ZOLEIKHA BIRON

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PROFESSIONAL EXPERIENCE

University of Florida, Gainesville, FL *January 2019 - Present*
Assistant Professor
Department of Electrical and Computer Engineering

Clemson University, Clemson, SC *May 2017 - December 2019*
Postdoctoral Research Fellow
Department of Mechanical and Automotive Engineering

Clemson University, Clemson, SC *September 2013 - May 2017*
Graduate Research Assistant
Department of Mechanical and Automotive Engineering

EDUCATION

Clemson University, Clemson, USA *August 2013 - May 2017*
Ph.D. Mechanical and Automotive Engineering

K.N.Toosi University of Technology, Tehran, Iran
MS. Electrical Engineering, 2011

University of Tehran, Tehran, Iran
BS, Electrical Engineering, 2008

RESEARCH INTERESTS

Theory: Distributed Control, Optimization and Estimation in Dynamic Systems, Machine learning, Reinforcement Learning, Artificial Intelligence, Game theory, Multi-agent systems.
Applications: Security and Control of Distributed Cyber Physical Systems (CPS), Power Systems, Energy Systems, Intelligent Transportation Systems (ITSs), and Robotics, Multi-agent Cooperative Robots.
Current Focus:
- Control, Security, and Resiliency of CPSs (Power Systems, ITS, and Smart Cities).
- Estimation and Optimal Control of Renewable Energy Sources, Distributed Energy Source Integrated with Power Systems.
- Fault Diagnosis of Dynamics Systems with Model-based and Data-Driven Methods.

HONORS AND AWARDS

- National Science Foundation (NSF)-CRII, Pre-Career Award, 2022

- Cybersecurity Collaborative Research Award, 2020

- IEEE Energy Conversion Congress and Expo (ECCE) Women in Engineering (WiE) award, 2019

- Southeastern Women Automotive Forum (SWAF) Scholarship, 2017

- Outstanding Automotive Engineering Ph.D. Student Award, Department of Automotive Engineering, Clemson University, 2016

- Best paper award at 18th International Conference on Intelligent Transportation Systems (ICITS), 2016

- Travel Award for Dynamic Systems and Control Conference (DSCC), 2016

- SAE Cyber-Auto Challenge Award, 2016

- Southeastern Women Automotive Forum (SWAF) Scholarship, 2015

- Doctorate Symposium, Prognostics and Health Management (PHM) Award, 2015

- Travel Award for Dynamic Systems and Control Conference (DSCC), 2015

- Southeastern Women Automotive Forum (SWAF) Scholarship, 2014

- Graduate Automotive Technology Education Fellowship from U.S. Department of Energy, 2013

- Recipient, National Scholarship, Government of Iran, 2008

- Recipient, National Scholarship, Government of Iran, 2002

RESEARCH GRANTS

1. CRII: OAC: A (near) Real-time Framework for Smart Integration of Electric Vehicles to Microgrids; **Solo PI**; Sponsor: National Science Foundation (NSF); May 2022-June 2024.

2. Decentralized Detection of Cyber Attacks against Microgrid Energy Management Systems; Sponsor: Cyber Florida Institue **PI** ; June 2020-Dec 2022.

PUBLICATIONS

Book Chapter

1. **Z. Biron**, and P. Pisu, "An Overview of Denial of Service (DoS) Attack in Control Systems with a Case Study of Connected Vehicles", pp. 239-259, Chapman and Hall/CRC Press.

Peer Reviewed Journal Articles

1. R. Abdollahi, P. Pisu, B. Ayalew, and Z. Biron, "Sliding Mode Control of DC Microgrids with Constant Power Loads", ready to submit to IEEE Transactions on Smart Grids, 2024.

2. D. S. Kushwaha and **Z. Biron**, "Accurate Anomaly Detection using Adaptive Threshold via Model Free Deep Reinforcement Learning for Residential Load Demand", Submitted to IEEE Transactions on Power Systems.

3. M. Hu and **Z. Biron**, "Microgrid Control using Cooperative Electric Vehicles: Game Theoretic Methods," under review at IEEE Access, 2023.

4. M. Hu and **Z. Biron**, "General Nash Bargaining for Collaborative Load control of microgrids using EV's available capacity", Submitted to IEEE Transactions on Intelligent Transportation Systems, 2023.

5. D. S. Kushwaha and **Z. Biron**, "Safe Reinforcement Learning using Lyapunov and Barrier Functions: A Survey", under review at IEEE Transactions on Emerging Topics in Computational Intelligence, 2023.

6. R. Abdollahi, **Z. Biron**, and R. Hadidi, "Effective Frequency Regulation Via Electricity Rate: Comparison to Other Frequency Control Strategies." IEEE Transactions on Industry Applications, no.2, pp.2305-2313, 2022.

7. R.Abdollahi Biroon, **Z. Biron**, P. Pisu, "False Data Injection Attack in a Platoon of CACC: Real-Time Detection and Isolation With a PDE Approach", IEEE Transactions on Intelligent Transportation Systems, pp. 1-12, DOI: 10.1109/TITS.2021.3085196, 2021.

8. R.Abdollahi Biroon, **Z. Biron**, and R. Hadidi,, "Inverter's Nonlinear Efficiency and Demand-Side Management Challenges", IEEE Power Electronics Magazine vol. 8, no. 1, pp. 49-54, 2021.

9. R.Abdollahi Biroon, **Z. Biron**, and R. Hadidi, "Commercial Load Profile Sensitivity Analysis to Electricity Tariffs and Battery Characteristics", IEEE Transactions on Industry Applications, vol. 56, no. 2, pp.1021-1030,2020.

10. R.A. Biroon, **Z. Biron**, R Hadidi, "Inverter's Nonlinear Efficiency and Demand-Side Management Challenges", IEEE Power Electronics Magazine, vol. 8, no. 1, pp.49-54, 2020.

11. R. A. Biroon, **Z. Biron**, and H. Hadidi, "Effect of Tariff on Commercial Load Profile Optimization in Presence of the Battery", IEEE Transactions on Industry Applications, vol. 56 , no. 2, pp. 1021 - 1030, 2019.

12. **Z. Biron**, S. Dey, and P. Pisu, "Real-time Detection and Estimation of Denial of Service Attack in Connected Vehicle Systems", in IEEE Transactions on Intelligent Transportation Systems, no. 99, pp. 1-10, 2018.

13. Y. Chen, W. Wang, **Z. Biron**, Y. Jia, and V. Krovi, "A Robotic Lift Assist: A Smart Companion for Heavy Payload Transport and Manipulation in Automotive Assembly", IEEE Robotics and Automation Magazine, vol. 25, no. 2, pp. 107-119.

14. P. Pisu, J. Martin, and **Z. Biron**, "A Control-Oriented Perspective for Security in Connected and Automated Vehicles", Mechanical Engineering Magazine Select Articles 139.12 (2017): S17- S20, 2017.

15. S. Dey, **Z. Biron**, S. Tatipamula, N. Das, S. Mohon, P. Pisu, and B. Ayalew, "Model-based Real-time Thermal Fault Diagnosis of Lithium-ion Batteries", Control Engineering Practice, vol. 56, pp. 37-48, 2016.

16. **Z. Biron**, and P. Pisu, "Sensor and Actuator Fault Detection of Connected Vehicles under Packet Dropping Network", International Journal of Computer, Electrical, Automation, Control and Information Engineering vol.10, no. 6, pp.967-974, (selected as a recommended publication), 2016.

17. L. Qiu, L. Qian, P. Chen, **Z. Biron**, and P. Pisu, "Predictive Fuel Efficient Control Strategies for a Group of Connected Vehicles Considering Vertical Vibration", Science China Technological Sciences, no. 60 vol.11, pp.1732-1746 (selected as a recommended publication), 2017.

18. L.Qiu, L. Qian, **Z. Biron**, and P. Pisu, "Closed-loop hierarchical control strategies for connected and autonomous hybrid electric vehicles with random errors", Journal of IET Intelligent Transport System, vol. 12, no. 10, pp. 1378-1385, 2018.

19. L.Qiu, L. Qian, **Z. Biron**, Z. Kong, and P. Pisu, "Engine map based predictive fuel efficient control strategies for a group of connected vehicles", Journal of Automotive Innovation, vol. 1, no. 4, pp. 311-319, 2018.

Peer Reviewed Conference Papers

1. D. S. Kushwaha, Miaomiao Hu, and **Z. Biron**, "Transformer Neural Network Based Transfer Learning for Economic Dispatch of Microgrids", Submitted to IEEE Power and Energy Society General Meeting (PESGM), 2024.

2. D. S. Kushwaha, Miaomiao Hu, and **Z. Biron**, "Lyapunov based Q-learning", Submitted to IEEE European Control Conference (ECC), 2024.

3. M. Hu, **Z. Biron**, and D. S. Kushwaha, "Real-time Load Control Based on Time Series Stackelberg Game", Submitted to 2024 American Control Conference (ACC), 2024.

4. D. S. Kushwaha and **Z. Biron**, "False Data Injection Attack Detection using Adaptive Threshold via Model Free Deep Reinforcement Learning for Residential Load Demand", Accepted to IEEE Power & Energy Society General Meeting (PESGM), 2023.

5. R. Abdollahi, P. Pisu, B. Ayalew, and **Z. Biron**, "Sliding Mode Control of DC Microgrids with Constant Power Loads", Accepted to IEEE American Control Conference, 2023.

6. R. Abdollahi, P. Pisu, **Z. Biron**, and B. Ayalew, "Robust Control of DC Microgrids with Constant Power Loads via Tube based Mechanism", Accepted to IEEE Power & Energy Society General Meeting (PESGM),

2023.

7. M. Hu and **Z. Biron**, "Bargaining-based Load control mechanism design for microgrids using EV's available capacity", pp. 599-604, IEEE American Control Conference (ACC) 2022.

8. M. Hu, **Z. Biron**, "Nash Bargaining based load control with information sharing on smart grid", IEEE 10th European Conference on Renewable Energy Systems (ECRES), 2022.

9. D. S. Kushwaha, R. Abdollahi, and **Z. Biron**, "Economic Energy Dispatch of Microgrids Economic Energy Dispatch using Model Predictive Control of Microgrid", IEEE Power and Energy Society General Meetings (PESGM), pp. 1-5, 2022.

10. D. S. Kushwaha, and **Z. Biron**, "Solar Power Forecasting in Smart Grids using Attention-LSTM Neural Networks", IEEE European Conference on Renewables Energy Systems (ECRES), 2022.

11. R. A. Biroon, **Z. Biron**, and P. Pisu, "Measurement Unknown Delay Estimation in Cyber-Physical Systems: a PDE approach", IEEE American Control Conference, pp. 619-4624, 2021.

12. R.Abdollahi, **Z. Biron**, and R. Hadidi, "The Effect of the Battery Efficiency on the Customer's Optimum Demand Load Profile", IEEE/IAS 56th Industrial and Commercial Power Systems Technical Conference, pp. 1-7, 2020.

13. R.Abdollahi, **Z. Biron**, and R. Hadidi, "Frequency Control by Tariff Regulation: A comparison between the MPC and Tariff Modification", IEEE Texas Power and Energy Conference (TPEC), 2020.

14. R. Abdollahi, **Z. Biron**, and P. Pisu, "Real-time False Data Injection Attack Detection in Connected Vehicle Systems with PDE modeling", IEEE American Control Conference, pp. 3267-3272, 2020.

15. R. Abdollahi, R Hadidi, **Z. Biron**, "On the Tariff Modification for the Future Electric Vehicle Connection to the Grid", 2019 North American Power Symposium (NAPS), 1-6, (Best paper presentation), 2019.

16. R. Abdollahi, **Z. Biron**, R Hadidi, "Effect of Tariff on Optimal Electric Vehicle Connection to the Grid in Residential Sector", IEEE Transportation Electrification Conference and Expo (ITEC), 1-6, 2019.

17. R. Abdollahi Biroon, **Z. Biron**, R Hadidi, "Fast and Regular Electric Vehicle Charging Impacts on the Distribution Feeders", IEEE Industry Applications Society Annual Meeting, 1-7, 2019.

18. R. Abdollahi, **Z. Biron**, and H. Hadidi, "Effects of Tariff on Commercial Load Profile Optimization in the Presence of Batteries", accepted at IEEE Industry Application Society, 2019.

19. Y. Chen, W. Wang,**Z. Biron**, Y. Jia, and V. Krovi, "A Smart Companion Robot for Heavy Payload Transport and Manipulation in Automotive Assembly", accepted at the 2019 International Conference on Robotics and Automation (ICRA), 2019.

20. **Z. Biron**, and P. Pisu, "Cooperative Adaptive Cruise Control: PDE Modeling and String Stability Analysis", IEEE American Control Conference (ACC), doi: 10.23919/ACC.2018.8431321, 2018.

21. R. Merco, **Z. Biron**, and P. Pisu, "Replay Attack Detection in a Platoon of Connected Vehicles with Cooperative Adaptive Cruise Control", IEEE American Control Conference (ACC), doi: 10.23919/ACC.2018.8431538, 2018.

22. A. Rayamajhi, **Z. Biron**, R. Merco, J. Martin, J.M. Westall, and P. Pisu, "The Impact of Dedicated Short Range Communication on Cooperative Adaptive Cruise Control", IEEE International Conference on Communication (ICC), doi: 10.1109/ICC.2018.8422309, 2018.

23. **Z. Biron**, S.Dey, and P. Pisu, "On Resilient Connected Vehicles under Denial of Service", 2017 American Control Conference (ACC), Seattle, WA, 2017, pp. 4971-4976, doi: 10.23919 ACC.2017.7963725.

24. G. Savaia, **Z. Biron**, and P. Pisu,"A Receding Horizon Switching Control Resilient to Communication Failures for Connected Vehicles", ASME 2017 Dynamic System and Control Conference (DSCC), no. DSCC2017-5195, pp. V001T45A009 (6 pages); doi: 10.1115/DSCC2017- 5195.

25. **Z. Biron**, S.Dey, and P. Pisu, "Sensor Fault Diagnosis of Connected Vehicles under Imperfect Communication Network", ASME 2016 Dynamic System and Control Conference (DSCC), no. DSCC2016-9822, pp. V001T16A003 (8 pages); doi: 10.1115/DSCC2016-9822.

26. **Z. Biron**, and P. Pisu, "Observer-Based Diagnostic Scheme for Lithium-Ion Batteries", In Proceedings of the ASME 2015 Dynamic Systems Control Conference (DSCC), no. DSCC2015- 9913, pp. V002T19A003 (7 pages); doi: 10.115/DSCC2015-9913. October 28-30, 2015, Columbus, Ohio, USA, 2015.

27. **Z. Biron**, and P. Pisu, "Sensor and Actuator Fault Detection of Connected Vehicles under Packet Drop out", 18th International Conference on Intelligent Transportation Systems, 2016.

28. S. Dey, **Z. Biron**, S. Tatipamula, N. Das, S. Mohon, P. Pisu, and B. Ayalew, "On-board Thermal Fault Diagnosis of Lithium-ion Batteries for Hybrid Electric Vehicle Application", IFAC Conference, vol. 45, issue. 15, pp. 389-394, 2015.

29. **Z. Biron**, B. HomChaudhuri and P. Pisu, "Observer Design Based Cyber Security for Cyber Physical Systems", 10th Annual Cyber and Information Security Research Conference ACM, Oak Ridge National Lab, 2015.

30. **Z. Biron**, and P. Pisu, "Distributed Fault Detection and Estimation for Cooperative Adaptive Cruise Control System in a Platoon", Prognostics and Health Management Conference (PHM), 2015.

31. **Z. Biron**, M. Hantehzadeh, and A.K. Sedigh, "Multilinear Modeling and Identification of the V94.2 Gas Turbine for Control System Design Purposes", Computer Modeling and Simulation (EMS), 2010 Fourth UKSim European Symposium, pp. 295-300, IEEE 2010, doi: 10.1109/EMS.2010.55.

32. **Z. Biron**, A.K.Sedigh, and R. Abdollahi, "Robust Gas Turbine Speed Control Using QFT", ASME Turbo Expo, no. GT2011-45605, pp. 141-147; doi: 10.1115/GT2011-45605, 2011.

Posters

1. D. S. Kushwaha, R. Abdollahi, and **Z. Biron**, "Optimal Energy Dispatch using Model Predictive Control of Microgrid", IEEE Power and Envery Society General Meetings (PGSGM), 2022.

2. **Z. Biron**, and P. Pisu, "Fault Diagnosis of Connected Vehicles", Prognostics and Health Management (PHM), 2015.

3. J. Gill, R. Merco, V. Rastogi, G. Wtkins, D. Kote, H. Diwan, J. Guterrez, Y. Li, **Z. Biron**, P. Pisu, S. Babu, A. Robb, and J. Martin, "Virtual Reality Based Simulator for Training and Evaluation of Autonomous Vehicles", NVIDIA's GTC conference, 2017.

TECHNICAL INVITED TALKS

- "Renewables Integration with Power Systems", GE meeting at Univeersity of Florida, October, 2024.

- "Machine Learning along with Control Theory for Smart Grid Security", UC Davis, April 2023.

- "Stability Analysis on Photovoltaic Integration to Power Systems", Gainesville Regional Utility; 2021.

- "A PDE based False Data Injection Attack Detection in Connected Vehicle", American Control Conference, 2020.

- "Security of Connected Vehicles as a Part of Future Smart City", Department of Computer Science and Engineering, University of South Florida, Tampa, April 2019.

- "Resilient Control of Cyber Physical System in the Presence of Cyber Attacks", Mechanical Engineering Department, Penn State University, April 2019

- "Security of Connected Vehicles", University of Virginia, Mechanical and Aerospace Engineering Department, April 2018

- "Resilient Control of Cyber Physical System with an Application in Connected Vehicles", Electrical and Computer Engineering Department, Virginia Commonwealth University, March 2018

- "Security of Connected Vehicles", San Diego State University, Electrical and Computer Engineering Department, February 2018

- "Control-Oriented Approaches to Secure Power Grid Systems", RTIPS Laboratory, Clemson University, 2017

- "Cyber Security of Cyber Physical Systems with an Application of Connected Vehicles", Doctoral Symposium of Prognostics and Health Management (PHM), 2015

- "On-board Thermal Fault Diagnosis of Lithium-ion Batteries for Hybrid Electric Vehicle Applications", E-COSM 2015

- "Robust Control via QFT Approach for Industrial Gas Turbines", Seminar, Department of Electrical and Computer Engineering, K. N. Toosi University of Technology, 2011

TEACHING EXPERIENCES

University of Florida, ECE Department

- Instructor of Linear Control System, EEL4657, Fall 2019, 2020, 2021, 2022, 2023, and spring 2020.

- Instructor Modern Control Theory, EEL6614, Spring 2021

- Programming for Engineering (C++/Python), EEL3834, Fall 2024

Clemson University, Automotive Engineering Department
Instructor

- Alternative Energy Sources, AuE 817, spring 2018

Teaching Assistant

- Alternative Energy Sources, AuE 817, CU, Spring 2016

- Hybrid Powertrain Control Lab, CU, Fall 2015

- Alternative Energy Sources, AuE 817, CU, spring 2015

- Sliding Mode Control, AuE 893, CU, Summer 2015

- Vehicle Control and System Design, AuE 827, CU, Fall 2014

K.N.Toosi University of Technology, ECE Department
Teaching Assistant

- Robotic Course, 2009

- Adaptive Control, 2010

University of Tehran, ECE Department
Teaching Assistant

- Linear Control, University of Tehran (UT), 2006

PROFESSIONAL ACTIVITIES

Panelist

- Panelist at National Science Foundation (NSF) grant proposal review, 2019-2021.

Reviewer

- Journal of Computers and Security

- IEEE Transactions on Control System Technology

- IEEE Transactions on Intelligent Transportation Systems

- IEEE Transactions on Automatic Control

- IEEE Transactions on Vehicular Technology

- Journal of Transportation Research Part C: Emerging Technologies

- ASME Journal of Dynamic Systems, Measurement and Control

- IET Journal of Circuits, Devices, and System

- IET Journal of Communications

- IET Intelligent Transport Systems

- American Control Conference (ACC)

- ASME Dynamic Systems and Control Conference (DSCC)

- IEEE Conference on Decision and Control (CDC)

- IEEE Conference on Control Technology and Applications (CCTA)

- IEEE Modeling, Estimation, and Control Conference (MECC)

Committee Member and Organizer

- Chair, Diversity, Equity and Inclusion (DEI) at Modeling Estimation, and Control conference (MECC), 2024

- Chair, Network Control regular session American Control Conference (ACC) 2021

- Editorial board member at Modeling Estimation, and Control conference (MECC) 2021 , 2022.

- Guest Editor, Special issue for SAE Journal of Connected and Automated Vehicles, 2021, 2022, 2023

- Co-Chair, Energy Systems at ASME Dynamic Systems and Control Conference (DSCC), 2019

- Co-Chair, Energy Systems at American Control Conference (ACC), 2019

- Technical Committee, Prognostics and Health Management (PHM) Conference, 2017

PROFESSIONAL REFERENCES

1. **Prof. Pierluigi Pisu**
   Professor, Automotive Engineering
   Clemson University
   Email: pisup@clemson.edu
   Phone: (864) 283-7227
   4 Research Drive, Greenville, SC 29607.

2. **Prof. Richard Brooks**
   Professor, Electrical and Computer Engineering
   Clemson University
   Email: rrb@clemson.edu
   Phone: (864) 656-0920
   313-C Riggs Hall, Clemson, SC 29631.

3. **Dr. Hisham Mahmood**
   Senior Research Engineer
   Pacific Northwest National Laboratory (PNNL)
   Email: hisham.mahmood@pnnl.gov
   Phone: (863) 210-6821
   902 Battelle Blvd, Richland, WA 99354.

4. **Prof. Beshah Ayalew**
   Professor, Automotive Engineering
   Clemson University
   Email: beshah@clemson.edu
   Phone: (864) 283-7228
   4 Research Drive, Greenville, SC 29607.

5. **Prof. Ardalan Vahidi**
   Professor, Electrical and Computer Engineering
   Clemson University
   Email: avahidi@clemson.edu
   Phone: (864) 656-4718
   203 Fluor Daniel Building, Clemson, SC 29631.