CHRISTOPHER HOYLE, PH.D.

Assistant Professor
School of Mechanical, Industrial, and Manufacturing Engineering (MIME)
Oregon State University

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AREAS OF RESEARCH INTEREST

My research interests are focused upon decision making in engineering design, with emphasis on the early design phase when uncertainty is high and the design space is large. My research contributions are to the field of Decision-Based Design, specifically in linking consumer preferences and enterprise-level objectives with the engineering design process. My areas of expertise are uncertainty propagation methodologies, optimization, design automation Bayesian statistics, and consumer choice modeling.

ACADEMIC PREPARATION

Northwestern University, Evanston, IL, December 2009.
PhD Mechanical Engineering

- Dissertation Advisor: Prof. Wei Chen
- Dissertation: *Configuring Engineering Systems Considering Consumer Heterogeneity*

Purdue University, West Lafayette, IN, May 1994.
MS Mechanical Engineering

- Thesis Advisor: Prof. Karthik Ramani
- Thesis: *Manufacture of Thermoplastic Composites*

University of Illinois, Urbana-Champaign, IL, June 1988.
BS General Engineering

POSITIONS HELD

Oregon State University (OSU), Corvallis, OR **9/2011-Present**
Assistant Professor (*Design Area*)
Research and teaching in design methodology and design optimization.

Oregon State University (OSU), Corvallis, OR **12/2010-9/2011**
Postdoctoral Researcher
DARPA funded joint research project to research methods of design verification for the early design phase of cyber-physical systems.

Zilliant, Inc., Austin, TX **2/2010-11/2010**
Senior Pricing Scientist
Estimate demand models and perform optimization, using customer-supplied transaction data, to find target prices for business-to-business pricing problems.

Illinois Institute of Technology (IIT), Chicago, IL **8/2009-12/2009**
Adjunct Professor of Mechanical, Materials, and Aerospace Engineering
Taught a course for undergraduate/graduate students covering the fundamentals of Computer Aided Design, Manufacturing, and Engineering.

NASA Ames Research Center, Mountain View, CA. **6/2006 − 9/2006**

Summer Research Intern

Developed an optimization-based design tool to make decisions during conceptual design regarding the allocation of Integrated Systems Health Management (ISHM) in an aerospace system.

Motorola, Inc., Deer Park, IL. **5/1994 – 3/2004**

Program Manager

Created a transmission control module concept and quotation proposal for a major automotive client, resulting in the largest business contract award in the history of the Motorola Automotive Group.

Mechanical Engineering Manager

Responsible for a department of eight mechanical engineers. Led the development of mechanical packaging for electronic controllers to survive in the most severe automotive environments.

Mechanical Engineering Group Leader

Managed a team of Mechanical Engineers developing mechanical packaging for automotive pressure sensors.

Mechanical Engineer

Designed several manifold pressure sensors and cost reduced existing sensor designs.

ITW Deltar, Frankfort, IL. **9/1989 – 12/1991**

Project Engineer

Designed injection molded components for automotive original equipment manufacturers.

FUNDING

TOTAL FUNDING (2011-PRESENT): TOTAL BUDGET: **$4,876,398**/ MY SHARE: **$1,502,073**

Full Proposals

- DARPA-Meta-X (Subaward to Vanderbilt DARPA: Contract VU-DSR-21806-S5): Probabilistic Requirements Verification through Uncertainty Propagation, Phase I. PI: I. Y. Tumer, CoPI: **C. Hoyle**. Oct 2011-Dec 2011.
- DARPA-Meta-X (Subaward to Vanderbilt DARPA: Contract VU-DSR-21806-S5): Probabilistic Requirements Verification through Uncertainty Propagation, Phase II. PI: I. Y. Tumer, CoPI: **C. Hoyle**. Jan 2012-Sept 2012.
- DARPA-Meta-X (Subaward to Vanderbilt DARPA: Contract VU-DSR-21806-S5): Probabilistic Requirements Verification through Uncertainty Propagation, Phase III. PI: I. Y. Tumer, CoPI: **C. Hoyle**. Sept 2012-Dec 2012.
- DARPA-Meta-X (Subaward to Vanderbilt DARPA: Contract VU-DSR-21806-S5): Probabilistic Requirements Verification through Uncertainty Propagation, Phase IV. PI: I. Y. Tumer, CoPI: **C. Hoyle**. Jan 2013-March 2014.
- Bonneville Power Administration: TIP 258: Development of a State-of-the-Art Computational Framework and Platform for the Optimal Control of Multi-Reservoir Systems under Uncertainty. PI: A. Leon, CoPI: **C. Hoyle** and N. Gibson. Oct 2012-Sept 2015.
- National Energy Technology Laboratory: Toward the Optimization of Collaborative Energy Supply Systems Influenced by the Analysis of Oregon Power Generation and Consumption, PI: B. DuPont, CoPI: **C. Hoyle**, E. Cotilla-Sanchez. Nov 2013-Nov 2014.
- SBIR (Adventium Labs): Reliability-Based Multidisciplinary Design Analysis and Optimization (RB-MDAO). PI: **C. Hoyle**, June 2014-Dec 2014.
- National Science Foundation: EAGER: A Control-Theoretic Approach for Designing Robust Complex Engineered Systems. PI: **C. Hoyle**. Oct 2013-Oct 2014.
- NSF CMMI: Collaborative Research: Safety-Informed Design of Complex Engineering Systems, Aug 2014- Aug 2016, PI: I. Y. Tumer, Co-PI: **C. Hoyle,** David Jensen.

- NSF CMMI: The Science of Designing Dependable & Adaptable Engineering Systems, Aug 2014-Aug 2016, PI: I. Y. Tumer, Co-PI: **C. Hoyle**, K. Tumer.
- DoD DMDII: Automated Assembly Planning: From CAD model to Virtual Assembly Process. PI: M. Campbell, CoPI: **C. Hoyle**. Jun 2015-Dec 2016.
- Bonneville Power Administration: TIP 258: Development of a State-of-the-Art Computational Framework and Platform for the Optimal Control of Multi-Reservoir Systems under Uncertainty. PI: A. Leon, CoPI: **C. Hoyle** and others. Oct 2015-Oct 2018.
- DOE NEUP: Model Calibration-based Design Methodologies for Structural Design of Supercritical CO2 Compact Heat Exchangers under Sustained Cyclic Temperature and Pressure Gradients. PI: **C. Hoyle**, CoPI: R. Malhotra, B. Paul. Oct 2016-Oct 2019.

I/UCRC Center for eDesign Projects

- OregonBest-Lucid Energy: A Tool to Estimate the Electrical Energy Generated from Turbines Inserted in Fresh Water Pipes, Oct 2014- Oct 2016, PI: **C. Hoyle**, CoPI: K. Niemeyer.
- NASA JPL: Failure-Resilient Design of Complex Systems Under Uncertainty, March 2016- March 2017, PI: **C. Hoyle**.
- NASA Ames: Autonomy in Aviation, Aug 2015- Aug 2016, PI: R. Stone, CoPI: **C. Hoyle**.

Short Proposals

- COB/COE Collaborative Seed Fund: Effectuation in New Product Development and Design: Driving Radical and Disruptive Innovation. PI: T. Moss (COB) and **C. Hoyle**, Funded by Oregon State University, July 2102.
- COB/COE Collaborative Seed Fund: Mapping User Requirements to Design Alternatives: the Whole Nine Yards. PI: **C. Hoyle** and B. Zhu (COB), Funded by Oregon State University, Jan 2102.

TEACHING

- OSU: Introduction to Design ME 382, 4 cr.
- OSU: Capstone Design ME 497, 4 cr.
- OSU: Capstone Design ME 498, 4 cr.
- OSU: Optimization in Design ME 517, 4 cr. (3 cr. in 2012)
- OSU: Design Automation ME 519, 4 cr.
- OSU: Decision-based Design ME 519, 4 cr.
- OSU: Bio-inspired Design ME 513, 4 cr.
- IIT: CAD/CAM/CAE Introduction, Fall 2009.
- NU: CAD for Engineering Design and Innovation M.S. Boot Camp, Fall 2008.

SERVICE:

UNIVERSITY

- NSF IU/CRC Center for eDesign site co-director (with Rob Stone, director and Irem Tumer, co-director)
- ASME Student Chapter Faculty Advisor. 2012-present
- Mechanical Engineering Undergraduate Program Committee: 2011-present

TECHNICAL CONFERENCE

Technical Committee Participation

- *Overall Technical Committee Chair (2015-16), Program Chair (2014-15) and Technical Secretary (2012-14),* Systems Engineering & Information and Knowledge Management (SEIKM) Technical Committee.
- *Session Chair*

- ASME Computers in Engineering Conferences (CIE), Systems Engineering & Information and Knowledge Management (SEIKM), 2012-present
- ASME International Design Engineering Technical Conferences, *Platform Architecture and Product Family Design Special Session* (DAC), 2013-present
- ASME International Design Engineering Technical Conferences, *Simulation-Based Design Under Uncertainty* (DAC), 2016
- ASME International Mechanical Engineering Congress & Exposition (IMECE), *Systems and Complexity*, 2016

Review Coordinator (2011-present)

- ASME International Design Engineering Technical Conferences: Design Theory and Methodology Conference (DTM)
- ASME International Design Engineering Technical Conferences: Design Automation Conference (DAC)
- ASME Computers in Engineering Conferences, Systems Engineering & Information and Knowledge Management (SEIKM)
- ASME International Mechanical Engineering Congress & Exposition (IMECE)

OTHER

- *Invited Reviewer*, NSF Grant Review Panel, NSF CMMI, Spring 2016
- *Journal Reviewer*:
  - ASME Journal of Mechanical Design
  - Engineering Optimization
  - Journal of Engineering Design
  - Structural and Multidisciplinary Optimization
  - IMechE Journal of Engineering Manufacture
  - AI EDAM
  - Journal of Aerospace Information Systems
- *Conference Reviewer*:
  - ASME International Design Theory and Methodology Conferences
  - ASME Design Automation Conference
  - ASME Computers in Engineering Conferences
  - ASME International Mechanical Engineering Congress & Exposition

HONORS AND AWARDS

- Walter P. Murphy Fellowship, Northwestern University: 2005-2006
- Altair Corporation Fellowship: 2008
- Arthur Hitsman Faculty Scholar, Oregon State University, 2011-2013.
- Faculty Advisor for the 2016 ASME student chapter *Shell EcoMarathon* competition: the team won 2nd place in the Battery/prototype vehicle class (in their inaugural year).
- ASME faculty advisor and senior capstone advisor for the Shell EcoMarathon team winning the 2016 Boeing Engineering Excellence Award at the 2016 OSU Engineering Expo

STUDENTS SUPERVISED:

PhD Students:

- Weifeng Huang (co-advised with Matt Campbell), PhD Student (Start Date: Fall 2015)
- Elham Keshavarzi, PhD Student (Start Date: Winter 14)
- Trung Pham, PhD Student (Start Date: Fall 13)
- Matthew McIntire, PhD Student (Start Date: Spring 12)
- Hoda Mehrpouyan (co-advised with Irem Tumer), PhD Student (Graduated: 2014)

- Joseph Piacenza (co-advised with Irem Tumer), PhD Student (Graduated: 2014)

MS Students:

- Arpan Biswas, MS Student (current)
- Danielle Jackson, MS Student (current)
- Yue Liu, MS Student (Graduated: Winter 16)
- John Fields, MS Student (Graduated: Fall 13)
- Prasad Edekar, MS Student (Graduated: Summer 13)

PhD Dissertation Committee Member (all ME majors at Oregon State except where noted):

1. Nima Rafibakhsh, PhD
2. Chris Sharp, PhD
3. Ryan Arlitt, PhD, 2015
4. Logan Yliniemi, PhD, 2015 (Robotics, I was the ME advisor)
5. Bryan O'Halloran, PhD, 2013
6. Douglas Van Bossuyt, PhD, 2012
7. David Jensen, PhD, 2012
8. Kerry Poppa, PhD, 2011

MS Thesis Committee Member (all ME majors at Oregon State except where noted):

1. Philip Arscott, MS, 2016
2. Marshall Wagoner, MS, 2016
3. Patrick Daily, MS, 2016
4. Robert Miller, MS, 2016
5. Caitlin Forinash, MS, 2016
6. Nicolas Francisco Soria Zurita, MS, 2016
7. Sean Hunter, MS, 2016
8. Robin Kiff, MS, 2016
9. Chris Sharp, MS, 2015
10. Ian Garretson, MS, 2015 (Manufacturing Engineering)
11. Michael Eastwood, 2014, (Manufacturing Engineering)
12. Yesenia Torres, MS, 2014
13. Brady Gilchrist, MS, 2013
14. Dane Eastlick, MS, 2012 (Manufacturing Engineering)

PUBLICATIONS

Book:

1. Chen, W., Hoyle, C., Wassenaar, H.J., *Decision-Based Design: Integrating Consumer Preferences into Engineering Design*, 2013, Springer-Verlag London Ltd. (Organized the material for the entire book and wrote 6/12 chapters)

2. Book Chapter, Flumerfelt, S., Alves, A., Calvo-Amodio, J., Hoyle, C. and Kahlen, F-J., "Managing Systems Complexity Through Congruence" to appear in *Trans-Disciplinary Perspectives on System Complexity*, Springer-Verlag London Ltd, 2016. (minor contributor)

Journal Publications:

1. **Mehrpouyan, H**., Giannakopoulou, D., Brat, G., Tumer, I.Y., and Hoyle, C., "Complex Engineered Systems Design Verification Based on Assume-Guarantee Reasoning", *Journal of the International Council on Systems Engineering (INCOSE)*. Accepted with revision, 2016. (minor contributor)

2. **Mehrpouyan, H**., Giannakopoulou, D., Brat, G., Tumer, I.Y., and Hoyle, C., "Towards A Framework for Resilient Design of Complex Engineered Systems," *Research in Engineering Design*. Accepted with revision, 2016. (key contributor)

3. **McIntire, M**., Tumer, I., Jensen, D., Hoyle, C., "Safety-Informed Design: Using Subgraph Analysis to Elicit Hazardous Emergent Failure Behavior in Complex Systems," *AI EDAM Special Issue on Design Informatics*, in press, 2016. (key contributor)

4. DuPont, B., Azam, R., Proper, S., Cotilla-Sanchez, E., Hoyle, C., **Piacenza, J.,** Oryshchyn, D., Zitney, S., and Bossart, S., "An Optimization Framework for Decision Making in Large, Collaborative Energy Supply Systems," *Journal of Energy Resources Technology*, 138(5), 051601, 2016. (minor contributor)

5. **Mehrpouyan, H.,** Haley, B., Dong, A., Hoyle, C., Tumer, I., "Resiliency Analysis for Complex Engineered System Design," *AI EDAM Special Issue* on *the Design of Complex Engineering Systems*, 29(1), pp 93-108, 2015. (key contributor)

6. Jensen, D., Bello, O., Hoyle, C., Tumer, I., "Reasoning about Emergent System Failure Behavior Using Large Sets of Qualitative Function-Based Simulation Data," *AI EDAM Special Issue* on *the Design of Complex Engineering Systems,* 28(4), pp 385-398, 2014. (minor contributor)

7. Yannou, B., Yvars, P.A., Hoyle, C., Chen, W., "Set-Based Design by Simulation of Usage Scenario Coverage", *Journal of Engineering Design*, 24(8), 575-603, 2013. (key contributor)

8. Van Bossuyt, D., Hoyle, C., Tumer, I., Dong, A., "Considering Risk Attitude Using Utility Theory in Risk-Based Design," *AI EDAM Special Issue on Intelligent Decision Support and Modelling*, Vol. 26, No. 4, 2012. (key contributor)

9. He, L., Chen, W., Hoyle, C., Yannou, B., "Choice Modeling for Usage Context-Based Design," *Journal of Mechanical Design,* Vol. 134, No. 3, 2012. (key contributor)

10. He, L., Hoyle, C., Chen, W., "Examination of Customer Satisfaction Surveys in Choice Modelling to Support Engineering Design", *Journal of Engineering Design*, Vol. 22, No. 10, 2011. (key contributor)

11. Hoyle, C., Chen, W., and Wang, N., "Understanding and Modeling Heterogeneity of Human Preferences for Engineering Design", *Journal of Engineering Design*, Vol. 22, No.8, 2011. (primary author)

12. Hoyle, C., Chen, W., Wang, N., Koppelman, F., "Integrated Bayesian Hierarchical Choice Modeling Approach to Capture Heterogeneous Consumer Preferences in Engineering Design", *Journal of Mechanical Design*, Vol. 132, No. 12, 2010. (primary author)

13. Hoyle, C., Chen, W., Ankenman, B., Wang, N., "Optimal Experimental Design of Human Appraisals for Modeling Consumer Preferences in Engineering Design", *Journal of Mechanical Design*, Vol. 131, No. 7, 2009. (primary author)

14. Hoyle, C., Tumer, I., Mehr, A., Chen, W., "Health Management Allocation during Conceptual System Design", *Journal of Computing & Information Science in Engineering*, Vol. 9, No. 2, 2009. (primary author)

15. Hoyle, C. and Chen, W., "Product Attribute Function Deployment (PAFD) for Decision–Based Conceptual Design", *IEEE Transactions on Engineering Management*, Vol. 56, No. 2, 2009. (primary author)

16. Kumar, D., Hoyle, C., Chen, W., Wang, N., Gomez-Levi, G., Koppelman, F., "A Hierarchical Choice Modeling Approach for Incorporating Customer Preferences and Market Trends in Engineering Design", *International Journal of Product Development*, Vol. 8, No. 3, 2009. (key contributor)

17. Ramani, K. and Hoyle, C., "Processing of Thermoplastic Composites Using a Powder Slurry Technique. I. Impregnation and Preheating*," Materials and Manufacturing Processes*, Vol. 10, No. 6, pp. 1169-1182, 1995. (primary author)

18. Ramani, K. and Hoyle, C., "Processing of Thermoplastic Composites Using a Powder Slurry Technique. II. Coating and Consolidation," *Materials and Manufacturing Processes*, Vol. 10, No. 6, pp. 1183-1200, 1995. (primary author)

19. Ramani, K., Borgoankar, H., Hoyle, C., "Experiments on Compression Molding and Pultrusion of Thermoplastic Powder Impregnated Towpregs," *Composites Manufacturing*, Vol. 6, No. 1, pp. 35-43, 1995. (minor contributor)

Conference Publications (Peer Reviewed):

1. **Liu, Y., Huang, W**., Rafibakhsh, N., Campbell, M., Hoyle, C., "Design of Experiments to Support Automated Assembly Planning," *Proc. ASME 2016 International Mechanical Engineering Congress and Exposition*, American Society of Mechanical Engineers, 2016. (key contributor)

2. **McIntire, M. G., Keshavarzi, E**., Hoyle, C., Tumer, I. Y., "Functional Models with Inherent Behavior: Towards a Framework for Safety Analysis Early in the Design of Complex Systems," *Proc. ASME 2016 International Mechanical Engineering Congress and Exposition*, American Society of Mechanical Engineers, 2016. (key contributor)

3. **Pham, T**., Hoyle, C., Zhang, Y., Nguyen, T., "Topology Optimization of Hyperelastic Continua" *Proc. ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers. (key contributor)

4. Soria, N. F., Colby, M., Tumer, I. Y., Hoyle, C., and Tumer, K., "Design of Complex Engineering Systems Using Multiagent Coordination," *Proc. ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers. (minor contributor)

5. Hunter, S., Jensen, D. C., Tumer, I. Y., and Hoyle, C., "The Impact of Abstraction and Fidelity Levels on the Usefulness of Early System Functional Models," *Proc. ASME 2016 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers. (minor contributor)

6. Tumer, I. Y., Hoyle, C., Jensen, D. C., and Hunter, S., "Validating model-based design simulation: The impact of abstraction and fidelity levels," *2015 International Conference on Complex Systems Engineering (ICCSE)*, IEEE, pp. 1-6, 2015. (minor contributor)

7. **Piacenza, J. R., Proper, S.,** Bozorgirad, M. A., Tumer, I. Y., and Hoyle, C., "Robust Topology Design of Complex Infrastructure Systems," *Proc. ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers, pp. V01BT02A040-V001BT002A040, 2015. (key contributor)

8. **Piacenza, J. R., Fields, J. J.,** Hoyle, C., and Tumer, I. Y., 2015, "Quantification of Indoor Environmental Quality in Sustainable Building Designs using Structural Equation Modeling," *DS 80-1 Proceedings of the 20th International Conference on Engineering Design (ICED 15) Vol 1: Design for Life*, Milan, Italy, pp. 053-064, 2015. (key contributor)

9. **McIntire, M. G.,** Hoyle, C., Tumer, I. Y., and Jensen, D. C., "Safety-Informed Design: Using Cluster Analysis to Elicit Hazardous Emergent Failure Behavior in Complex Systems," *Proc. ASME 2015 International Mechanical Engineering Congress and Exposition*, American Society of Mechanical Engineers, pp. V011T014A043-V011T014A043, 2015. (key contributor)

10. Manion, C., Soria, N. F., Tumer, K., Hoyle, C., and Tumer, I. Y., "Designing a Self-Replicating Robotic Manufacturing Factory," *Proc. ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers, pp. V01BT02A045-V001BT002A045, 2015. (minor contributor)

11. **Keshavarzi, E., McIntire, M.,** and Hoyle, C., "Dynamic Design Using the Kalman Filter for Flexible Systems with Epistemic Uncertainty," *Proc. ASME 2015 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of

Mechanical Engineers, pp. V02BT03A019-V002BT003A019, 2015. (key contributor)

12. DuPont, B., Azam, R., Proper, S., Cotilla-Sanchez, E., Hoyle, C., **Piacenza, J**., Oryshchyn, D., Zitney, S., and Bossart, S., "Decision Making for the Collaborative Energy Supply System of Oregon and Washington," *Proc. ASME 2015 Power Conference collocated with the ASME 2015 9th International Conference on Energy Sustainability, the ASME 2015 13th International Conference on Fuel Cell Science, Engineering and Technology, and the ASME 2015 Nuclear Forum*, American Society of Mechanical Engineers, pp. V001T001A012-V001T001A012, 2015. (minor contributor)
13. Calvo-Amodio, J., Flumerfelt, S., and Hoyle, C., "A Complementarist Approach to Lean Systems Management," *Proceedings of the 58th Annual Meeting of the ISSS-2014*, United States, pp. 787-795, 2015. (minor contributor)
14. **Pham, T. B**., Hoyle, C., and Bay, B., "Robust Topology Optimization Under Random Load Locations," *Proc. ASME 2014 International Mechanical Engineering Congress and Exposition*, American Society of Mechanical Engineers, pp. V011T014A029-V011T014A029, 2015. (key contributor)
15. **Mehrpouyan, H**., Giannakopoulou, D., Tumer, I. Y., Hoyle, C., and Brat, G., "Combination of Compositional Verification and Model Checking for Safety Assessment of Complex Engineered Systems," *Proc. ASME 2014 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers, pp. V01BT02A021-V001BT002A021, 2014. (minor contributor)
16. **McIntire, M. G**., Vasylkivska, V., Hoyle, C., and Gibson, N., "Applying Robust Design Optimization to Large Systems," *Proc. ASME 2014 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers, pp. V02BT03A054-V002BT003A054, 2014. (key contributor)
17. Hoyle, C., **Piacenza, J.**, DuPont, B., and Cotilla-Sanchez, E., 2014, "Robust Optimization of Complex Cyber-Physical Systems," *Proceedings of the International Annual Conference of the American Society for Engineering Management*., pp. 1-10, 2014. (key contributor)
18. Flumerfelt, S., Kahlen, F.-J., Alves, A., Calvo-Amodio, J., and Hoyle, C., "Systems Competency for Engineering Practice," *Proc. ASME 2014 International Mechanical Engineering Congress and Exposition*, American Society of Mechanical Engineers, pp. V011T014A054-V011T014A054, 2014. (minor contributor)
19. DuPont, B., **Piacenza, J**., Azam, R., Wardman, J., Hoyle, C., Cotilla-Sanchez, E., Oryshchyn, D., and Bossart, S., 2014, "Decision-Making for Large-Scale Collaborative Power Systems," *Proceedings of the International Annual Conference of the American Society for Engineering Management*., pp 1-10, 2014. (minor contributor)
20. Arlitt, R., Papakonstantinou, N., O'Halloran, B., Hoyle, C., and Stone, R., "Using a Feasibility Study of Human Computation for Failure Scenario Identification," *Proc. ASME 2014 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, American Society of Mechanical Engineers, pp. V01BT02A004-V001BT002A004, 2014. (minor contributor)
21. Hoyle, C., Gilchrist. B., Tumer, I., "A Structural Equation Modeling Approach to Product Innovation", *Design Computing and Cognition'14*. Springer International Publishing, pp. 663-679, 2015. (key contributor, 29% acceptance rate)
22. **Mehrpouyan, H**., Tumer, I. Y., Hoyle, C., Giannakopoulou, D., and Brat, G., "Formal Verification of Complex Systems based on SysML Functional Requirements," *Annual Conference of the Prognostics and Health Management Society 2014*, Fort Worth, TX, Vol. 5, 2014, (minor contributor)
23. **Piacenza, J**., Bozorgirad, M. A., Hoyle, C., Tumer, I., "Robust Design of North American Power Grid to Mitigate Cascading Failures" *2013 ASME International Mechanical Engineering Congress and*

Exposition (*IMECE*), American Society of Mechanical Engineers, pp. V012T13A017-V012T13A017, November 2013. (key contributor)

24. **Mehrpouyan, H.**, Haley, B., Dong, A., Hoyle, C., Tumer, I., "Resilient Design of Complex Engineered Systems Against Cascading Failure", *2013 ASME International Mechanical Engineering Congress and Exposition* (*IMECE*), American Society of Mechanical Engineers, pp. V012T13A063-V012T13A063 November 2013. (key contributor)
25. **Piacenza, J.**, Seyedmahmoudi, S., Haapala, K., Tumer, I., Hoyle, C., "Comparison of Sustainability Performance: Cross Laminated Timber versus Reinforced Concrete" *2013 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. V004T05A036-V004T05A036, August 2013. (minor contributor)
26. **Mehrpouyan, H.**, Haley, B., Dong, A., Hoyle, C., Tumer, I., "Resilient Design of Complex Engineered Systems", *2013 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. V03AT03A048-V03AT03A048, August 2013. (key contributor)
27. **Mehrpouyan, H.**, Giannakopoulou, D., Brat, G., Hoyle, C., Tumer, I., "Complex System Design Verification Using Assumption Generation", *2013 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. V02BT02A017-V02BT02A017, August 2013. (minor contributor)
28. O'Halloran, B. M., Hoyle, C., Stone, R. B., and Tumer, I. Y., "The early design reliability prediction method," *Proc. ASME 2012 International Mechanical Engineering Congress and Exposition*, American Society of Mechanical Engineers, pp. 1765-1776, 2012 (key contributor).
29. **Piacenza, J.**, Tumer, I. Y., Hoyle, C., and **Fields, J**., "Power Grid System Design Optimization Considering Renewable Energy Strategies and Environmental Impact," *Proc. ASME 2012 International Mechanical Engineering Congress and Exposition*, American Society of Mechanical Engineers, pp. 1859-1869, 2012. (key contributor).
30. **Piacenza, J**., Tumer, I., Hoyle, C., "Lighting Optimization for Sustainable Building Design Considering User Productivity", *2012 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 3-12, August 2012. (key contributor)
31. Jensen, D., Hoyle, C., Tumer, I., "Clustering Function-Based Failure Analysis Results to Evaluate and Reduce System-Level Risks", *2012 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 1055-1064, August 2012. (key contributor)
32. Van Bossuyt, D., Hoyle, C., Tumer, I., Dong, A., Doolen, T., Malak, R., "Toward Considering Risk Attitudes in Engineering Organizations Using Utility Theory", *2012 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 693-704, August 2012. (key contributor, ~50% acceptance rate)
33. **Mehrpouyan, H**., Jensen, D., Hoyle, C., Tumer, I., Kurtgolu, T., "A Model-Based Failure Identification and Propagation Framework for Conceptual Design of Complex Systems", *2012 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 1087-1096, August 2012. (minor contributor)
34. O'Halloran, B., Hoyle, C., Stone, R., Tumer, I., "A Method to Calculate Function and Component Failure Distributions using a Hierarchical Bayesian Model and Frequency Weighting", *2012 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 727-736, August 2012. (key contributor, ~50% acceptance rate))
35. Uckun, S., Kurtgolu, T., Bunus, P., Tumer, I., Hoyle, C., Musliner, D., "Model-Based Systems Engineering for the Design and Development of Complex Aerospace Systems", No. 2011-01-2664, *SAE 2011 AeroTech Congress & Exhibition*, Oct. 2011. (key contributor)
36. Hoyle, C., Tumer, I., Kurtgolu, T., Chen, W., "Multi-Stage Uncertainty Quantification for Verifying the Correctness of Complex System Designs", *2011 ASME Design Engineering Technical Conference*

(*IDETC/CIE*), American Society of Mechanical Engineers, pp. 1169-1178, August 2011. (primary author)

37. He, L., Hoyle, C., Chen, W., Wang, J., Yannou, B., "A Framework for Choice Modeling in Usage Context-Based Design", *2010 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 265-276, August 2010. (key contributor)
38. Hoyle, C., Chen, W., Wang, N., and Koppelman, F., "Bayesian Hierarchical Choice Modeling Framework for Capturing Heterogeneous Preferences in Engineering System Design", *2009 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 361-370, September 2009. (primary author)
39. Yannou, B., Wang, J., Rianantsoa, N., Hoyle, C., Drayer, M., Chen, W., "Usage Coverage Model for Choice Modeling: Principles and Taxonomy", *2009 ASME Design Engineering Technical Conference* (*IDETC/CIE*), American Society of Mechanical Engineers, pp. 407-418, September 2009. (minor contributor)
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