian, A., **Behdad*, S.**, "Demystifying the Relationship Between Use-phase Attributes and Energy Consumption: A Case Study of Personal Computers," ASME 2017 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2017, Aug 6-9, 2017, Cleveland, OH, USA. [**DFMLC Best Paper Award**]
- C26. Oh, Y., **Behdad*, S.**, and Zhou, C. "Part Separation methods for Assembly based Design in Additive Manufacturing," ASME 2017 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2017, Aug 6-9, 2017, Cleveland, OH, USA.
- C25. Gopalakrishnan, P. K., **Behdad*, S.**, "Usage of Product Lifecycle Data to Detect Hard Disk Drives Failure Factors," ASME 2017 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2017, Aug 6-9, 2017, Cleveland, OH, USA.
- C24. Sabbaghi, M., **Behdad*, S.**, "Design for Repair: A Game Between Manufacturer and Independent Repair Service Provider," ASME 2017 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2017, Aug 6-9, 2017, Cleveland, OH, USA.
- C23. Raihanian, A., **Behdad*, S.**, "Measuring the Complexity of Additive Manufacturing Supply Chains," ASME 2017 International Manufacturing Science and Engineering Conferences, MSEC2017, June 4-8 2017, Los Angeles, CA, USA.
- C22. Raihanian, A., **Behdad*, S.**, and Zhuang, J. "Agent Based Simulation Optimization of Waste Electrical and Electronics Equipment Recovery: A Cloud-Based Remanufacturing Application," ASME 2016 International Manufacturing Science and Engineering Conferences, MSEC2016, June 27 – July 1, 2016, Blacksburg, Virginia, USA.
- C21. Huang, J, Esmaeilian, B., and **Behdad*, S.**, "Design for Ease-of-Repair by Consumers," ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2016, Aug 21-24, 2016, Charlotte, NC, USA, Paper number: IDETC2016-59685.
- C20. Raihanian, A., **Behdad*, S.**, "Scheduling of Electronic Waste Collection," ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2016, Aug 21-24, 2016, Charlotte, NC, USA. Paper number: IDETC2016-59325.
- C19. Sabbaghi, M., **Behdad*, S.**, "The Role of Components Deterioration and Consumer Behavior in Controlling the Product Lifespan: A Life Cycle Assessment," ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2016, Aug 21-24, 2016, Charlotte, NC, USA, Paper number: IDETC2016-59321.

- C18. Oh, Y, **Behdad*, S.**, “Assembly based Part Design to Improve the Additive Manufacturing Productivity: Process Time, Cost and Surface Roughness,” ASME 2016 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2016, Aug 21-24, 2016, Charlotte, NC, USA, Paper number: IDETC2016-59652.
- C17. Raihanian, A., Esmailian, B., and **Behdad*, S.**, “Impact of Additive Manufacturing Adoption on Future of Supply Chain,” ASME 2015 International Manufacturing Science and Engineering Conferences, MSEC2015, June 8-12, 2015, Charlotte, NC, USA.
- C16. Raihanian, A., Esmailian, B. and **Behdad*, S.**, “Modeling Consumer Decisions on Returning End-of-Use Products Considering Design Features and Consumer Interactions,” ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2015, Aug 2-5, Boston, MA, USA.
- C15. Sabbaghi, M., Esmailian, B., Raihanian, A., Cade, W., and **Behdad*, S.**, “Assessment of Products Future Reusability Based on Consumers Usage Behavior: Implications for Lithium-ion Laptop Batteries,” ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2015, Aug 2-5, Boston, MA, USA.
- C14. Huang, J, Esmailian, B. and **Behdad*, S.**, “Multi-Purpose Disassembly Sequence Planning,” ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2015, Aug 2-5, Boston, MA, USA.
- C13. Deka, A., Hamta, N., Esmailian, B. and **Behdad*, S.**, “Predictive Modeling Techniques to Forecast Energy Demand in the United States: A Focus on Economic and Demographic Factors,” ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2015, Aug 2-5, Boston, MA, USA.
- C12. Jayaram, S., Goyal, H., and **Behdad*, S.**, “Study of Current Trade-In Programs Available for Used Consumer Electronics: Investigation of Cellphones Design Features,” ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2015, Aug 2-5, Boston, MA, USA.
- C11. Raihanian, A. and **Behdad*, S.**, “Upgrade Planning of Used Products Considering Uncertainty in Quantity and Variability in Quality of Returns,” ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2014, Aug 17-20, Buffalo, NY, USA.
- C10. Pareek, M., Srivastava, R.V. and **Behdad*, S.**, “Energy Conservation Using Cost Minimization for Household Space Heating,” ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2014, Aug 17-20, Buffalo, NY.
- C9. **Behdad, S.**, Berg, L., Thurston, D., and Vance, J., “Synergy between Normative and Descriptive Design Theory and Methodology,” ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2013, Aug 4-7, Portland, Oregon, USA.
- C8. **Behdad, S.**, Joseph, A.T., and Thurston, D., “Systems Simulation of Design for End-of-Life Recovery under Uncertainty,” ASME 2013 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2013, Aug 4-7, Portland, Oregon, USA.
- C7. **Behdad, S.**, Berg, L., Thurston, D., and Vance, J., “Integrating Immersive Computing Technology with Mixed-Integer Nonlinear Programming for Disassembly Sequence Planning under Uncertainty,” Proceedings of the ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2012, Aug 12- 15, Chicago, Illinois, USA.
- C6. Berg, L., **Behdad, S.**, Vance, J., and Thurston, D., “Disassembly Evaluation and Training using Graph Visualization and Immersive Computing Technologies,” Proceedings of the ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2012, Aug 12-15, Chicago, Illinois, USA.

- C5. **Behdad, S.** and Thurston, D., “A Markov Chain Model to Maximize Revenue by Varying Refurbished Product Upgrade Levels,” Proceedings of the ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2011, Aug 29-31, Washington, DC, USA.
- C4. **Behdad, S.**, Williams, S. A. and Thurston, D., “End of Life Decision Making for Used Products with Uncertain Quantity of Return,” Proceedings of the ASME 2011 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2011, Aug 29-31, Washington, DC, USA.
- C3. **Behdad, S.** and Thurston, D., “Disassembly Process Planning Tradeoffs for Product Maintenance,” Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2010, Aug 15-18, Montreal, Quebec, Canada.
- C2. **Behdad, S.**, Kwak, M., Zhao, Y., Kim, H.M. and Thurston, D., “E-waste Stream Analysis and Design Implications,” Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2010, Aug 15-18, Montreal, Quebec, Canada.
- C1. **Behdad, S.**, Kwak, M., Kim, H.M. and Thurston, D., “A Mixed-Integer Programming Model for Disassembly Planning and End-of-Life Decision Making for Multiple Products,” Proceedings of the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2009, Aug 30-Sep 02, San Diego, California, USA.

e. PhD and Master’s Students Research Advisement

PhD Students: Mostafa Sabbaghi (ISE), Ardeshir Raihanian Mashhadi (MAE), Yosep Oh (ISE).

MS. Students: Parth Jatinkumar Shah (ISE), Weizhi Zhu (MAE), Praveen Kumare Gopalakrishnan (MAE), Tarun Bhat (ISE), Sobhan Koppuravuri (ISE), Venkata Bhaskar Reddy (ISE), Alicia Gurlpersuad (MAE), Shayne Mckay (ISE), Youtang Wang (MAE), Xi Gong (MAE), Harshit Goyal (MAE), Sunayana Jayaram (MAE), Angshuman Deka (MAE), Tarun Bhat (ISE).

f. Research Highlights & Media Coverage

- Fixing Electronics Interview on [The Matt Townsend Show](#), BYU Radio
- Why aren’t we allowed to fix our own electronic devices? July 2017
 - [The Conversation](#), [Quartz](#), [Daily Mail](#), [Government Technology](#), [PBS Newshour](#), [The Chicago Tribune newspaper](#), [Popular Mechanics](#), [UB news](#), Other examples: TimesUnion, SFGate, Qoshi, Techxplore, newstimes, Houston Chronicle, MySanAntonio.
- Gizmodo, Gawker Media network, 2016. [The crazy ways we’ll soon mine old gadgets for treasure](#)
- The Battery Show, <http://www.thebatteryshow.com/>, 2016, [Future Reusability – Implications for Lithium-Ion Laptop Batteries](#).
- Motherboard, the science and technology magazine of Vice Media, 2015, [A Slimmer Smartphone Means Mountains of E-waste](#)
- University at Buffalo News Center, 2015, [Overcoming our e-waste problem](#)
- Buffalo Rising, 2015, [“Gadget Hoarding” is Another Form of e-Waste](#)
- Bigthink, Jenkers.com, 2015, [Smarter Product Design Could Help Reduce E-Waste](#)
- Pivot International, 2015, [Could smarter product designs reduce e-waste?](#)
- Mehrnews (Language: Farsi), 2015, [Solving electronics waste issue through design modification](#)