Updated: February 2022

Curriculum Vitae

Name:	Chao Hu
Title:	Associate Professor
	Department of Mechanical Engineering
	Department of Electrical and Computer Engineering (courtesy)
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Research Interests

- Engineering Design under Uncertainty, Prognostics and Health Management (PHM), Physics-Informed Machine Learning for PHM, Design for Failure Recovery of Lithium-ion Batteries

Education

- **Ph.D., Mechanical Engineering** *Aug. 2007–Aug. 2011*
  University of Maryland, College Park, MD
  Dissertation Title: "Advances in System Reliability-Based Design and Prognostics and Health Management (PHM) for System Resilience Analysis and Design"
  Advisor: Dr. Byeng D. Youn Co-Advisor: Dr. Bongtae Han
- **B.E., Engineering Physics** *Sep. 2003–Jul.2007*
  Tsinghua University, Beijing, China

Work Experience

- **Associate Professor**, Iowa State University, IA *Aug. 2021–Present*
- **Assistant Professor**, Iowa State University, IA *Aug. 2015–Aug. 2021*
- **Principal Scientist**, Medtronic, Inc., MN *Jun. 2014–Jul. 2015*
- **Senior Reliability Engineer**, Medtronic, Inc., MN *Oct. 2011–May 2014*
- **Graduate Research Assistant**, University of Maryland, College Park, MD *Aug. 2007–Aug. 2011*
- **Researcher and Co-Teacher**, Seoul National University, Seoul, South Korea *Sep. 2010–May 2011*

Awards and Recognitions

- ASME Reviewers of the Year Award (Journal of Mechanical Design) *2019*
- Best Track Paper Award (IISE Annual Conference, Engineering Economy Track) *2019*
- ASME Design Automation Young Investigator Award *2018*
- NSF CISE Research Initiation Initiative (CRII) Award *2016*
- Highly Cited Research Paper 2012-2013 (Applied Energy) *2015*
- Star of Excellence Individual Award (Medtronic, Inc.) *2014*
  Awarded to 2 out of over 20,000 employees
- Ford Motor Company - Best Paper Award (ASME Design Automation Conference) *2013*
- Best Paper Award (IEEE PHM Conference, IEEE Reliability Society) *2012*
- Nomination of Eni Award 2013: "Nobel Prize of Energy Research" (Eni Award Commission) *2012*

- Top 10 Best Paper Award out of 118 Accepted (ASME Design Automation Conference) *2012*
- Top 10 Best Paper Award out of 122 Accepted (ASME Design Automation Conference) *2011*
- C. Raymond Knight Scholarship Award (University of Maryland, College Park) *2010*

Teaching Experience

- **Instructor**, Iowa State University *Sep. 2015 – Present*
  Manufacturing Engineering, Spring 2021 (49 undergraduate students, student rating: 4.6 out of 5)
  Mechanical Component Design, Fall 2020 (63 undergraduate students, student rating: 3.9)
  Probabilistic Engineering Analysis and Design, Spring 2020 (10 graduate students, N.A.)
  Manufacturing Engineering, Fall 2019 (75 undergraduate students, 4.6)
  Mechanical Component Design, Fall 2019 (52 undergraduate students, 4.2)
  Probabilistic Engineering Analysis and Design, Spring 2019 (20 graduate students, 4.5)
  Mechanical Component Design, Fall 2018 (74 undergraduate students, 3.8)
  Probabilistic Engineering Analysis and Design, Spring 2018 (15 graduate students, 4.9)
  Mechanical Component Design, Fall 2017 (75 undergraduate students, 4.3)
  Mechanical Component Design, Spring 2017 (88 undergraduate students, 4.0)
  Manufacturing Engineering, Fall 2016 (81 undergraduate students, 4.1)
  Manufacturing Engineering, Spring 2016 (89 undergraduate students, 4.4)
  Manufacturing Engineering, Fall 2015 (59 undergraduate students, 4.0)
- **Co-Teacher**, Seoul National University *Sep. 2010 – May. 2011*
  Engineering Mathematics (undergraduate course with 45 students)
  Advances in Reliability-Based Design (graduate course with 12 Students)
- **Teaching Assistants**, University of Maryland, College Park *Sep. 2007 – Aug. 2009*
  Thermodynamics (undergraduate course with 32 Students)
  Electronics and Instrumentation II (undergraduate course with 26 Students)
  Statistical Methods for Product Development (two undergraduate courses with 87 students in total)
  Fluid Mechanics (undergraduate course with 29 students)

Advising Experience
(* denotes my role as students' co-advisors)

- **Postdocs**

Name	Research Topic, Current Job	Expected Date of Completion
Dr. Venkat P. Nemani	Deep Learning and IIoT for Bearing Prognostics	*Oct. 2019 – Mar. 2022*
Dr. Zhixiong Li	Ensemble Learning for Machinery Failure Prognostics (Research Fellow at the University of Wollongong)	*Sep. 2016 – Sep. 2017 (Completed)*

- **Ph.D. Students**

Name	Dissertation Title/Topic, Current Job	Expected Date of Completion
Adam Thelen	Physics-Informed Machine Learning for High-Rate Systems	*Aug. 2023*
Todd Thompson	Design for Fatigue Reliability and Remanufacturing	*May 2023*
Ankush Mishra	Machine Learning for Battery Early Cycle Life	*Dec. 2022*

Name	Dissertation Title/Topic, Current Job	Expected Date of Completion
Hao Lu	Physics-Informed Deep Learning for Bearing Prognostics	*May 2022*
Jinqiang Liu	Performance Modeling of Battery Energy Storage in Grid Applications (Co-Advisor: Dr. Zhaoyu Wang)	*May 2022*
Yu-Hui Lui*	Multiphysics Modeling of Lithium-Ion Batteries (Advisor: Dr. Shan Hu)	*May 2021*
Vahid Barzegar*	Real-Time Machine Learning for High-Rate State Estimation (Advisor: Dr. Simon Laflamme)	*May 2020*
Dr. Sheng Shen	Data-Driven Approaches for Battery State Estimation and Early Cycle Life Prediction, Postdoc at Berkeley Lab	*Nov. 2020* (Graduated)
Dr. Meng Li	Advances in Reliability Analysis and Health Prognostics Using Probabilistic Machine Learning, Data Scientist at National Oilwell Varco	*Jun. 2020* (Graduated)
Dr. Mohammad K. Sadoughi	Data-Driven Approaches for Improving Failure Resilience of Engineered Systems, Research Scientist at Amazon	*May 2019* (Graduated)
Dr. Austin Downey	Dense Sensor Networks for Health Monitoring and Prognostics of Mesoscale Structures (Co-Advisor: Dr. Simon Laflamme), Assistant Professor at the University of South Carolina	*Jul. 2018* (Graduated)

- **M.S. Students**

Name	Dissertation Title	Date of Completion
Matthew Nelson*	Physics-Informed Machine Learning for High-Rate State Estimation	*May 2022* (Expected)
Yifei Li	Ensemble Bias-Correction based State of Charge Estimation of Lithium-Ion Batteries	*Dec. 2017* (Graduated)
Sumin Seong*	Design Optimization Under Uncertainty for Reliable Power Generation Performance of Piezoelectric Energy Harvester (Advisor: Dr. Soobum Lee at the University of Maryland, Baltimore County)	*May 2015* (Graduated)

- **Undergraduates**

Name	Research Topic	Date of Completion
Cade Allen	Physics-Informed Deep Learning for Bearing Failure Prognostics	*May 2022*
Tingkai Li	Machine Learning for Battery Early Life Prediction	*December 2021*
Kate Lyon	Machine Learning for Battery Early Life Prediction	*May 2021*
Evan Hartman Austin Bray	Machine Learning for Bearing Failure Prognostics	*May 2021*
Adam Thelen	Recurrent Neural Network for Real-Time State Estimation	*May 2020*

Name	Research Topic	Date of Completion
Yingying Huang Amrita Ghosh Carter Foughty	On-board Monitoring and Correction of Shaft Unbalance	*May 2020*
Tyler Markve Patrick Black	Battery Lifetime Prediction Using Dynamic Charge/Discharge Profiles	*May 2020*
Nick Schnoebelen Jonathan McGill	Physics-Informed Deep Learning for Bearing Failure Prognostics	*Dec. 2019*
Martin Martinez	Physics-Informed Deep Learning for Bearing Fault Diagnostics	*Aug. 2019*
Dalton Louks	Machine Learning for Bearing Fault Diagnostics	*May 2019*
Zhi-Fang Tan	Deep Learning for State-of-Health Monitoring of Lithium-Ion Battery	*Dec. 2018*
Jhamaree Elam	Data-Driven Prognostics of Lithium-Ion Battery Using Gaussian Process Regression	*Aug. 2018*
Max Hendricks	Deep Learning for Bearing Fault Diagnostics	*Aug. 2018*
Garrett D. Bunge Aditya K. Ranawat	Deep Learning for Bearing Fault Diagnostics	*May 2018*
Olivia Pfeiffer	Prognostics of Bearings in Wind Turbine Gearboxes	*Aug. 2017*
Nicole Essner Nolgie O.O. Colón	Vibration-based Fault Diagnostics and Failure Prognostics of Wind Turbine Gearbox	*Aug. 2016*
Jajun Ryu	Maximum Entropy Modeling with Discrete Data	*May 2016*
Ha Lim Jeong Cole J. Tenold Stetsen Greiner	Online Detection of Lithium Plating for Lithium-Ion Battery through High Precision Coulometry	*May 2016*
John Bavlsik	Data-Driven Prognostics of Lithium-Ion Battery Using Bilinear Kernel Regression	*Dec. 2015*

Research Grants

Overview: PI/Co-PI on 24 research grants totaling $3.1M, including from government agencies (NSF, DOE, DOT and Army) and industry. Among them, Hu's share supporting his activities is about $1.9M, of which the total amount serving as PI is about $1.5M.

Title of Grant, Role	Agency	Dollar Amount	Beginning and End Dates
From the Landfill to the Grid: Repurposing Used Batteries for Resilient Grid Storage, Co-PI (PIs: Cary Pint and Gül E. Kremer)	Iowa Economic Development Authority	$294,859	12/2021–12/2023
Quantification of financial and environmental benefits tradeoff in multi-generational product family development considering Re-X performances, ISU Co-PI (UIUC PIs: Harrison Kim and Pingfeng Wang, ISU PI: Gül E. Kremer)	Department of Energy	$500,000	07/2021–06/2023

Title of Grant, Role	Agency	Dollar Amount	Beginning and End Dates
Design Iteration Support Tool to Sustain Remanufacturability, Co-PI (PI: Gül E. Kremer, Other Co-PIs: Kyung J. Min and Matthew C. Frank)	Department of Energy	$248,638	07/2021–06/2023
Predicting Battery Lifetime with Early-Life Data for Grid Applications, PI (Co-PIs: Anne Kimber, Zhaoyu Wang, and Gül E. Kremer)	Iowa Economic Development Authority	$280,070	01/2021–12/2022
STTR Phase I: Probabilistic and Explainable Deep Learning for the Intuitive Predictive Maintenance of Industrial and Agricultural Equipment, Co-PI (PI: Andrew Zimmerman at Grace Technologies)	National Science Foundation	$256,000	12/2020–11/2021
Deep Learning and IIoT for Predictive Maintenance of Industrial Equipment (Phase II), sole PI	Iowa Regents Innovation Fund	$100,000	07/2020–05/2021
Onboard Monitoring of Shaft Unbalance and Bearing Health (Phase 2), sole PI	Vermeer Corporation	$85,000	08/2020–08/2021
Physics-Based Probabilistic Prognostics for Battery Health Management, PI (Co-PIs: Simon Laflamme and Shan Hu)	National Science Foundation	$384,825	06/2020–05/2023
RTML: Small: Collaborative: A Programming Model and Platform Architecture for Real-time Machine Learning for Sub-second Systems, Co-PI (PI: Simon Laflamme)	National Science Foundation	$240,000	10/2019–09/2022
Data-Driven Design Decision Support for Re-X of High-Value Components in Industrial and Agricultural Equipment, PI (Co-PI: Gül E. Kremer) **[REMADE Project Showcase]**	Department of Energy	$100,000	09/2019–09/2020
Onboard Monitoring of Shaft Unbalance and Bearing Health (Phase 1), sole PI	Vermeer Corporation	$35,000	09/2019–03/2020
PFI-TT: Physics-based Deep Transfer Learning for Predictive Maintenance of Industrial and Agricultural Machinery, PI (Co-PIs: Matthew J. Darr, Simon Laflamme, and Carey E. Novak)	National Science Foundation	$290,094	08/2019–01/2022
Deep Learning and IIoT for Predictive Maintenance of Industrial Equipment, sole PI	Iowa Regents Innovation Fund	$105,800	07/2019–08/2020
Reliability Analysis of Hydraulic Drive Systems (Phase II), sole PI	Deere & Company	$35,000	06/2019–09/2019
Intelligent Fault Diagnostics of Rolling-Element Bearings, sole PI	Grace Engineered Products and ISU	$39,351	01/2019–09/2019
High-Fidelity Performance/Degradation Modelling of Utility-Scale Battery Energy Storage Systems, PI (Co-PIs: Zhaoyu Wang and Venkataramana Ajjarapu)	Electric Power Research Center	$162,000	07/2018–06/2021
Reliability Analysis of Hydraulic Drive Systems, sole PI	Deere & Company	$98,000	01/2018–04/2019

Title of Grant, Role	Agency	Dollar Amount	Beginning and End Dates
Validation of Computer Models for Engineering Systems with Multiple Dynamic Responses, sole PI	Center for e-Design	$15,000	09/2017–09/2018
Predictive Modeling with Automated Analytics for Intelligent Bearing Prognostics, sole PI	Iowa Regents Innovation Fund	$103,800	07/2017–05/2018
Data-Driven Dynamic Reliability Assessment of Lithium-Ion Battery Considering Degradation Mechanisms, PI (Co-PI: Shan Hu)	National Science Foundation	$330,000	08/2016–07/2020
Efficient Reliability-based Design Optimization of Engineered Systems with Multiple Inter-Dependent Components, sole PI	Center for e-Design	$30,000	08/2016–08/2018
Lifetime Prediction of Hybrid Energy Storage Devices in Operating and Storage Conditions, ISU PI (Prime Contractor: Carbon Solutions Inc.)	US Army SBIR Phase II	$120,000	07/2016–07/2021
CRII: CPS: Designing Complex Cyber-Physical Systems for Failure Resilience, sole PI **[NSF Computer Systems Research Spotlight Project]**	National Science Foundation	$175,000	06/2016–05/2019
Model Validation and Uncertainty Quantification of Medical Devices, sole PI	Medtronic	$30,000	06/2016–03/2018
On-Board Prediction of Remaining Useful Life of Lithium-Ion Battery, sole PI	Department of Transportation	$100,158	03/2016–02/2017

Publications

$^{+}$ *Denotes student/postdoc co-author.*

* *Denotes corresponding author.*

- Overview: 62 journal articles published/accepted; one book, two book chapters; two US patents filed and one patent pending; four paper awards.
- Citation Highlights (statistics as of September 2021): Google Scholar citations: h = 29, and 3,310 cites in total; several journal articles were among the top 3% most cited articles of the respective journals; a total of nine articles had received more than 100 cites each per the Google Scholar data.

Journal Articles (Under Review/Revision)

1. Yazdekhasti A., Fussell L., Hu C., Kremer G.E., and Ma J.*, "Incorporating Truck-Drone Bimodal Delivery System into Mobile Additive Manufacturing Considering Preferred Delivery Time-Window and Optimal Printing Sequence Corresponding," Under Review, *International Journal of Production Economics*, 2021.
2. Thompson T.$^{+}$*, Liu J.$^{+}$, and Hu C., "A Comparative Analysis of Step Stress and Staircase Testing for Fatigue Strength Estimation of an Engine Component," Under Review, *International Journal of Fatigue*, 2021.
3. Thelen A.$^{+}$, Lui Y.H.$^{+}$, Shen S.$^{+}$, Laflamme S., Hu S., and Hu C.*, "Integrating Physics-Based Modeling and Machine Learning for Degradation Diagnostics of Lithium-Ion Batteries," Under Review, *Energy Storage Materials*, 2021.
4. Liu J.$^{+}$, Thelen A.$^{+}$, Mishra, A.$^{+}$, Hu C.*, Yang X.G., and Wang Z., "Battery Capacity-Trajectory Prediction Using Early-Life Data," Under Review, *Applied Energy*, 2022.

5. Nemani V.P.[+], Liu J.[+], Ahmed N., Cartwright A., Kremer G.E., and Hu C.*, "Reliability-Informed Economic and Energy Evaluation for Bi-Level Design for Remanufacturing: A Case Study of Transmission and Hydraulic Manifold," Under Revision, *Journal of Mechanical Design*, 2022.

Journal Articles (Published/Accepted)

6. Nemani V.P.[+], Lu H.[+], Thelen A.[+], and Hu C.*, and Zimmerman A.., "Ensembles of Probabilistic LSTM Predictors and Correctors for Bearing Prognostics Using Industrial Standards," In Press, *Neurocomputing*, 2021.
7. Giahi R.*, MacKenzie C., and Hu C., "Optimizing the Flexible Design of Hybrid Renewable Energy Systems," In Press, *Engineering Economist*, 2022.
8. Barzegar V.[+,]*, Laflamme S., Hu C., and Dodson J., "Ensemble of Recurrent Neural Networks with Long Short-Term Memory Cells for High-Rate Structural Health Monitoring," *Mechanical Systems and Signal Processing*, v164, 108201 (15pp), 2022.
9. Yang Y.H., Wei H.P., Han B.*, and Hu, C., "Implementation and Performance Evaluation of a Bivariate Cut-HDMR Metamodel for Semiconductor Packaging Design Problems with a Large Number of Input Variables," *Materials*, v14, n16, 4619 (16pp), 2021.
10. Shen S.[+], Lu H.[+], Sadoughi M.[+], Hu C.*, Nemani V.[+], Thelen A.[+], Webster K., Darr M., Kenny S., and Sidon J., "A Physics-Informed Deep Learning Approach for Bearing Fault Detection," *Engineering Applications of Artificial Intelligence*, v103, 104295 (15pp), 2021.
11. Li M.[+], Shen S.[+], Barzegar V.[+], Sadoughi M.[+], Hu C.*, and Laflamme S., "Kriging-Based Reliability Analysis Considering Predictive Uncertainty Reduction," *Structural and Multidisciplinary Optimization*, v63, p2721–2737, 2021.
12. Li M.[+], Nemani V.P.[+], Liu J.[+], Lee M.A., Ahmed N., Kremer G.E., and Hu C.*, "Reliability-Informed Life Cycle Warranty Cost and Life Cycle Analysis of Newly Manufactured and Remanufactured Units," *Journal of Mechanical Design*, v143, n11, 112001 (14pp), 2021.
13. Barzegar V.[+,]*, Laflamme S., Hu C., and Dodson J., "Multi-time Resolution Ensemble LSTMs for Enhanced Feature Extraction in High-Rate Time Series," *Sensors*, v21, n6, 1954 (18pp), 2021.
14. Gargh P., Sarkar, A., Lui Y.H.[+], Shen S.[+], Hu C., Hu S., Nlebedim I.C., and Shrotriya P.*, "Correlating Capacity Fade with Film Resistance Loss in Fast Charging of Lithium-ion Battery," *Journal of Power Sources*, v485, 229360 (7pp), 2021.
15. Lui Y.[+], Li M.[+], Downey A.[+], Shen S.[+], Nemani V.P.[+], Ye H., VanElzen C., Jain G., Hu S., Laflamme S., and Hu C.*, "Physics-Based Prognostics of Implantable-Grade Lithium-Ion Battery for Remaining Useful Life Prediction," *Journal of Power Sources*, v485, 229327 (15pp), 2021.
16. Liu J.[+], Hu C.*, Kimber A., and Wang Z., "Uses, Cost-Benefit Analysis, and Markets of Energy Storage Systems for Electric Grid Applications," *Journal of Energy Storage*, v32, 101731 (16pp), 2020.
17. Barzegar V.[+,]*, Laflamme S., Downey A., Li M.[+], and Hu C., "Numerical Evaluation of a Novel Passive Variable Friction Damper for Vibration Mitigation," *Engineering Structures*, v220, 110920 (12pp), 2020.
18. Sadoughi M.[+], Hu C.*, Moghadassian B., Sharma A., Beck J., and Mathiesen D., "Sequential Online Dispatch in Design of Experiments for Single- and Multi-Response Surrogate Modeling," *IEEE Transactions on Automation Science and Engineering*, v17, n4, p1674–1688, 2020.
19. Li M.[+], Sadoughi M.[+], Hu Z., and Hu C.*, "A Hybrid Gaussian Process Model for System Reliability Analysis,", *Reliability Engineering and System Safety*, v197, 106816 (15pp), 2020.
20. Shen S.[+], Sadoughi M.[+], Li M.[+], Wang Z., and Hu C.*, "Deep Convolutional Neural Networks with Ensemble Learning and Transfer Learning for Capacity Estimation of Lithium-ion Batteries," *Applied Energy*, v260, 114296 (14pp), 2020.
21. Giahi R.*, MacKenzie C., and Hu C., "Design Optimization for Resilience for Risk-Averse Firms,"

Computers and Industrial Engineering, v139, 106122 (14pp), 2020.

22. Sadoughi M.[+] and Hu C.*, "Physics-Based Convolutional Neural Network for Fault Diagnosis of Rolling Element Bearings," *IEEE Sensors Journal*, v19, n11, p4181–4192, 2019.
23. Sarkar A., Shrotriya P.*, Chandra A., and Hu C., "Chemo-Economic Analysis of Battery Aging and Capacity Fade in Lithium-Ion Battery," *Journal of Energy Storage*, v25, 100911 (8pp), 2019.
24. Li M.[+], Sadoughi M.[+], Hu C.*, Hu Z., Eshghi A.T., and Lee S., "High-Dimensional Reliability-Based Design Optimization Involving Highly Nonlinear Constraints and Computationally Expensive Simulations," *Journal of Mechanical Design*, v141, n5, 051402 (14pp), 2019.
25. Shen S.[+], Sadoughi M.[+], Chen X.Y., Hong M.Y., and Hu C.*, "A Deep Learning Method for Online Capacity Estimation of Lithium-Ion Batteries," *Journal of Energy Storage*, v25, p100817, 2019.
26. Downey A.[+], Lui Y.[+], Hu C.*, Laflamme S., and Hu S., "Physics-Based Prognostics of Lithium-Ion Battery Using Non-linear Least Squares with Dynamic Bounds," *Reliability Engineering and System Safety*, v182, p1–12, 2019.
27. Li Z.[+], Wu D., Hu C.*, and Terpenny J., "An Ensemble Learning-based Prognostic Approach with Degradation-Dependent Weights for Remaining Useful Life Prediction," *Reliability Engineering and System Safety*, v184, p110–122, 2019.
28. Nahvi A.*, Sadoughi M.[+], Arabzadeh A., Sassani S., Hu C., Ceylan H., and Kim S., "Multi-objective Bayesian Optimization of Super Hydrophobic Coatings on Asphalt Concrete Surfaces," *Journal of Computational Design and Engineering*, v19, n11, p4181–4192, 2019.
29. MacKenzie C. and Hu C.*, "Decision Making under Uncertainty for Design of Resilient Engineered Systems," *Reliability Engineering and System Safety*, v192, 1061719 (10pp), 2019.
30. Hu Z.*, Hu C., Zissimos P.M., and Sankaran M., "Model Discrepancy Quantification in Simulation-based Design of Dynamical Systems," *Journal of Mechanical Design*, v141, n1, 011401 (13pp), 2018.
31. Downey A.[+,]*, Sadoughi M.[+], Laflamme S., and Hu C., "Incipient Damage Detection for Large Area Structures Monitored with a Network of Soft Elastomeric Capacitors Using Relative Entropy," *IEEE Sensors Journal*, v18, n21, p 8827–8834, 2018.
32. Sadoughi M.[+], Li M.[+], and Hu C.*, "Multivariate System Reliability Analysis Considering Highly Nonlinear and Dependent Safety Events," *Reliability Engineering and System Safety*, v180, p189–200, 2018.
33. Downey A.[+,]*, Sadoughi M.[+], Laflamme S., and Hu C., "Fusion of Sensor Geometry into Additive Strain Fields Measured with Sensing Skin," *Smart Materials and Structures*, v27, 075033, p1–14, 2018.
34. Sadoughi M.[+], Downey A.[+], Yan J., Hu C.*, and Laflamme S., "Reconstruction of Unidirectional Strain Maps via Iterative Signal Fusion for Mesoscale Structures Monitored by a Sensing Skin," *Mechanical Systems and Signal Processing*, v112, p401–416, 2018.
35. Sadoughi M.[+], Li M.[+], Hu C.*, MacKenzie C., Eshghi A.T., and Lee S., "A High-Dimensional Reliability Analysis Method for Simulation-Based Design Under Uncertainty," *Journal of Mechanical Design*, v140, n7, 071401 (12pp), 2018.
36. Sadoughi M.[+], Hu C.*, MacKenzie C., Eshghi A.T., and Lee S., "Sequential Exploration-Exploitation with Dynamic Trade-off for Efficient Reliability Analysis of Complex Engineered Systems," *Structural and Multidisciplinary Optimization*, v57, n1, p235–250, 2018.
37. Hu C.*, Hui Y., Jain G., and Schmidt C., "Remaining Useful Life Assessment of Lithium-Ion Batteries in Implantable Medical Devices," *Journal of Power Sources*, v375, p118–130, 2018.
38. Li Z.[+], Jiang Y., Guo Q., Hu C.*, and Peng Z., "Multi-Dimensional Variational Decomposition for Bearing-Crack Detection in Wind Turbines with Large Driving-Speed Variations," *Renewable Energy*, v116 (Part B), p55–73, 2018.
39. Downey A.[+,]*, Hu C., and Laflamme S., "Optimal Sensor Placement within a Hybrid Dense Sensor

Network using an Adaptive Genetic Algorithm with Learning Gene Pool," *Structural Health Monitoring*, v17, n3, p450–460, 2018.

40. Eshghi A.T., Lee S.*, Sadoughi M.+, Hu C., Kim Y.C., and Seo J.H., "Design Optimization under Uncertainty and Speed Variability for a Piezoelectric Energy Harvester Powering a Tire Pressure Monitoring Sensor," *Smart Materials and Structures*, v26, n10, 105037, p1–18, 2017.
41. Zhang C., Li Z.+,*, Hu C., Chen S., Wang J., and Zhang X., "An Optimized Ensemble Local Mean Decomposition Method for Fault Detection of Mechanical Components," *Measurement Science and Technology*, v28, n3, 035102 (15pp), 2017.
42. Seong S.+, Hu C., and Lee S.*, "Design under Uncertainty for Reliable Power Generation of Nonlinear Piezoelectric Energy Harvester," *Journal of Intelligent Material Systems and Structures*, v28, n17, p2437–2449, 2017.
43. Li Z.+,*, Jiang Y., Hu C., and Peng Z., "Recent Progress on Decoupling Diagnosis of Hybrid Failures in Gear Transmission Systems Using Vibration Sensor Signal: A Review," *Measurement*, v90, p4–19, 2016.
44. Jiang Y., Li Z.+,*, Zhang C., Hu C., and Peng Z., "On the Bi-Dimensional Variational Decomposition Applied to Nonstationary Vibration Signals for Rolling Bearing Crack Detection in Coal Cutters," *Measurement Science and Technology*, v27, n6, p065103, 2016.
45. Hu C.*, Jain G., Schmidt C., Strief C., and Sullivan M., "Online Estimation of Lithium-Ion Battery Capacity Using Sparse Bayesian Learning," *Journal of Power Sources*, v289, p105–113, 2015.
46. Hu C., Youn B.D.*, Kim T., and Wang P., "A Co-Training-Based Approach for Prediction of Remaining Useful Life Utilizing both Failure and Suspension Data," *Mechanical Systems and Signal Processing*, v62–63, p75–90, 2015.
47. Youn B.D.*, Park K.M., Hu C., Yoon, J.T., and Bae Y.C., "Statistical Health Reasoning of Power Generator Stator Windings against Moisture Absorption," *IEEE Transactions on Energy Conversion*, v30, n4, p1376-1385, 2015.
48. Bai G.+, Wang P.*, and Hu C., "A Self-Cognizant Dynamic System Approach for Prognostics and Health Management," *Journal of Power Sources*, v278, p163–174, 2015.
49. Wang P., Youn B.D.*, Hu C., Jong M.H., and Jeon B., "A Probabilistic Detectability-Based Sensor Network Design Method for System Health Monitoring and Prognostics," *Journal of Intelligent Material Systems and Structures*, v26, n9, p1079–1090, 2015.
50. Fathi R., Burns J.C., Stevens D.A., Ye H., Hu C., Jain G., Scott E., Schmidt C., and Dahn J.R.*, "Ultra High-Precision Studies of Degradation Mechanisms in Aged $LiCoO_2$/Graphite Li-Ion Cells," *Journal of The Electrochemical Society*, v161, n10, A1572–A1579, 2014.
51. Bai G.+, Wang P.*, Hu C., and Pecht M., "A Generic Model-Free Approach for Lithium-Ion Battery Health Management," *Applied Energy*, v135, p247–260, 2014.
52. Hu C.*, Jain G., Zhang P., Schmidt C., Gomadam P., and Gorka T., "Data-Driven Approach Based on Particle Swarm Optimization and K-Nearest Neighbor Regression for Estimating Capacity of Lithium-Ion Battery," *Applied Energy*, v129, p49–55, 2014.
53. Hu C.*, Jain G., Tamirisa P., and Gorka T., "Method for Estimating Capacity and Predicting Remaining Useful Life of Lithium-Ion Battery," *Applied Energy*, v126, p182–189, 2014.
54. Wang P.*, Tamilselvan P., and Hu C., "Health Diagnostics Using Multi-Attribute Classification Fusion," *Engineering Applications of Artificial Intelligence*, v32, p192–202, 2014.
55. Xi Z., Wang P., Jing R., and Hu C., "A Copula-Based Sampling Method for Data-Driven Prognostics," *Reliability Engineering and System Safety*, v132, p72–82, 2014.
56. Hu C., Youn B.D.*, and Yoon H., "An Adaptive Dimension Decomposition and Reselection Method for Reliability Analysis," *Structural and Multidisciplinary Optimization*, v47, n3, p423–440, 2013.

57. Hu C., Wang P., Youn B.D.*, and Lee W.R., "Copula-Based Statistical Health Grade System against Mechanical Faults of Power Transformers," *IEEE Transactions on Power Delivery*, v27, n4, p1809–1819, 2012.
58. Wang P., Youn B.D.*, and Hu C., "A Generic Probabilistic Framework for Structural Health Prognostic and Uncertainty Management," *Mechanical Systems and Signal Processing*, v28, p622–637, 2012.
59. Xi Z., Hu C., and Youn B.D.*, "A Comparative Study of Probability Estimation Methods for Reliability Analysis," *Structural and Multidisciplinary Optimization,* v45, n1, p33–52, 2012.
60. Hu C., Youn B.D.*, Wang P., and Yoon, J.T., "Ensemble of Data-Driven Prognostic Algorithms for Robust Prediction of Remaining Useful Life," *Reliability Engineering and System Safety,* v103, p120–135, 2012.
61. Hu C., Youn B.D.*, and Chung J., "A Multiscale Framework with Extended Kalman Filter for Lithium-Ion Battery SOC and Capacity Estimation," *Applied Energy,* v92, p694–704, 2012. [Highly Cited Research Paper 2012-2013]
62. Youn B.D.*, Hu C., and Wang P., "Resilience-Driven System Design of Complex Engineered Systems," *Journal of Mechanical Design*, v133, n10, 101011 (15pp), 2011.
63. Hu C. and Youn B.D.*, "An Asymmetric Dimension-Adaptive Tensor-Product Method for Reliability Analysis," *Structural Safety,* v33, n3, p218–231, 2011.
64. Hu C. and Youn B.D.*, "Adaptive-Sparse Polynomial Chaos Expansion for Reliability Analysis and Design of Complex Engineering Systems," *Structural and Multidisciplinary Optimization,* v43, n3, p419–442, 2011.
65. Wang P., Hu C., and Youn B.D.*, "A Generalized Complementary Intersection Method for System Reliability Analysis and Design," *Journal of Mechanical Design,* v133, n7, 071003 (13pp), 2011.
66. Youn B.D.*, Hu C., Wang P., and Yoon J.T., "Resilience Allocation for Resilient Engineered System Design," *Journal of Institute of Control, Robotics and Systems*, v17, n11, p1082–1089, 2011.
67. Xi Z., Youn B.D.*, and Hu C., "Random Field Characterization Considering Statistical Dependence for Probability Analysis and Design," *Journal of Mechanical Design,* v132, n10, 101008 (12pp), 2010.

Books and Chapters

1. Laflamme S., Hu C., and Dodson J., "Real-Time Machine Learning for High-Rate Structural Health Monitoring," Chapter 6 in *Structural Health Monitoring Based on Data Science Techniques*, Edited by Cury A., Ribeiro D. Ubertini F., and Todd M., 2021.
2. Hu C., Youn B.D., and Wang P., "Engineering Design under Uncertainty and Health Prognostics," *Springer Series in Reliability Engineering*, Springer, 2019.
3. Hu C., Wang P., and Youn B.D., "Advances in System Reliability Analysis under Uncertainty," Chapter 9 in *Numerical Methods for Reliability and Safety Assessment*, Edited by Seifedine K., and Abdelkhalak, E.H., Springer, 2015.

Patents and Invention Disclosures

1. Liu J.$^{+}$, Hu C., Nemani V.$^{+}$, Li M.$^{+}$, Lee M., and Ahmed N., "A Software Tool for Data-Driven Design Decision Support for Remanufacturing," Invention Disclosure Under Review by Office of Intellectual Property and Technology Transfer at Iowa State University, ISURF Ref. No. 05246, 2020.
2. Nemani V.$^{+}$, Hu C., Novak C., and Zimmerman A., "A Hybrid Deep Learning Model for Bearing Failure Prognostics," Invention Disclosure Under Review by the Office of Intellectual Property and Technology Transfer at Iowa State University, ISURF Ref. No. 05122, 2020.
3. Sadoughi M.$^{+}$, Lu H.$^{+}$, Hu C., Shawn K., Sidon J., and Brett B., "Fault Detection Technique for a Bearing," Patent Filed, US Patent Application No. 17/235419, 2021.

4. Louwagie J., Richard S., Viavattine J., Zhang P., and Hu C., "Battery Assembly for Medical Device," Provisional Patent Filed, US Patent Application No. 62/835738, 2019.

Conference Proceedings

1. Liu J.+, Thelen A.+, Mishra, A.+, Hu C.*, Yang X.G., and Wang Z., "An End-to-End Learning Framework for Early Prediction of Battery Capacity Trajectory," *Annual Conference of the Prognostics and Health Management (PHM) Society 2021*, Nov 29-Dec 2 2021, hosted online.
2. Nemani V.P.+, Liu J.+, Ahmed N., Cartwright A., Kremer G.E., and Hu C.*, "Reliability-Informed Economic and Energy Evaluation for Design for Remanufacturing: A Case Study on a Hydraulic Manifold," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 17-19 2021, hosted online.
3. Thelen A.+, Lui Y.H.+, Shen S.+, Laflamme S., Hu S., and Hu C.*, "Physics-Informed Machine Learning for Degradation Diagnostics of Lithium-Ion Batteries," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 17-19 2021, hosted online.
4. Lu H.+, Barzegar V.+, Nemani V.+, Hu C.*, Laflamme S., and Zimmerman, A., "GAN-LSTM Predictor for Failure Prognostics of Rolling Element Bearings," *2021 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 7-9 2021, hosted online.
5. Liu Y., Hu Z.*, Todd M., and Hu C., "Data-Driven Remaining Useful Life Estimation Using Gaussian Mixture Models," *AIAA Non-Deterministic Approaches Conference*, *2021 AIAA SciTech Forum*, Jan 19-21 2021, hosted online.
6. Thelen A.+, Li M.+, Hu C.*, Bekyarova E., Kalinin S., Sanghadasa M., "Integrating Model-Based Projection with Data-Driven Correction for Prognostics of All-Solid-State Battery-Supercapacitor Hybrid Devices," *2020 NASA Aerospace Battery Workshop*, Nov 17-19 2020, hosted online.
7. Li M.+, Shen S.+, Sadoughi M.+, Barzegar V., Laflamme S., and Hu C.*, "Expected Uncertainty Reduction for Sequential Kriging-Based Reliability Analysis," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 16-19 2020, hosted online.
8. Li M.+, Liu J.+, Nemani V.P.+, Ahmed N., Kremer G.E., and Hu C.*, "Reliability-Informed Life-Cycle Warranty Cost Analysis: A Case Study on a Transmission in Agricultural Equipment," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 16-19 2020, hosted online.
9. Eshkalak N.J.+, Lu H.+, Hu C.*, Daining S., and Wirth D., "Two-Plane Balancing Method for Correction Of Shaft Unbalance," *Annual Conference of the Society of Machinery Failure Prevention Technology (MFPT)*, Aug 6 2020, hosted online.
10. Liu J.+, Hu C.*, and Wang Z., "Optimal Bidding of Li-ion BESS in Regulation Markets Considering Capacity Degradation," *2020 IEEE Transportation Electrification Conference and Expo (ITEC)*, Jun 22-26 2020, hosted online.
11. Shen S.+, Nemani V.P.+, Liu J.+, Hu C.*, and Wang Z., "A Hybrid Machine Learning Model for Battery Cycle Life Prediction with Early Cycle Data," *2020 IEEE Transportation Electrification Conference and Expo (ITEC)*, Jun 22-26 2020, hosted online.
12. Lu H.+, Sadoughi M.+, Zimmerman A., and Hu C.*, "A Physics-Based Feature Weighting Approach for Fault Diagnosis of Rolling Element Bearings," *12th International Workshop on Structural Health Monitoring*, Sep 10-12, 2019, Stanford, CA.
13. Downey A.+,*, Hong J.+, Joyce B., Dodson J., Hu C., and Laflamme S., "Methodology for Real-Time State Estimation at Unobserved Locations for Structures Experiencing High-Rate Dynamics," *12th International Workshop on Structural Health Monitoring*, Sep 10-12, 2019, Stanford, CA.

14. Li M.+, Sadoughi M.+, Hu Z., and Hu C.*, "System Reliability Analysis Using Hybrid Gaussian Process Model," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 18-21 2019, Anaheim, CA.
15. Sadoughi M.+, Li M.+, Beck J., and Hu C.*, "A Reliability Model Validation Method for Mitigating the Effects of Measurement Uncertainty," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 18-21 2019, Anaheim, CA.
16. Shen S.+, Sadoughi M.+, and Hu C.*, "Online Estimation of Lithium-Ion Battery Capacity Using Transfer Learning," *2019 IEEE Transportation Electrification Conference and Expo (ITEC)*, Jun 19-21 2019, Novi, MI.
17. Liu J.+, Wang Z., and Hu C.*, "Co-Optimizing Size and Schedule of Lithium-Ion Battery Combined with PV Generation," *2019 IEEE Transportation Electrification Conference and Expo (ITEC)*, Jun 19-21 2019, Novi, MI.
18. Sadoughi M.+, Lu H.+, and Hu C.*, "A Deep Learning Approach for Failure Prognostics of Rolling Element Bearings," *2019 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 17-19 2019, Burlingame, CA.
19. Li M.+, Sadoughi M.+, Shen S.+, and Hu C.*, "Remaining Useful Life Prediction of Lithium-Ion Batteries Using Multi-model Gaussian Process," *2019 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 17-19 2019, Burlingame, CA.
20. Giahi R.*, MacKenzie C., and Hu C., "A Multi-Stage Optimization Model for Flexibility in Engineering Design," *IISE Annual Conference & Expo*, May 30-June 2 2019, New Orleans, LA. **[Best Track Paper Award]**
21. Sadoughi M.+ and Hu C.*, "A Physics-based Deep Learning Approach for Fault Diagnosis of Rotating Machinery," *44th Annual Conference of the IEEE Industrial Electronics Society*, Oct 21-23 2018, Washington, DC.
22. Sadoughi M.+, Downey A.+, Bunge G.+, Ranawat A.+, Hu C.*, and Laflamme S., "A Deep Learning-based Approach for Fault Diagnosis of Roller Element Bearings," *Annual Conference of the Prognostics and Health Management (PHM) Society 2018*, Oct 24-27 2018, Philadelphia, PA.
23. Lui Y.H.+, Li M.+, Sadoughi M.+, Hu C.*, and Hu S., "Physics-based State of Health Estimation of Lithium-Ion Battery Using Sequential Experimental Design," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 26-29 2018, Quebec City, Canada.
24. Shen S.+, Sadoughi M.+, Chen X.Y., Hong M.Y., and Hu C.*, "Online Estimation of Lithium-Ion Battery Capacity Using Deep Convolutional Neural Networks," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 26-29 2018, Quebec City, Canada.
25. Downey A.+, Sadoughi M.+, Cao L., Laflamme S., and Hu C.*, "Passive Variable Friction Damper for Increased Structural Resilience to Multi-Hazard Excitations," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 26-29 2018, Quebec City, Canada.
26. Bekyarova E.*, Itkis M.E., Kalinin S., Dai J., Hu L., Li M.+, and Hu C., "All-Solid-State Battery-Ultracapacitor Hybrid Devices Based on Nanostructured Materials," *The 48th Power Sources Conference*, Jun 11-14 2018, Denver, CO.
27. Eshghi A.T., Lee S.*, Sadoughi M.+, Hu C., Kim Y. C., and Seo J., "Experimental verification of tire energy harvester designed via reliability based design optimization method," *SPIE Smart Structures/Non-Destructive Evaluation (NDE) 2018*, Mar 4-8 2018, Denver, CO.

28. Sadoughi M.+, Downey A.+, Hu C.*, and Laflamme S., "An Iterative Signal Fusion Method for Reconstruction of In-Plane Strain Maps from Strain Measurements by Hybrid Dense Sensor Networks," *19th AIAA Information Systems-Infotech At Aerospace Conference*, *2018 AIAA SciTech Forum*, Jan 8-12 2018, Kissimmee, FL.
29. Li M.+, Sadoughi M.+, Hu C.*, and Hu Z., "Reliability-based Design Optimization of High-Dimensional Engineered Systems Involving Computationally Expensive Simulations," *20th AIAA Non-Deterministic Approaches Conference*, *2018 AIAA SciTech Forum*, Jan 8-12 2018, Kissimmee, FL.
30. Alnaqeb A.*, Lui Y.H.+, Li Y.+, Hu C., Hu S., and Wei P., "Real-time Prediction of Battery Power Supply and Estimation of Future Power Demand for Electrical Rotorcraft," *19th AIAA Non-Deterministic Approaches Conference*, *2018 AIAA SciTech Forum*, Jan 8-12 2018, Kissimmee, FL.
31. Li Y.+, Sadoughi M.+, Li Z.+, and Hu C.*, "An Ensemble Bias-Correction Method with Adaptive Weights for Dynamic Modeling of Lithium-Ion Batteries," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 6-9 2017, Cleveland, OH.
32. Sadoughi M.+, Li M.+, Hu C.*, and MacKenzie C., "High-Dimensional Reliability Analysis of Engineered Systems Involving Computationally Expensive Black-Box Simulations," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 6-9 2017, Cleveland, OH.
33. Li Z.+, Wu D., Hu C.*, Terpenny J., and Shen S.+, " Ensemble Prognostics with Degradation-Dependent Weights: Prediction of Remaining Useful Life for Aircraft Engines," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 6-9 2017, Cleveland, OH.
34. Hu C.*, and MacKenzie C., "Optimizing Resilience When Designing Engineered Systems," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 6-9 2017, Cleveland, OH.
35. Sadoughi M.+, Hu C.*, and MacKenzie C., "A Maximum Expected Utility Method for Efficient Reliability Analysis of Complex Engineered Systems," *18th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference*, *2017 AIAA AVIATION Forum*, Jun 5–9 2017, Denver, CO.
36. Li Z.+, Jiang Y., Hu C.*, and Peng Z., "Multi-Dimensional Variational Mode Decomposition Applied to Intrinsic Vibration Mode Extraction for Bearing Crack Detection in Wind Turbines with Large Speed Variation," *35th Wind Energy Symposium*, *2017 AIAA SciTech Forum*, Jan 9-13 2017, Grapevine, TX.
37. Hubbard C., Bavlsik J.+, Hegde C., and Hu C.*, "Data-Driven Prognostics of Li-Ion Rechargeable Battery using Bilinear Kernel Regression," *Annual Conference of the Prognostics and Health Management (PHM) Society 2016*, Oct 3-6 2016, Denver, CO.
38. Hu C.*, Hong M., Li Y.+, Tenold C.J.+, and Jeong H.L.+, "On-Board Analysis of Degradation Mechanisms of Lithium-Ion Battery using Differential Voltage Analysis," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 21-24 2016, Charlotte, NC.
39. R. Fathi, J.C. Burns, D.A. Stevens, Hui Ye, Hu C., Gaurav Jain, Erik Scott, Craig Schmidt and J.R. Dahn*, "Ultra High-Precision Studies of Degradation Mechanisms in Aged $LiCoO_2$/graphite Li-ion Cells," *18th International Meeting on Lithium Batteries (IMLB)*, June 19-24 2016, Chicago, IL.
40. Hu C.*, Jain G., Schmidt C., Strief C., and Sullivan M., "Online Estimation of Lithium-Ion Battery Capacity Using Sparse Bayesian Learning," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 2-5 2015, Boston, MA.

41. Kim H., Kim S., Kim T., Hu C., and Youn B.D.*, "Online Thermal State Estimation of High Power Lithium-Ion Battery," *2015 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 22-25 2015, Austin, TX.
42. Seong S.+, Lee S.*, and Hu C., "Reliability-Based Design Optimization for Nonlinear Energy Harvesters." *Proc. SPIE 9439, Smart Materials and Nondestructive Evaluation for Energy Systems 2015,* Mar 8-12 2015, San Diego, CA.
43. Hu C.*, Jain G., Tamirisa P., and Gorka T., "Method for Estimating Capacity and Predicting Remaining Useful Life of Lithium-Ion Battery," *2014 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 22-25 2014, Spokane, WA.
44. Tamilselvan P., Wang P.*, and Hu C., "Design of a Robust Classification Fusion Platform for Structural Health Diagnostics," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 4-7 2013, Portland, OR.
45. Wang P., Youn B.D.*, and Hu C., "Concurrent Design of Functional Reliability and Failure Prognosis for Engineered Resilience," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 4-7 2013, Portland, OR.
46. Xi Z.*, Jing R., Wang P., and Hu C., "A Copula-based Sampling Method for Data-driven Prognostics and Health Management," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 4-7 2013, Portland, OR. **[Ford Motor Company - Best Paper Award]**
47. Youn B.D.*, Park K.M., Hu C., Yoon, J.T., and Bae Y.C., "Health Diagnostics of Water-Cooled Power Generator Stator Windings Using a Directional Mahalanobis Distance (DMD)," *2013 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 24-27 2013, Gaithersburg, MD.
48. Hu C., Youn B.D.*, and Kim T., "Statistical Health Grade System against Mechanical failures of Power Transformers," *Annual Conference of the Prognostics and Health Management (PHM) Society 2012*, Sep 23-27 2012, Minneapolis, MN.
49. Hu C., Youn B.D.*, Wang P., and Yoon, J.T., "An Ensemble Approach for Robust Data-Driven Prognostics," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 12-15 2012, Chicago, DC. **[Top 10 Best Paper Award out of 122 Accepted]**
50. Hu C., Youn B.D.*, and Kim T., "Semi-Supervised Learning with Co-Training for Data-Driven Prognostics," *2012 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 18-21 2012, Denver, CO. **[Best Paper Award]**
51. Hu C., Youn B.D.*, and Chung J., "Online Estimation of Lithium-Ion Battery State-of-Charge and Capacity with a Multiscale Filtering Technique," *Annual Conference of the Prognostics and Health Management (PHM) Society 2011*, Sep 25-29 2011, Montreal, Canada.
52. Hu C., Youn B.D.*, and Kim T., "Semi-Supervised Learning with Co-Training for Data-Driven Prognostics," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 28-31 2011, Washington, DC.
53. Youn B.D.*, Hu C., and Wang P., "Resilience-Driven System Design of Complex Engineered Systems," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 28-31 2011, Washington, DC. **[Top 10 Best Paper Award out of 118 Accepted]**
54. Hu C. and Youn B.D.*, "An Asymmetric Dimension-Adaptive Tensor-Product Method for Reliability Analysis," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 28-31 2011, Washington, DC.

55. Youn B.D.*, Hu C., and Wang P., "Resilience-Driven System Design of Complex Engineered Systems," *9th World Congress on Structural and Multidisciplinary Optimization (WCSMO-9)*, June 13-17 2011, Granship, Shizuoka, Japan.
56. Wang P., Youn B.D.*, and Hu C., "A Probabilistic Detectability-Based Structural Sensor Network Design Methodology for Prognostics and Health Management," *Annual Conference of the Prognostics and Health Management (PHM) Society 2010*, Oct 10-16 2010, Portland, OR.
57. Hu C., Youn B.D.*, and Wang P., "Ensemble of Data-Driven Prognostic Algorithms with Weight Optimization and K-Fold Cross Validation," *Annual Conference of the Prognostics and Health Management (PHM) Society 2010*, Oct 10-16 2010, Portland, OR.
58. Wang P., Youn B.D.*, and Hu C., "A Generic Sensor Network Design Framework Based on a Detectability Measure," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 15-18 2010, Montreal, Quebec, Canada.
59. Hu C., Youn B.D.*, and Wang P., "Ensemble of Data-Driven Prognostic Algorithms with Weight Optimization and *K*-Fold Cross Validation," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 15-18 2010, Montreal, Quebec, Canada.
60. Xi Z., Youn B.D.*, and Hu C., "Effective Random Field Characterization Considering Statistical Dependence for Probability Analysis and Design," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 15-18 2010, Montreal, Quebec, Canada.
61. Hu C., Youn B.D.*, Chung J., and Ortanez R., "A Multiscale Framework with Extended Kalman Filter for Lithium-Ion Battery SOC and Capacity Estimation," *15th International Meeting on Lithium Batteries (IMLB)*, June 27-July 2 2010, Montreal, Quebec, Canada.
62. Hu C. and Youn B.D.*, "An Asymmetric Dimension-Adaptive Tensor-Product Method for Reliability Analysis," *AIAA 2010-2109, 51th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Apr 12-15 2010, Orlando, FL.
63. Hu C. and Youn B.D.*, "Adaptive-Sparse Polynomial Chaos Expansion for Reliability Analysis and Design of Complex Engineering Systems," *ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE)*, Aug 30-Sep 2 2009, San Diego, CA.
64. Wang P., Youn B.D.*, and Hu C., "A Generalized Complementary Intersection Method (CIM) for System Reliability Analysis," *AIAA 2009-2109, 50th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, May 4-7 2009, Palm Springs, CA.

Invited Talks

1. Hu C., "Physics-informed Machine Learning for Battery Health Prognostics – Challenges, Data Acquisition, and Methodologies," *2021 GIST Mini Symposium on Artificial Intelligence for Mechanical Engineering*, Dec 9 2021, hosted online.
2. Hu C., "Battery Capacity Forecasting and Early Life Prediction," *3rd Asia Pacific Conference of the Prognostics and Health Management Society (PHM Asia Pacific 2021)*, Sep 8 2021, hosted online. **[Tutorial Presentation]**
3. Hu C., "Introduction to Battery Prognostics and Early Life Prediction," *2021 IEEE International Conference on Prognostics and Health Management (PHM)*, Jun 7 2021, hosted online. **[Tutorial Presentation]**
4. Hu C., "Toward Reliable Design of Engineered Systems: Design under Uncertainty and Health Prognostics," The University of Central Florida, Apr 9 2021, hosted online.

5. Hu C., "Toward Reliable Design of Engineered Systems: Design under Uncertainty and Health Prognostics" The Iowa Chapter of ASME, Feb 19 2021, hosted online.
6. Hu C., Kremer G.E., Nemani V.P., and Liu J., "Data-Driven Design for Remanufacturing of High-Value Components in Industrial and Agricultural Equipment," Project Webinar Hosted by the REMADE Institute, Jan 7 2021, hosted online.
7. Hu C., "Engineering Design under Uncertainty and Probabilistic Failure Prognostics – Methods, Progress, and Challenges," *International Conference on Uncertainty Quantification & Optimisation*, Nov 16 2020, hosted online. **[Keynote Presentation]**
8. Hu C., Javadi, N., and Thelen A., "Shaft Unbalance Correction and Bearing Health Monitoring," Vermeer Corporation, Nov 3 2020, hosted online.
9. Hu C., "ISU Research on Battery Reliability and Lifetime Prediction: Challenges, Long-Term Tests and Methodologies," ISU Electric Power Research Center/MISO Energy Storage Webinar — Session 7, Oct 23 2020, hosted online.
10. Hu C. and Nemani V., "Data-Drive Design Decision Support for Re-X of High-Value Components in Industrial and Agricultural Equipment," John Deere, Aug 7 2020, hosted online.
11. Hu C., "Reliability Analysis of Hydraulic Drive Systems," Deere & Company, Dec 17 2019, Ankeny, IA.
12. Hu C., "Predicting Transition in Capacity Fade Trend Using Physics-Based Prognostics," *10^{th} Annual Battery Safety Summit*, Oct 24 2019, Alexandria, VA.
13. Hu C., "Intelligent Failure Prognostics for Predictive Maintenance in Industrial Applications," Rutgers, The State University of New Jersey, Sep 24 2019, Piscataway, NJ.
14. Hu C. and Sadoughi M., "Physics-Based Deep Learning for Bearing Fault Diagnostics," Vermeer Corporation, Mar 12 2019, Ames, IA.
15. Hu C., "Intelligent Failure Prognostics for Industry Applications," Minnesota Reliability Consortium (MRC) Meeting, Nov 13 2018, Minneapolis, MN.
16. Hu C., "Intelligent Failure Prognostics for Industry Applications," Grace Engineered Products Inc., Sep 28 2018, Davenport, IA.
17. Hu C., "Intelligent Failure Prognostics of Lithium-Ion Energy Storage and Renewable Energy Systems," Invited Guest Lecture, School of Mechanical Engineering, Xi'an Jiaotong University, Jul 17 2017, Xi'an, China.
18. Hu C., "Data-Driven Failure Prognostics of Complex Engineered Systems using Ensemble Prediction," Invited Speaker, *Asia Pacific Conference of the Prognostics and Health Management Society 2017*, Jul 12-15 2017, Jeju, Korea. (Track on Data-Driven Prognostics)
19. Hu C. and Sadoughi M., "Gaussian Process (Kriging) for Design of Simulation Experiments," Medtronic PLC, May 22 2017, Minneapolis, MN.
20. Hu C., "Intelligent Failure Prognostics of Agriculture and Farming Equipment," John Deere, May 10 2017, Ankeny, IA.
21. Hu C., "Design for Reliability and Failure Prevention of Lithium-Ion Batteries: Physics-Based Degradation Modeling and Prognostics and Health Management (PHM)," Invited Guest Lecture, Electrical Power Research Center (EPRC) Spring Meeting, Iowa State University, Apr 13 2017, Ames, IA.
22. Hu C., "Prognostics and Health Management (PHM) of Lithium-Ion Energy Storage and Renewable Energy Systems," Invited Guest Lecture, Department of Electrical and Computer Engineering, Iowa State University, May 11 2016, Ames, IA.

23. Hu C., "Data-Driven Failure Prognostics of High-Value Engineered Systems using Deep Learning and Ensemble Prediction," Invited Talk, Center for Nondestructive Evaluation, Iowa State University, Apr 19 2016, Ames, IA.
24. Hu C., "Toward Life-Cycle Reliability Management: Reliability-Based Design and Prognostics and Health Management," Invited Guest Lecture, Wind Energy Science, Engineering & Policy (WESEP) Program, Iowa State University, Oct 29 2015, Ames, IA.
25. Hu C., "Toward Life-Cycle Reliability Management: Reliability-Based Design and Prognostics and Health Management," Iowa State University, Feb 12 2015, Ames, IA.
26. Hu C., "Design for Resilience of Energy Storage Systems," Boise State University, Dec 8 2014, Boise, ID.
27. Hu C., "Toward Life-Cycle Reliability Management: Reliability-Based Design and Prognostics and Health Management," City University of Hong Kong, Sep 26 2014, Hong Kong SAR.
28. Hu C., "Toward Life-Cycle Reliability Management: Reliability-Based Design and Prognostics and Health Management," University of Maryland, Baltimore County, Mar 14 2014, Baltimore, MD.
29. Hu C., "Life-Cycle Reliability Management: Prognostics and Health Management," Minnesota Reliability Consortium (MRC) Meeting, Jan 15 2013, Minneapolis, MN.
30. Hu C., "Achieving Reliable Engineering Product Design through Reliability-Based Design and Prognostics and Health Management (PHM)," Medtronic Technical Forum, Dec 9 2011, Minneapolis, MN.
31. Hu C., Youn B.D., and Chung J., "Online Estimation of Lithium-Ion Battery State-of-Charge and Capacity with a Multiscale Filtering Technique," *Annual Conference of the Prognostics and Health Management (PHM) Society 2011*, Sep 25–29 2011, Montreal, Canada. (Battery Management System Workshop).

Professional Services and Membership

- Lead Guest Editor, Special Issue on "Physics-Informed Machine Learning Enabling Fault Feature Extraction and Robust Failure Prognosis" in *Mechanical Systems and Signal Processing* *2021*
- Lead Guest Editor, Special Issue on "Advanced Optimization Enabling Digital Twin Technology" in *Structural and Multidisciplinary Optimization* *2021*
- Member, ASME Design Automation Executive Committee *2021–Present*
- Review Editor, *Structural and Multidisciplinary Optimization* *2021–Present*
- Session Chair, Optimization algorithms - II (14^{th} World Congress of Structural and Multidisciplinary Optimization) *2021*
- Session Co-Chair, Robust design and reliability-based design optimization – III and Machine learning for design optimization - I (14^{th} World Congress of Structural and Multidisciplinary Optimization) *2021*
- Session Co-Chair, Energy Storage System Design: Thermal, Structural, and Electrical Considerations (2020 IEEE Transportation Electrification Conference and Expo) *2020*
- Panelist, NSF CMMI Division, Dynamics, Control and Systems Diagnostics Program *2021–Present*
- Panelist, NSF IIP Division, Partnerships for Innovation Program *2020–Present*
- Panelist, NSF CNS Division, Cyber-Physical Systems Program *2019–Present*
- Session Co-Chair and Review Coordinator, Uncertainty Quantification in Simulation and Model Verification & Validation (ASME Computers and Information in Engineering Conference) *2017–Present*
- Panelist, NSF ECCS Division, Energy, Power, Control, and Network Program *2017–Present*

- Session Chair and Review Coordinator, Design for Resilience and Failure Recovery (ASME Design Automation Conference) *2016–Present*
- Panelist, NSF CMMI Division, Engineering and Systems Design Program *2016–Present*
- Co-Guest Editor, Special Section on "Prognostics and Health Management (PHM) in Smart Structures and Systems" in *Smart Structures and Systems* *2018*
- Track Chair, Data-Driven Prognostics I (Asia Pacific Conference of the PHM Society) *2017*
- Co-Guest Editor, Special Issue on "Battery Energy Storage and Management Systems" in *IEEE Access* *2017*
- Co-Guest Editor, Special Issue on "Complex System Health Management based on Condition Monitoring and Test Data" in *IEEE Access* *2016*
- Panel Chair, Battery Prognostics and Health Management (IEEE PHM Conference) *2014*
- Session Chair, Lithium-Ion Battery Health Prognostics (IEEE PHM Conference) *2014*
- Session Chair, Medical Equipment PHM (IEEE PHM Conference) *2013*
- Panelist, PHM Design Techniques & Algorithms (IEEE PHM Conference) *2012*
- Members, IEEE and IEEE Reliability Society *2013–Present*
- Member, American Society of Mechanical Engineers *2009–Present*