JUN CHEN, PH.D., ASSISTANT PROFESSOR

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CONTACT

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EDUCATION

Ph.D. in Electrical Engineering (minor in CS), Iowa State University, Ames IA, 4.0/4.0 — 12/2014
B. S. in Automation, Zhejiang University, Hangzhou China — 06/2009

RESEARCH INTERESTS

Systems and Control: Model predictive control, optimal control, stochastic processes, event-triggered control
Artificial Intelligence: Reinforcement learning, deep learning, time series, generative adversary network
Intelligent Vehicles: Autonomous vehicle, electric vehicle, battery control, vehicle dynamics, co-simulation
Power & Energy: Hybrid energy systems, renewable energy, power electronics, battery, economic analysis
Discrete Event and Hybrid Systems: failure diagnosis and prognosis, resiliency, privacy, verification

EMPLOYMENT

Assistant Professor, ECE Deptartment, Oakland University, Rochester MI, USA — 08/2020–present
Senior Control Systems Engineer, General Motors, Milford MI, USA — 01/2017–08/2020
R&D Scientist in *Power and Energy Systems*, Idaho National Laboratory, ID, USA — 11/2014–12/2016
Summer Intern in *Software V&V*, General Motors R&D, MI, USA — 04/2014–07/2014
Research Assistant in *Stochastic Hybrid Systems*, Iowa State University, IA, USA — 01/2011–10/2014
Teaching Assistant in *Electrical Engineering*, Iowa State University, IA, USA — 01/2011–12/2013
Research Assistant in *System Identification*, University of Central Florida, FL, USA — 08/2009–12/2010

HONORS AND RECOGNITIONS

NSF CAREER Award, National Science Foundation — 2022
IEEE Best Paper Award, IEEE Transactions on Automation Science and Engineering — 2016
Best Paper Award, IEEE International Conference on Electro-Information Technology — 2023
Faculty Recognition Award for Research, Oakland University — 2023
Associate Editor, IEEE International Conference on Robotics and Automation — 2020
IEEE Senior Member — 2020
Associate Editor, IEEE Conference on Control Technology and Applications — 2023–present
Associate Editor, IET Cyber-Systems and Robotics — 2022–present
Associate Editor, IFAC International Symposium on Advances in Automotive Control — 2022
Undergraduate Research Competition Winner (my advisee), ASME ICE Division — 2022
INL Publication Achievement Award, Idaho National Laboratory — 2016
Research Excellence Award, Iowa State University — 2014
Student Travel Award, American Control Conference — 2014
Provost Graduate Fellowship, University of Central Florida — 2009–2010
Third Class Scholarship for Undergraduate Student, Zhejiang University — 2008
Outstanding Student, Zhejiang University — 2008

PUBLICATIONS

(Students under my close supervision are marked in underline; corresponding author is marked by *)

Patents

[4] Min Sun, Yiran Hu, David Edwards, **Jun Chen**, Insu Chang and Steven Moorman, "Active Thermal Management System and Method for Flow Control," U.S. Patent No. US11312208 B2, April 26, 2022.

[3] **Jun Chen**, Ruixing Long and Yiran Hu, "Method for Increasing Control Performance of Model Predictive Control Cost Functions," U.S. Patent No. US11192561 B2, December 7, 2021.

[2] Yiran Hu, David Edwards, Michael Paratore Jr, Min Sun, **Jun Chen**, Eugene Gonze and Sergio Quelhas, "Method and Apparatus for Control of Propulsion System Warmup Based on Engine Wall Temperature," U.S. Patent No. 11078825 B2, August 3, 2021.

[1] **Jun Chen**, David Edwards, Yiran Hu, Min Sun, Adam J. Heinzen and Michael A. Smith, "Method and System for Determining Thermal State," U.S. Patent No. 10995688 B2, May 4, 2021.

Book Chapter

[1] Mariam Ibrahim, **Jun Chen** and Ratnesh Kumar, "Quantification of Centralized/Distributed Secrecy in Stochastic Discrete Event Systems," in *Recent Advances in Systems Safety and Security*, Editors: Emil Pricop and Grigore Stamatescu, Springer, May 2016, ISBN: 978-3-319-32523-1.

Journal Articles

[30] **Jun Chen***, Aman Behal, Zhaojian Li and Chong Li, "Active Battery Cell Balancing by Real Time Model Predictive Control for Extending Electric Vehicle Driving Range," *IEEE Transactions on Automation Science and Engineering*, (Accepted for Publication June 2023).

[29] **Jun Chen***, "A Probabilistic Test for A-Diagnosability of Stochastic Discrete-Event Systems with Guaranteed Error Bound," *IEEE Control Systems Letters*, (Accepted for Publication June 2023).

[28] Mohammad R. Hajidavalloo, **Jun Chen***, Qiuhao Hu, Ziyou Song, Xunyuan Yin and Zhaojian Li, "NMPC-based Integrated Thermal Management of Battery and Cabin for Electric Vehicles in Cold Weather Conditions," *IEEE Transactions on Intelligent Vehicles*, (Accepted for Publication May 2023).

[27] Zhaodong Zhou, Christopher Rother and **Jun Chen***, "Event-Triggered Model Predictive Control for Autonomous Vehicle Path Tracking: Validation using CARLA Simulator," *IEEE Transactions on Intelligent Vehicles*, (Accepted for Publication April 2023).

[26] Zaiyu Gu, Guojiang Xiong, Xiaofan Fu, Ali Wagdy Mohamed, Mohammed Azmi Al-Betar, Hao Chen and **Jun Chen**, "Extracting Accurate Parameters of Photovoltaic Cell Models via Elite Learning Adaptive Differential Evolution," *Energy Conversion and Management*, volume 285, pages 1–25, June 2023.

[25] Qinghua Liu, Guojiang Xiong, Xiaofan Fu, Ali Wagdy Mohamed, Jing Zhang, Mohammed Azmi Al-Betar, Hao Chen, **Jun Chen** and Sheng Xu, "Hybridizing Gaining-Sharing Knowledge and Differential Evolution for Large-scale Power System Economic Dispatch Problems," *Journal of Computational Design and Engineering*, volume 10, number 2, pages 615–631, April 2023.

[24] **Jun Chen***, Xiangyu Meng and Weinan Gao, "Preface: Recent Advances on Learning-Based Control - Theory and Application," *International Journal of Modelling, Identification and Control*, volume 43, number 3, March 2023.

[23] Ali Irshayyid and **Jun Chen***, "Comparative Study of Cooperative Platoon Merging Control Based on Reinforcement Learning," *Sensors*, volume 23, number 2-990, pages 1–23, January 2023.

[22] **Jun Chen***, Zhaodong Zhou, Ziwei Zhou, Xia Wang and Boryann Liaw, "Impact of Battery Cell Imbalance on Electric Vehicle Range," *Green Energy and Intelligent Transportation*, volume 1, number 3, pages 1–8, December 2022.

[21] **Jun Chen*** and Ratnesh Kumar, "Stochastic Failure Prognosis of Discrete Event Systems," *IEEE Transactions on Automatic Control*, volume 67, number 10, pages 5487–5492, October 2022.

[20] **Jun Chen*** and Junhui Zhao, "Generating Synthetic Wind Speed Scenarios using Artificial Neural Networks for Probabilistic Analysis of Hybrid Energy Systems," *International Journal of Modelling, Identification and Control*, volume 41, number 3, pages 183–192, July 2022.

[19] Xuan Xie, Guojiang Xiong, **Jun Chen** and Jing Zhang, "Universal Transparent Artificial Neural Network Based Fault Section Diagnosis Models for Power Systems," *Advanced Theory and Simulations*, volume 5, number 4, pages 1–12, April 2022.

[18] Guojiang Xiong, Xufeng Yuan, Ali Wagdy Mohamed, **Jun Chen** and Jing Zhang, "Improved Binary Gaining-sharing Knowledge based Algorithm with Mutation for Fault Section Location in Distribution Networks," *Journal of Computational Design and Engineering*, volume 9, number 2, pages 393–405, April 2022.

[17] **Jun Chen*** and Ramesh S, "Model-based Validation of Diagnostic Software with Application in Automotive Systems," *IET Cyber-Systems and Robotics*, volume 3, number 2, pages 140–149, June 2021.

[16] **Jun Chen***, "Extended Kalman Filter Steady Gain Scheduling using k-means Clustering," *International Journal of Modelling, Identification and Control*, volume 34, number 2, pages 158–162, February 2020.

[15] Xiang Yin, **Jun Chen**, Zhaojian Li and Shaoyuan Li, "Robust Fault Diagnosis of Stochastic Discrete Event Systems," *IEEE Transactions on Automatic Control*, volume 64, number 10, pages 4237–4244, October 2019.

[14] **Jun Chen**, Qin Wang, Jianming Lian and Wanning Li, "Guest Editorial: Advances in Control and Decision for Power and Energy Systems," *Journal of Control and Decision*, volume 5, number 2, pages 115–116, February 2018.

[13] **Jun Chen**, Christoforos Keroglou, Christoforos N. Hadjicostis and Ratnesh Kumar, "Revised Test for Stochastic Diagnosability of Discrete-Event Systems," *IEEE Transactions on Automation Science and Engineering*, volume 15, number 1, pages 404–408, January 2018.

[12] **Jun Chen**, Peter Molnar and Aman Behal, "Identification of a Stochastic Resonate-and-Fire Neuronal Model via Nonlinear Least Squares and Maximum Likelihood Estimation," *International Journal of Modelling, Identification and Control*, volume 28, number 3, pages 221–231, October 2017.

[11] **Jun Chen** and Cristian Rabiti, "Synthetic Wind Speed Scenarios Generation for Probabilistic Analysis of Hybrid Energy Systems," *Energy*, volume 120, pages 507-517, February 2017.

[10] **Jun Chen**, Mariam Ibrahim and Ratnesh Kumar, "Quantification of Secrecy in Partially Observed Stochastic Discrete Event Systems," *IEEE Transactions on Automation Science and Engineering*, volume 14, number 1, pages 185–195, January 2017.

[9] Jong S. Kim, **Jun Chen** and Humberto E. Garcia, "Modeling, Control, and Dynamic Performance Analysis of a Reverse Osmosis Desalination Plant Integrated within Hybrid Energy Systems," *Energy*, volume 112, pages 52–66, October 2016.

[8] **Jun Chen** and Humberto E. Garcia, "Economic Optimization of Operations for Hybrid Energy Systems under Variable Markets," *Applied Energy*, volume 177, pages 11–24, September 2016.

[7] **Jun Chen**, Humberto E. Garcia, Jong S. Kim and Shannon M. Bragg-Sitton, "Operations Optimization of Nuclear Hybrid Energy Systems," *Nuclear Technology*, volume 195, number 2, pages 143–156, August 2016.

[6] Humberto E. Garcia, **Jun Chen**, Jong S. Kim, Richard B. Vilim, William R. Binder, Shannon M. Bragg-Sitton, Richard D. Boardman, Michael G. McKellar and Christiaan J. J. Paredis, "Dynamic Performance Analysis of Two Regional Nuclear Hybrid Energy Systems," *Energy*, volume 107, pages 234–258, July 2016.

[5] **Jun Chen** and Ratnesh Kumar, "Fault Detection of Discrete-Time Stochastic Systems Subject to Temporal Logic Correctness Requirements," *IEEE Transactions on Automation Science and Engineering*, volume 12, number 4, pages 1369–1379, October 2015. (**IEEE Best Paper Award**: link)

[4] **Jun Chen** and Ratnesh Kumar, "Stochastic Failure Prognosability of Discrete Event Systems," *IEEE Transactions on Automatic Control*, volume 60, number 6, pages 1570–1581, June 2015.

[3] **Jun Chen** and Ratnesh Kumar, "Failure Detection Framework for Stochastic Discrete Event Systems with Guaranteed Error Bounds," *IEEE Transactions on Automatic Control*, volume 60, number 6, pages 1542–1553, June 2015.

[2] **Jun Chen** and Ratnesh Kumar, "Polynomial Test for Stochastic Diagnosability of Discrete Event Systems," *IEEE Transactions on Automation Science and Engineering*, volume 10, number 4, pages 969–979, October 2013.

[1] Lingfei Zhi, **Jun Chen**, Peter Molnar and Aman Behal, "Weighted Least-Squares Approach for Identification of a Reduced-Order Adaptive Neuronal Model," *IEEE Transactions on Neural Networks and Learning Systems*, volume 23, number 5, pages 834–840, May 2012.

Peer Reviewed Conference Articles

[29] Mohammad R. Hajidavalloo, **Jun Chen**, Qiuhao Hu and Zhaojian Li, "Study on the Benefits of Integrated Battery and Cabin Thermal Management in Cold Weather Conditions," *2023 American Control Conference*, San Diego, CA, May 31–June 2, 2023.

[28] Zhaodong Zhou, **Jun Chen***, Mingyuan Tao, Peng Zhang and Meng Xu, "Experimental Validation of Event-Triggered Model Predictive Control for Autonomous Vehicle Path Tracking," *IEEE International Conference on Electro Information Technology*, Romeoville, IL, May 18–20, 2023. (**Best Paper Award**: link)

[27] Yang Chen, **Jun Chen***, Chenang Liu, Guodong Liu, Maximiliano Ferrari and Aditya Sundararajan, "Integrated Modeling and Optimal Operation of Multi-Energy System for Coastal Community," *IEEE International Conference on Electro Information Technology*, Romeoville, IL, May 18–20, 2023.

[26] **Jun Chen*** and Zhaodong Zhou, "Battery Cell Imbalance and Electric Vehicles Range: Correlation and NMPC-based Balancing Control," *IEEE International Conference on Electro Information Technology*, Romeoville, IL, May 18–20, 2023.

[25] Steven DeCoste, Antonio Scalzi, **Jun Chen*** and Dan DelVescovo*, "Minimizing Steady-State Testing Time in an Engine Dynamometer Laboratory," *2023 SAE World Congress*, Detroit, MI, April 18–20, 2023.

[24] Ranya Badawi and **Jun Chen***, "Performance Evaluation of Event-Triggered Model Predictive Control for Boost Converter," *2022 IEEE Vehicle Power and Propulsion Conference*, Merced, CA, November 1–4, 2022.

[23] Man Liang and **Jun Chen**, "A Conceptual Design of Barking Drones Fleet Management to Detect and Repulse Cattle," *21st Asia Pacific Automotive Engineering Conference*, Melbourne, Australia, October 3–5, 2022. (Preprint)

[22] Ranya Badawi and **Jun Chen***, "Enhancing Enumeration-Based Model Predictive Control for DC-DC Boost Converter with Event-Triggered Control," *European Control Conference*, London, UK, July 12–15, 2022.

[21] **Jun Chen***, Xiangyu Meng and Zhaojian Li, "Reinforcement Learning-based Event-Triggered Model Predictive Control for Autonomous Vehicle Path Following," *2022 American Control Conference*, Atlanta, GA, June 8–10, 2022.

[20] Shan Huang and **Jun Chen***, "Event-triggered Model Predictive Control for Autonomous Vehicle with Rear Steering," *2022 SAE World Congress*, Detroit, MI, April 5–7, 2022.

[19] **Jun Chen***, Aman Behal and Chong Li, "Active Cell Balancing by Model Predictive Control for Real Time Range Extension," *IEEE Conference on Decision and Control*, Austin, TX, USA, December 13–15, 2021.

[18] **Jun Chen*** and Zonggen Yi, "Comparison of Event-Triggered Model Predictive Control for Autonomous Vehicle Path Tracking," *2021 IEEE Conference on Control Technology and Applications*, San Diego, CA, August 8–11, 2021. (Invited Paper)

[17] **Jun Chen*** and Junhui Zhao, "Synthetic Wind Speed Scenarios Generation using Artificial Neural Networks for Probabilistic Analysis of Hybrid Energy Systems," *2021 IEEE International Symposium on Industrial Electronics*, Kyoto, Japan, June 20–23, 2021.

[16] **Jun Chen***, Man Liang and Xu Ma, "Probabilistic Analysis of Electric Vehicle Energy Consumption Using MPC Speed Control and Nonlinear Battery Model," *2021 IEEE Green Technologies Conference*, Denver, CO, April 7–9, 2021.

[15] **Jun Chen***, Zhaojian Li and Xiang Yin, "Optimization of Energy Storage Size and Operation for Renewable-EV Hybrid Energy Systems," *2021 IEEE Green Technologies Conference*, Denver, CO, April 7–9, 2021.

[14] Aaron S. Epiney, Andrea Alfonsi, Cristian Rabiti and **Jun Chen**, "Economic Assessment of Nuclear Hybrid Energy Systems: Optimization using RAVEN," *2017 ANS Annual Meeting*, San Francisco, CA, June 11–15, 2017.

[13] **Jun Chen**, Jong S. Kim and Cristian Rabiti, "Probabilistic Analysis of Hybrid Energy Systems Using Synthetic Renewable and Load Data," *2017 American Control Conference*, Seattle, WA, May 24–26, 2017.

[12] **Jun Chen** and Humberto E. Garcia, "Operations Optimization of Hybrid Energy Systems under Variable Markets," *2016 American Control Conference*, Boston, MA, July 6–8, 2016.

[11] Mariam Ibrahim, **Jun Chen** and Ratnesh Kumar, "A Resiliency Measure for Electrical Power Systems," *2016 IFAC/IEEE International Workshop on Discrete Event Systems*, Xi'an, China, May 30 – June 1, 2016.

[10] Mariam Ibrahim, **Jun Chen** and Ratnesh Kumar, "Quantification of Distributed Secrecy Loss in Stochastic Discrete Event Systems under Bounded-Delay Communications," *2016 IFAC/IEEE International Workshop on Discrete Event Systems*, Xi'an, China, May 30 – June 1, 2016.

[9] Mariam Ibrahim, **Jun Chen** and Ratnesh Kumar, "An Information Theoretic Measure for Secrecy Loss in Stochastic Discrete Event Systems," *2015 International Conference on Electronics, Computers and Artificial Intelligence – International Workshop on Systems, Safety and Security*, Bucharest, Romania, June 25–27, 2015.

[8] **Jun Chen** and Ratnesh Kumar, "Failure Prognosability of Stochastic Discrete Event Systems," *2014 American Control Conference*, Portland, OR, June 4–6, 2014.

[7] **Jun Chen** and Ratnesh Kumar, "Pattern Mining for Predicting Critical Events from Sequential Event Data Log," *2014 IFAC/IEEE International Workshop on Discrete Event Systems*, Paris-Cachan, France, May 14–16, 2014.

[6] Mariam Ibrahim, **Jun Chen** and Ratnesh Kumar, "Secrecy in Stochastic Discrete Event Systems," *2014 IEEE International Conference on Networking, Sensing and Control*, Miami, FL, April 7–9, 2014.

[5] **Jun Chen** and Ratnesh Kumar, "Failure Diagnosis of Discrete-Time Stochastic Systems Subject to Temporal Logic Correctness Requirements," *2014 IEEE International Conference on Networking, Sensing and Control*, Miami, FL, April 7–9, 2014.

[4] **Jun Chen** and Ratnesh Kumar, "Online Failure Diagnosis of Stochastic Discrete Event Systems," *2013 IEEE Multi-Conference on Systems and Control – IEEE Conference on Computer Aided Control System Design*, Hyderabad, India, August 28–30, 2013.

[3] **Jun Chen** and Ratnesh Kumar, "Decentralized Failure Diagnosis of Stochastic Discrete Event Systems," *2013 IEEE Conference on Automation Science and Engineering*, Madison, WI, August 17–21, 2013. (Invited Paper)

[2] **Jun Chen** and Ratnesh Kumar, "Polynomial Test for Stochastic Diagnosability of Discrete Event Systems," *2012 IEEE Conference on Automation Science and Engineering*, Seoul, Korea, August 20–24, 2012.

[1] **Jun Chen**, Jose Suarez, Peter Molnar and Aman Behal, "Maximum Likelihood Parameter Estimation in a Stochastic Resonate-and-Fire Neuronal Model," *2011 IEEE International Conference on Computational Advances in Bio and medical Sciences (ICCABS)*, Orlando, FL, February 3–5, 2011.

Thesis and Dissertation

[2] **Jun Chen**, "Failure Diagnosis and Prognosis in Stochastic Discrete-Event and Cyber-Physical Systems," Ph.D. Dissertation, Department of Electrical and Computer Engineering, Iowa State University, Ames, IA, USA, August 2014.

[1] **Jun Chen**, "On the Reliability of MVB Communication Network," Bachelor's Thesis, College of Electrical Engineering, Zhejiang University, China, June 2009.