JUN CHEN, PH.D., ASSISTANT PROFESSOR

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CONTACT

Department of Electrical and Computer Engineering
Oakland University, Rochester, MI 48309, USA

248-370-4797 | junchen@oakland.edu
www.secs.oakland.edu/∼junchen | jchen2020.net

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
Design for Six Sigma Black Belt Certification, General Motors	11/2018
Accomplishment Certificate for Machine Learning, Coursera	12/2014

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

Automotive Systems: Autonomous vehicle, electric vehicle, battery control, vehicle dynamics, co-simulation

Energy Systems: Hybrid energy systems, renewable energy, power electronic, battery, economic analysis

Discrete Event and Hybrid Systems: failure diagnosis and prognosis, resiliency analysis, verification

Formal Methods: Model-based verification and validation, statistical verification, linear-time temporal logic

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

HONORS AND RECOGNITIONS

Associate Editor, IFAC International Symposium on Advances in Automotive Control	2022
IEEE Senior Member	2020
Associate Editor, IEEE International Conference on Robotics and Automation	2020
IEEE Best Paper Award, IEEE Transactions on Automation Science and Engineering	2016
Associate Editor, Energy Systems	2016–present
INL Publication Achievement Award, Idaho National Laboratory	2016
INL Exceptional Contributions Program Award, Idaho National Laboratory	2015 & 2016
Research Excellence Award, Iowa State University	2014
Student Travel Award, American Control Conference	2014
Professional Development Grants (PAG), Iowa State University	2014
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 *)

Patent

[4] Min Sun, Yiran Hu, David Edwards, **Jun Chen**, Insu Chang and Steven Moorman, "Active Thermal Management System and Method for Flow Control," USPTO Application No. 16/551064; filed by GM Global Technology Operations LLC on August 26, 2019, **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," USPTO Application No. 16/418658; filed by GM Global Technology Operations LLC on May 21, 2019, **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," USPTO Application No. 16/589579; filed by GM Global Technology Operations LLC on October 1, 2019, **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," USPTO Application No. 16/431199, filed by GM Global Technology Operations LLC on June 4, 2019, **U.S. Patent No. 10995688 B2, May 4, 2021**.

Journal Articles

[21] **Jun Chen*** and Ratnesh Kumar, "Stochastic Failure Prognosis of Discrete Event Systems," *IEEE Transactions on Automatic Control*, (Accepted for publication; to appear in 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*, (Accepted for publication)

[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 Modeling, Identification and Control*, volume 34, number 2, pages 158–162, 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 Modeling, 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**)

[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

[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," *2021 IEEE Conference on Decision and Control*, Austin, TX, 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.

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.

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.

OTHER RESEARCH PRODUCTS

(Students under my close supervision are marked in underline)

Peer Reviewed Technical Reports

[1] Cristian Rabiti, Andrea Alfonsi, Joshua Cogliati, Diego Mandelli, Robert Kinoshita, Sonat Sen, Congjian Wang, **Jun Chen**, "RAVEN User Manual," INL/EXT-15-34123 Version 5, Idaho Falls, ID: Idaho National Laboratory, March 2017.

[2] Joshua Cogliati, **Jun Chen**, Japan Patel, Diego Mandelli, Daniel Maljovec, Andrea Alfonsi, Cristian Rabiti and Congjian Wang, "Time Dependent Data Mining in RAVEN," INL/EXT-16-39860, Idaho Falls, ID: Idaho National Laboratory, September 2016.

[3] Aaron Epiney, **Jun Chen** and Cristian Rabiti, "Status on the Development of a Modeling and Simulation Framework for the Economic Assessment of Nuclear Hybrid Energy Systems (FY 16)," INL/EXT-16-39832, Idaho Falls, ID: Idaho National Laboratory, September 2016.

[4] Shannon M. Bragg-Sitton, Richard D. Boardman, Cristian Rabiti, Jong S. Kim, Michael G. McKellar, Piyush Sabharwall, **Jun Chen**, M. Sacit Cetiner, T. Jay Harrison and A. Lou Qualls, "Nuclear-Renewable Hybrid Energy Systems: 2016 Technology Development Program Plan," INL/MIS-16-38165, Idaho Falls, ID: Idaho National Laboratory, March 2016.

[5] Shannon M. Bragg-Sitton, Richard D. Boardman, Cristian Rabiti, Jong S. Kim, Michael G. McKellar, Piyush Sabharwall, **Jun Chen**, Mark Ruth, M. Sacit Cetiner, T. Jay Harrison and A. Lou Qualls, "Nuclear-Renewable Hybrid Energy Systems 2016 Technology Development Roadmap (DRAFT)," INL/EXT-15-37446, Idaho Falls, ID: Idaho National Laboratory, December 2015.

[6] Humberto E. Garcia, **Jun Chen**, Jong S. Kim, Michael G. McKellar, Wesley R. Deason, Richard B. Vilim, Shannon M. Bragg-Sitton and Richard D. Boardman, "Nuclear Hybrid Energy Systems – Regional Studies: West Texas & Northeastern Arizona," INL/EXT-15-34503, Idaho Falls, ID: Idaho National Laboratory, April 2015.

[7] **Jun Chen**, "Model-based Validation of Diagnostic Specification," Electrical & Controls Systems Lab, General Motors Research & Development Center, Warren, MI, July 2014.

Posters

[1] Christopher Rother and **Jun Chen**, "Scale Vehicle Development for Autonomous Vehicle Motion Controls Testing," 5th International Conference on Connected and Autonomous Driving (MetroCAD 2022), Detroit, MI, April 28, 2022.

[2] Zhaodong Zhou, Christopher Rother and **Jun Chen**, "Event-Triggered MPC for AV Motion Planning and Control," NSF IUCRC on Pervasive Personalized Intelligence Planning and IAB Workshop, Oakland University, Rochester, MI, April 7, 2022.

[3] **Jun Chen**, "Optimal Control and Artificial Intelligence Lab," *2021 SECS Faculty Research Expo*, Oakland University, Rochester, MI, October 29, 2021.

[4] **Jun Chen** and Humberto E. Garcia, "Operations Optimization of Nuclear Hybrid Energy Systems," *2015 INL Early Career Research Symposium*, Idaho Falls, ID, July 30–31, 2015.

[5] Mariam Ibrahim, **Jun Chen** and Ratnesh Kumar, "An Information Theoretic Measure for Secrecy Loss in Stochastic Discrete Event Systems," *The 4th Midwest Workshop on Control and Game Theory*, Ames, IA, April 25–26, 2015.

[6] **Jun Chen** and Ratnesh Kumar, "Metrics for Secrecy and Resiliency for Cyber-Physical Systems," *9th Showcase Meeting, NSF Security and Software Engineering Research Center*, Washington D.C., May 20, 2014.

[7] **Jun Chen**, Meng Li and Ratnesh Kumar, "Model-based Embedded Software Testing/Monitoring," *2014 ECpE Graduate Poster Session, Iowa State University*, Ames, IA, April 18, 2014.

Non-Referred Conference Articles / Presentations

[1] Zhibang Xu, **Jun Chen**, Xia Wang and Zissimos Mourelatos, "Developing Reduced-order Physical Based Model to Estimate the SOC of Li-Ion Batteries," *2021 Battery Congress*, Virtual Session, May 12–13, 2021.

Confidential Publications

[1] **Jun Chen**, et al., One (1) Defensive Publication with General Motors, August 2020. (Details remain confidential.)

Open Source Software

[1] "Risk Analys Virtual ENvironment (RAVEN)," Idaho National Laboratory, ID, USA
- URL: https://raven.inl.gov/SitePages/Overview.aspx
- GitHub: https://github.com/idaholab/raven
- Contribution: time dependent data mining, stochastic optimization, and synthetic data generation

- Member of Change Control Board