Ali Moghassemi

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Education

Clemson University — *Clemson, SC*

Ph.D. in Electrical and Electronic Engineering — *Aug. 2022 – May 2025*

- **Dissertation:** Real-Time Active Thermal Management and Degradation Forecasting of PEBBs in All-Electric Ship Systems
- **Supervisor:** Dr. Christopher Edrington

Islamic Azad University, South Tehran Branch — *Tehran, Iran*

M.Sc. in Electrical Engineering — *Sept. 2013 – Dec. 2015*

- **Thesis:** Response and Reliability Improvement of Grid-Connected Photovoltaic Systems with Trans-Z-Source Inverter

Islamic Azad University, South Tehran Branch — *Tehran, Iran*

B.Sc. in Electrical Engineering — *Sept. 2008 – Jul. 2012*

- **Thesis:** Power Flow Optimization of Distribution Network in the Presence of Distributed Generations

Academic Experience

University of Wisconsin-Milwaukee — *Milwaukee, WI*

Post-Doctoral Research Associate — *June. 2025 – Present*

- **NiPEC-PEPDS Solution Space Exploration and Digital Twin Based Dielectric Scaling Law and Health Prognosis:** Developed an Integration Framework for PEPDS, focusing on Virtual Prototyping Process (VPP) leading to metamodels of Power Electronic Power Distribution System (PEPDS) equipment within the Navy and collaboration with ASU to produce dielectric scaling laws for use within the VPP.
- **Tech Candidate for Future Navy Integrated Power and Energy Corridor:** Collaborated with the Power Electronic Power Distribution System (PEPDS) integration team to bring a range of technologies developed on the PEPDS.
- **Power Energy Thermal Technologies and Integration Systems (PETTIS):** Co-development of an equipment sizing tool with UTA for shipboard BESS suitable for the exploration of power electronics, battery technologies and thermal management approaches.
- **Demo D Preparation:** Co-development of the PEPDS hardware demonstration platform with UTA and establishes bases of cost estimates, providing validation cases and "new sources of truth" to increase the confidence in equipment metamodels and measurement data.
- Mentored 4 Ph.D. students, 3 Master's students, and 2 undergraduate students.
- Provided guidance on experimental methods, coding practices, or writing techniques.
- Contributed to lab management, group meetings, and collaborative initiatives.

Clemson University — *Clemson, SC*

Graduate Research Assistant — *Aug. 2022 – May. 2025*

- **Electrothermal Management Using In-situ Junction Thermal Estimates for Enhanced Converter Reliability:** Developed data-driven and model-based electro-thermal management control strategies to ensure acceptable electrical performance while minimizing cooling demands and thermal cycling in power converters, through implemented control and management algorithms on various real-time controller boards and digital simulation platforms.
- **Dynamometer Test Bed: 1)** Designed, modeled, controlled, prototyped, and validated a dyno testbed with two PMSMs (4-p 10kW/350A and 5-p 12kW/350A), mechanically coupled via a bearingless digital torque transducer and enclosed in a protective housing. **2)** Designed, modeled, controlled, prototyped, and validated a 10kW/96V/120A Neutral-Point Clamped (NPC) inverter using 1200V/193A SiC MOSFETs, 1200V/160A clamping diodes, and 1200V gate drivers, integrated capacitors, heatsinks, and cold plates for both air and liquid cooling. **3)** Designed sensor and auxiliary PCBs, and validated the complete testbed through CHIL/PHIL testing using dSPACE and OPAL-RT platforms for propulsion loads.

Aarhus University *Herning, Denmark*

External Researcher *Mar. 2021 – Jun. 2021*

- Collaborated on *"Damping of Low-Frequency Oscillations in Power Systems by Large-Scale PV Farms"* research project and published one journal article funded by the Science Foundation Ireland (SFI).

Aalborg University *Esbjerg, Denmark*

External Researcher *Nov. 2020 – Mar. 2021*

- Collaborated on *"Decarbonization of Grid with an Optimal Controller and Energy Management for Energy Storage System in Microgrid Applications"* research project and published one journal article funded by the Ministry of Education (MOE), Malaysia.

Teaching Experience

University of Applied Science and Technology *Tehran, Iran*

University Lecturer *Jan. 2021 – Jul. 2021*

- Designed and taught undergraduate courses in *Industrial Electronics*, *Power Systems Analysis*, *Protections and Relays*, and *Electric Machines*.
- Implemented project-based learning and structured assignments to connect theory with practical engineering applications.
- Provided mentorship and individualized academic support to enhance student performance and engagement.

Islamic Azad University, South Tehran Branch *Tehran, Iran*

Course Instructor *Sept. 2012 – Jun. 2016*

- Taught *MATLAB* for undergraduate/graduate students, focusing on control and modeling of power electronics.
- Developed interactive tutorials and laboratory-style assignments to strengthen computational and simulation skills.
- Advised students on research projects and power electronics simulations, fostering independent problem-solving.

Islamic Azad University, South Tehran Branch *Tehran, Iran*

Teaching Assistant (Instructional and Grading Duties) *Sept. 2010 – Jun. 2015*

- Supported instruction in courses: *Electric Circuits I/II*, *Power Electronics*, *Advanced Power Systems Operation*, and *Power System Planning*.
- Led discussion sessions, assisted with laboratory activities, and provided guidance during problem-solving exercises.
- Evaluated student work, offered constructive feedback, and facilitated exam preparation.

Professional Experience

Intelligent Control & Processing (ICP) Company *Tehran, Iran*

Technical Expert *Jun. 2021 – Aug. 2022*

- Developed technical/commercial proposals for over € 3M advanced control systems (DCS, ESD, FGS, PDCS, PMS, BMS), resulting in successful projects from different domains.
- Supported business developments by preparing BOMs, responding to RFIs/RFPs, and engaged with clients to assess technical needs.
- Arranged technical meetings with clients, tackled their technical needs, ensuring optimal solutions per project specifications.
- Led R&D initiatives, successfully enhanced proposed control system solutions.

Shawer Rayaneh Company *Tehran, Iran*

Electrical Engineer *Apr. 2018 – Jun. 2020*

- Maintenance and control of photovoltaic inverters.
- Research and development (R&D).

Paykar Bonyan Sanat (PBS) Company *Tehran, Iran*

Intern *Feb. 2012 – Jun. 2012*

- Programming of PLCs from Omron & Siemens manufacturers.
- Control of AC inverters.

Publications

Journal Articles

1. **A. Moghassemi**, L. Timilsina, I. Rahman, A. Arsalan, G. Muriithi, G. Ozkan, B. Papari, C. Edrington, Z. Zhang, "Real-Time Electro-Thermal Management and Data-Driven Degradation Forecasting of Power Electronics Building Blocks in All-Electric Ships," *J. Mar. Eng. Technol.*, 2025. *(Under Review)*
2. **A. Moghassemi**, I. Rahman, G. Ozkan, C. Edrington, "Finite Control Set Model Predictive Control for Electro-Thermal Management of Power Electronics Building Blocks in All-Electric Ships," *Nav. Eng. J.*, 2025. *(Under Review)*
3. I. Rahman, M. Ozden, G. Ozkan, **A. Moghassemi**, A. Arsalan, E. Buraimoh, L. Timilsina, B. Papari, C. Edrington, "Co-Simulation Strategy Using Functional Mock-up Interface for Advanced Thermal Management in Electric Motor Drive," *eTransportation*, 2025. *(Under Review)*
4. A. Arsalan, B. Papari, G. Muriithi, L. Timilsina, E. Buraimoh, **A. Moghassemi**, I. Rahman, A. Khan, G. Ozkan, C. Edrington, "Real-Time Deep Learning Based Cyberattack Mitigation in Electric Drive Systems," *IEEE Trans. Power Electron.*, 2025. *(Under Review)*
5. I. Rahman, M. Ozden, **A. Moghassemi**, L. Timilsina, A. Arsalan, E. Buraimoh, G. Ozkan, B. Papari, C. Edrington, "Real-Time Thermal Management Framework for Neutral-Point Clamped Converters in Electric Vehicles Employing Active Thermal Control and Active Cooling," *IEEE Trans. Transp. Electrif.*, 2025. *(Under Review)*
6. L. Timilsina, P.H. Hoang, **A. Moghassemi**, E. Buraimoh, A. Arsalan, I. Rahman, G. Ozkan, C. Edrington, "Real-Time Degradation Abatement Technique in Hybrid Electric Vehicle Using Data-Driven Methods," *Int. Trans. Electr. Energy Syst.*, 2025. *(Under Review)*
7. L. Timilsina, **A. Moghassemi**, G. Ozkan, B. Papari, C. Edrington, "Real-Time Analysis of Battery Degradation in a Plug-In Hybrid Electric Vehicles During V2G Operation," *SAE Int. J. Electrified Veh.*, 2025. *(Accepted)*
8. E. Buraimoh, G. Ozkan, L. Timilsina, I. Rahman, G. Muriithi, **A. Moghassemi**, A. Arsalan, B. Papari, M. Ozden, C. Edrington, "Adaptive Multi-Parameter Model-Free Delay Compensation for Interface Signals in Distributed Real-Time Co-Simulation of Power Systems," *IEEE Trans. Power Syst.*, vol. 40, no. 6, pp. 4932-44, 2025, doi.
9. A. Khan, L. Timilsina, G. Muriithi, A. Arsalan, **A. Moghassemi**, B. Papari, G. Ozkan, M. Ozden, C. Edrington, N. Boghrabadi, Z. Wang, "Energy Management Systems for Maritime Microgrids: A Comprehensive Review of Intelligent Optimization Strategies," *IEEE Access*, vol. 13, pp. 171563-97, 2025, doi.
10. **A. Moghassemi**, L. Timilsina, I. Rahman, A. Arsalan, G. Muriithi, E. Buraimoh, G. Ozkan, B. Papari, C. Edrington, Z. Zhang, K. Chamarthi, "Real-Time Improved Nearest Level Control for Power Electronics Building Blocks in All-Electric Ship Power Systems," *IEEE Trans. Ind. Appl.*, vol. 61, no. 5, pp. 7656-70, 2025, doi.
11. A. Arsalan, B. Papari, L. Timilsina, G. Muriithi, **A. Moghassemi**, I. Rahman, E. Buraimoh, G. Ozkan, C. Edrington, "Reliability Score Benchmarking and Resistive Loss Profile-Based Open-Circuit Fault Diagnosis Approach for Motor Drive System," *IEEE Trans. Power Electron.*, vol. 40, no. 7, pp. 9824–39, 2025. doi.
12. E. Buraimoh, G. Ozkan, L. Timilsina, G. Muriithi, B. Papari, A. Arsalan, **A. Moghassemi**, M. Ozden, C. Edrington, "Analysis of Model Free Predictors for Interface Signal Delay Compensation in Real-Time Co-simulation," *IEEE Trans. Ind. Inf.*, vol. 21, no. 4, pp. 3448–57, 2025, doi.
13. **A. Moghassemi**, D.S. Vanaja, J. Olamaei, G. Ozkan, C. Edrington, "A Novel Switching Method in PV Fed Quasi-ZSI-DVR for Voltage Quality Enhancement of Photovoltaic Integrated Networks," *IET Renew. Power Gener.*, vol. 19, pp. 1–29, 2025, doi.
14. G. Muriithi, B. Papari, **A. Moghassemi**, A. Sundar, A. Arsalan, L. Timilsina, G. Ozkan, C. Edrington, "Vulnerability Assessment and Detection of Stealthy Sequential Cyberattacks in Hybrid Tracked Vehicles," *IEEE Trans. Transp. Electrif.*, vol. 11, no. 2, pp. 6472–89, 2025, doi.
15. A. Arsalan, B. Papari, L. Timilsina, G. Muriithi, **A. Moghassemi**, I. Rahman, E. Buraimoh, G. Ozkan, C. Edrington, "Enhanced Real-Time ATM-Based MPC for Electric Vehicles with Cyber-Physical Security Aspect," *IEEE Trans. Transp. Electrif.*, vol. 11, no. 1, pp. 4698–716, 2025, doi.
16. B. Papari, L. Timilsina, **A. Moghassemi**, A. Khan, A. Arsalan, G. Ozkan, C. Edrington, "Advanced Meta Metrics-Based Approach to Assess an Appropriate Optimization Method for Wind/PV/Battery Based Hybrid AC-DC Microgrid," *e-Prime*, p. 100640, 2024, doi.

17. I. Rahman, **A. Moghassemi**, K. Chamarthi, G. Ozkan, C. Edrington, B. Papari, "Emerging Trends and Challenges in Thermal Management of Power Electronic Converters: A State of The Art Review," *IEEE Access*, vol. 12, pp. 50633–72, 2024, doi.
18. L. Timilsina, P.H. Hoang, **A. Moghassemi**, G. Ozkan, B. Papari, C. Edrington, "A Real-Time Prognostic Based Control Framework for Hybrid Electric Vehicles," *IEEE Access*, vol. 11, pp. 127589–607, 2023, doi.
19. **A. Moghassemi**, I. Rahman, G. Ozkan, C. Edrington, Z. Zhang, K. Chamarthi, "Power Converters Coolant: Past, Present, Future, And A Path Toward Active Thermal Control in Electrified Ship Power Systems," *IEEE Access*, vol. 11, pp. 91620–59, 2023, doi.
20. S.K. Doniparthi, R. Carter, A.V. Sant, **A. Moghassemi**, "Speed Control of PMBLDC Motor Drive Powered By Solar PV Array Using P, PI, and PID Controllers: A Comparison Study," *Insight-Automatic Control*, vol. 6, p. 569, 2023, doi.
21. **A. Moghassemi**, S. Ebrahimi, S. Padmanaban, M. Mitolo, J. Holm-Nielsen, "Two Fast Metaheuristic Based MPPT Techniques for Partially Shaded Photovoltaic System," *Int. J. Electr. Power Energy Syst.*, vol. 137, p. 107567, 2022, doi.
22. D.S. Vanaja, A.A. Stonier, **A. Moghassemi**, "A Novel Control Topology for Grid-Integration with Modular Multilevel Inverter," *Int. Trans. Electr. Energy Syst.*, vol. 31, no. 12, p. e13135, 2021, doi.
23. M. Saadatmand, G. Gharehpetian, **A. Moghassemi**, J. Guerrero, P. Siano, H. Alhelou, "Damping of Low-Frequency Oscillations in Power Systems by Large-Scale PV Farms: A Comprehensive Review of Control Methods," *IEEE Access*, vol. 9, pp. 72183–206, 2021, doi.
24. **A. Moghassemi**, S. Padmanaban, V. Ramachandaramurthy, M. Mitolo, M. Benbouzid, "A Novel Solar Photovoltaic Fed TransZSI-DVR for Power Quality Improvement of Grid-Connected PV Systems," *IEEE Access*, vol. 9, pp. 7263–79, 2020, doi.
25. **A. Moghassemi**, S. Padmanaban, "Dynamic Voltage Restorer (DVR): A Comprehensive Review of Topologies, Power Converters, Control Methods, and Modified Configurations," *Energies*, vol. 13, no. 16, p. 4152, 2020, doi.
26. **A. Moghassemi**, M. Hosseini, J. Olamaei, "Power Quality Improvement of Grid-Connected Photovoltaic Systems Using Trans-Z-Source Inverter Under Partial Shading Condition," *Iran. J. Sci. Technol. Trans. Electr. Eng.*, vol. 44, no. 4, pp. 1429–47, 2020, doi.
27. **A. Moghassemi**, S. Ebrahimi, J. Olamaei, "Maximum Power Point Tracking Methods Used in Photovoltaic Systems: A Review," *Signal Processing and Renewable Energy*, vol. 4, no. 3, pp. 19–39, 2020, doi.
28. **A. Moghassemi**, S. Ebrahimi, J. Olamaei, "MPPT and Current Mode Control Methods for PV Modules: A Review and A New Multi-Loop Integrated Method," *Signal Processing and Renewable Energy*, vol. 4, no. 2, pp. 1–22, 2020, doi.
29. S. Ebrahimi, **A. Moghassemi**, J. Olamaei, "PV Inverters and Modulation Strategies: A Proposed Control Strategy for Frequency and Voltage Regulation," *Signal Processing and Renewable Energy*, vol. 4, no. 1, pp. 1–21, 2020, doi.
30. J. Olamaei, S. Ebrahimi, **A. Moghassemi**, "Compensation of Voltage Sag Caused by Partial Shading in Grid-Connected PV System Through the Three-Level SVM Inverter," *Sustainable Energy Technol. Assess.*, vol. 18, pp. 107–18, 2016, doi.

Conference Papers

1. **A. Moghassemi**, L. Timilsina, I. Rahman, A. Arsalan, E. Buraimoh, G. Ozkan, B. Papari, C. Edrington, Z. Zhang, "Electro Thermal Management and Degradation Forecasting of Power Electronics Building Blocks in All-Electric Ships," *2025 IEEE Electric Ship Technologies Symposium (ESTS)*, Alexandria, VA, USA, pp. 87-94, 2025, doi.
2. I. Rahman, M. Ozden, G. Ozkan, **A. Moghassemi**, L. Timilsina, O. Ciftci, B. Papari, Z. Zhang, C. Edrington, "Active Thermal Control via Power Routing of Parallel Inverters in All-Electric Ships," *2025 IEEE Electric Ship Technologies Symposium (ESTS)*, Alexandria, VA, USA, pp. 154-61, 2025, doi.
3. A. Khan, G. Muriithi, L. Timilsina, **A. Moghassemi**, B. Papari, C. Edrington, G. Ozkan, N. Boghrabadi, Z. Wang, "Secure Energy Management for Ship Power Systems Using Federated Learning," *2025 IEEE Electric Ship Technologies Symposium (ESTS)*, Alexandria, VA, USA, pp. 517-24, 2025, doi.
4. L. Timilsina, E. Buraimoh, **A. Moghassemi**, I. Rahman, A. Arsalan, G. Muriithi, O. Ciftci, G. Ozkan, B. Papari, C. Edrington, "Hybrid Electric Vehicle Simulation Operation Across Distributed Laboratories Using Hardware Integrated Virtual Environment Concept," *2024 IEEE Southern Power Electronics Conference (SPEC)*, Brisbane, Australia, pp. 1–8, 2024, doi.

5. **A. Moghassemi**, L. Timilsina, D. Scruggs, A. Arsalan, I. Rahman, A. Khan, O. Ciftci, B. Papari, G. Ozkan, C. Edrington, "Heuristic Evolutionary Optimization For Control and Management of Renewable-Based Hybrid Microgrids," *2024 IEEE Sixth International Conference on DC Microgrids (ICDCM)*, Columbia, SC, USA, pp. 1–8, 2024, doi.
6. E. Buraimoh, G. Ozkan, L. Timilsina, G. Muriithi, A. Arsalan, B. Papari, **A. Moghassemi**, C. Edrington, M. Ozden, "Distributed Deep Deterministic Policy Gradient Agents For Real-Time Energy Management of DC Microgrid," *2024 IEEE Sixth International Conference on DC Microgrids (ICDCM)*, Columbia, SC, USA, pp. 1–5, 2024, doi.
7. L. Timilsina, **A. Moghassemi**, E. Buraimoh, I. Rahman, A. Khan, G. Muriithi, G. Ozkan, B. Papari, C. Edrington, "Degradation and State of Health Prediction of a Battery Used in a Microgrid in Real-Time," *2024 IEEE Sixth International Conference on DC Microgrids (ICDCM)*, Columbia, SC, USA, pp. 1–7, 2024, doi.
8. **A. Moghassemi**, L. Timilsina, I. Rahman, A. Arsalan, K. Chamarthi, G. Ozkan, B. Papari, C. Edrington, Z. Zhang, "Nearest Level Control Based Modular Multi-Level Converters for Power Electronics Building Blocks Concept in Electric Ship System," *2024 IEEE Transportation Electrification Conference and Expo (ITEC)*, Chicago, IL, USA, pp. 1–6, 2024, doi.
9. I. Rahman, **A. Moghassemi**, L. Timilsina, P. Badr, Q. Zhu, R. Prucka, G. Ozkan, C. Edrington, "Model-Based Active Thermal Management for Neutral-Point Clamped Power Converter with Adaptive Weight," *2024 IEEE Transportation Electrification Conference and Expo (ITEC)*, Chicago, IL, USA, pp. 1–6, 2024, doi.
10. K. Chamarthi, **A. Moghassemi**, I. Rahman, L. Timilsina, O. Ciftci, E. Buraimoh, G. Ozkan, B. Papari, C. Edrington, "A Novel Four Switch Transformerless Inverter with Step Up/Down Capability for PV Fed Grid Connected Systems," *2024 IEEE Transportation Electrification Conference and Expo (ITEC)*, Chicago, IL, USA, pp. 1–5, 2024, doi.
11. K. Chamarthi, I. Rahman, **A. Moghassemi**, L. Timilsina, O. Ciftci, B. Papari, G. Ozkan, C. Edrington, "A Proposed Cuk Converter Based Dual Input Hybrid Converter Topology As EV Charging Station," *2024 IEEE Transportation Electrification Conference and Expo (ITEC)*, Chicago, IL, USA, pp. 1–6, 2024, doi.
12. L. Timilsina, O. Ciftci, **A. Moghassemi**, E. Buraimoh, I. Rahman, K. Chamarthi, G. Ozkan, B. Papari, C. Edrington, "A Dual Energy Management for Hybrid Electric Vehicles," *2024 IEEE Transportation Electrification Conference and Expo (ITEC)*, Chicago, IL, USA, pp. 1–6, 2024, doi.
13. L. Timilsina, **A. Moghassemi**, E. Buraimoh, A. Arsalan, K. Chamarthi, G. Ozkan, B. Papari, C. Edrington, "Impact of Vehicle-to-Grid (V2G) on Battery Degradation in a Plug-In Hybrid Electric Vehicle," *SAE World Congress Experience (WCX)*, Detroit, MI, USA, 2024, doi.
14. A. Arsalan, B. Papari, I. Rahman, L. Timilsina, **A. Moghassemi**, G. Muriithi, G. Ozkan, C. Edrington, "Machine Learning Approach for Open Circuit Fault Detection and Localization in EV Motor Drive Systems," *SAE World Congress Experience (WCX)*, Detroit, MI, USA, 2024, doi.
15. K. Chamarthi, C. Edrington, A. Arsalan, L. Timilsina, B. Papari, G. Ozkan, **A. Moghassemi**, "A Novel 1-ϕ Cuk Based On-Board EV Charger with Minimal Power Components," *2023 SAE Energy & Propulsion Conference & Exhibition (EPCE)*, Greenville, SC, USA, 2023-01-1686, 2023, doi.
16. **A. Moghassemi**, G. Ozkan, C. Edrington, G. Muriithi, Z. Zhang, "Active Thermal Control of AC/DC Power Converter Considering Health Monitoring of Power Modules," *2023 IEEE Electric Ship Technologies Symposium (ESTS)*, Alexandria, VA, USA, pp. 78–85, 2023, doi.
17. G. Muriithi, B. Papari, **A. Moghassemi**, A. Arsalan, G. Ozkan, C. Edrington, "Security Enhancement of Cyber-Physical DC Ship Power System Using Scalable Deep Learning Method," *2023 IEEE Electric Ship Technologies Symposium (ESTS)*, Alexandria, VA, USA, pp. 520–527, 2023, doi.
18. **A. Moghassemi**, S. Ebrahimi, F. Ferdowsi, "A Novel Control Scheme for TransZSI-DVR to Enhance Power Quality in PV Integrated Networks," *2021 North American Power Symposium (NAPS)*, College Station, TX, USA, pp. 1–6, 2021, doi.
19. **A. Moghassemi**, S. Ebrahimi, "Modified SVPWM for Trans-Z-Source Inverter-Based PV Systems," *7th National Congress of Newly Discovered Iranian Electrical Engineering*, Tehran, Iran, 2020, doi.
20. F. Zareei, M. Hosseini, **A. Moghassemi**, "Optimal Placement and Sizing of Distributed Generation via a Hybrid Multi-Objective Artificial Bee Colony and Differential Evolution Algorithms," *7th National Congress of Newly Discovered Iranian Electrical Engineering*, Tehran, Iran, 2020, doi.
21. S. Ebrahimi, **A. Moghassemi**, M. Mola, "Target Tracer Switching Strategy for Multi-Level PV Inverters Motor Drives Based on MPC," *7th National Congress of Newly Discovered Iranian Electrical Engineering*, Tehran, Iran, 2020, doi.
22. **A. Moghassemi**, J. Olamaei, M. Hosseini, "Simulation of Photovoltaic System Based on Zero-Current Switching Forward Converter," *The 17th Iranian Student Conference on Electrical Engineering*, Kish, Iran, 2014, doi.

23. **A. Moghassemi**, K. Rostampoor, "New Control Technique in DVR As A Series Compensator to Protect Sensitive Loads Against Voltage Disturbances," *The 1st Conference on Electrical and Electronic Engineering North West of Iran*, Tabriz, Iran, pp. 76–81, 2014, doi.

Books and Book Chapters

1. T. Kerci, W. Zhong, **A. Moghassemi**, F. Milano, P. Moutis, "Frequency Control and Regulating Reserves by VPPs," *Scheduling and Operation of Virtual Power Plants,* pp. 131–162, Cambridge: Elsevier, 2022, doi.
2. Z. Shah, **A. Moghassemi**, P. Moutis, "Frameworks of Considering RESs and Loads Uncertainties in VPP Decision-Making," *Scheduling and Operation of Virtual Power Plants,* pp. 209–226, Cambridge: Elsevier, 2022, doi.
3. **A. Moghassemi**, S. Ebrahimi, *Application of Renewable Energy Systems in MATLAB/Simulink Software: PV Solar and Wind Turbine,* Tehran, Iran: Roham Andisheh Press, 2019, doi.

Grants, Fellowships, and Funded Projects

Resilient Power Electronics Building Blocks: Thermal-Aware Control, Predictive Health Monitoring, Reliability and Visualization — *Office of Naval Research (ONR)*

Ali Moghassemi (PI or Co-PI) — *In Preparation*

- This project proposes a framework integrating thermal-aware control, AI/ML-based health monitoring, and predictive maintenance for MMC-based Power Electronic Building Blocks (PEBBs). The system leverages real-time temperature feedback, intelligent modulation, and visualization dashboards to improve resilience, extend lifetime, and enable proactive decision-making. The proposal aligns with ONR's mission for intelligent, survivable shipboard power systems.

High Penetration of Inverter-Based Resources and Power Quality Improvement Framework — *GRAPES*

Ali Moghassemi (Co-PI) — *Submitted*

- This project aims to develop a comprehensive control and coordination framework to enhance power quality and system stability in grids with a high penetration of Inverter-Based Resources (IBRs). The proposed research focuses on advanced control strategies for mitigating harmonics, improving voltage regulation, and ensuring robust operation under dynamic and unbalanced conditions.

Optimizing Converter Control for Capacitor Longevity Using Degradation Prediction Models — *Office of Naval Research (ONR)*

Ali Moghassemi (Co-PI) — *Submitted*

- As an extension of my Ph.D. project, this project will develop adaptive control strategies that leverage capacitor degradation prediction models to extend converter lifespan. The approach dynamically adjusts operation based on real-time degradation data, improving reliability and reducing maintenance needs.

NiPEC-PEPDS: Digital Twin–Based Dielectric Scaling and Health Prognosis — *Office of Naval Research (ONR)*

Ali Moghassemi (Post-Doctoral Research Contributor) — *Jun. 2025 – Present*

- Built an integration framework for the Power Electronic Power Distribution System (PEPDS), using the Virtual Prototyping Process (VPP) to generate metamodels of Navy equipment. Collaborated with Arizona State University to establish dielectric scaling laws for predictive health monitoring within the VPP environment.

Tech Candidate for Future Navy Integrated Power and Energy Corridor (PEPDS) — *Office of Naval Research (ONR)*

Ali Moghassemi (Post-Doctoral Research Contributor) — *Jun. 2025 – Present*

- Contributed to technology integration for the Power Electronic Power Distribution System (PEPDS), supporting evaluation of candidate solutions for future Navy power and energy corridors. This project produces models for PEPDS equipment and structures for use in Smart Ship Systems Design (S3D).

Power Energy Thermal Technologies and Integration Systems (PETTIS) — *Office of Naval Research (ONR)*

Ali Moghassemi (Post-Doctoral Research Contributor) — *Jun. 2025 – Present*

- Co-developed an equipment sizing tool with UT-Arlington for shipboard Battery Energy Storage Systems (BESS), enabling exploration of power electronics, advanced battery technologies, and thermal management solutions.

Demo D Preparation — *Office of Naval Research (ONR)*

Ali Moghassemi (Post-Doctoral Research Contributor) — *Jun. 2025 – Present*

- Co-developed the PEPDS hardware demonstration platform with UT-Arlington, establishing cost baselines and validation cases to provide "new sources of truth" that increase confidence in equipment metamodels and measurement data.

Electrothermal Management Using In-Situ Junction Thermal Estimates for Enhanced Converter Reliability — *Office of Naval Research (ONR)*

Ali Moghassemi (Ph.D. Research Contributor) — *Aug. 2022 – May. 2025*

- Contributed to research combining PEBB advancements with predictive electro-thermal control to mitigate thermal stress and cooling demand. Results enhanced dynamic response and power density of Ship Power Systems (SPS).

Science Foundation Ireland (SFI) and in part with the University College Dublin (UCD) Energy Institute — *Science Foundation Ireland*

Ali Moghassemi (Research Contributor) — *Mar. 2021 – Jun. 2021*

- Contributed with paper: *"Damping of Low-Frequency Oscillations in Power Systems by Large-Scale PV Farms: A Comprehensive Review of Control Methods."*

Decarbonisation of Grid with Optimal Controller and Energy Management for Energy Storage Systems in Microgrids — *Ministry of Education, Malaysia*

Ali Moghassemi (Research Contributor) — *Nov. 2020 – Mar. 2021*

- Contributed with paper: *"A Novel Solar Photovoltaic Fed TransZSI-DVR for Power Quality Improvement of Grid-Connected PV Systems."*

Industry & Academic Projects (Selected)

Industry *(Led technical/commercial proposals, resulting in successful projects at ICP Co.)*

Dec. 2022	**PMS**, Dehshir Gas Compressor Station, *8 months, € 74,000*	*Siemens S7-400H*
Dec. 2022	**PMS**, Ardestan Gas Compressor Station, *8 months, € 74,000*	*Siemens S7-400H*
Dec. 2022	**ESD/F&G**, Dehshir Gas Compressor Stations, *8 months, € 300,000*	*ABB 800 Series*
Dec. 2022	**SCS**, Dehshir Gas Compressor Station, *8 months, € 240,000*	*Siemens S7-400H*
Nov. 2022	**ESD/F&G**, Ardestan Gas Compressor Stations, *8 months, € 300,000*	*ABB 800 Series*
Nov. 2022	**SCS**, Ardestan Gas Compressor Station, *8 months, € 240,000*	*Siemens S7-400H*
Oct. 2022	**PDCS**, Kangan Utility & Offsite Project (Phase II), *6 months, € 280,000*	*IEC 61850*
Oct. 2022	**PDCS**, KPRC HDPE, *5 months, € 401,000*	*IEC 61850*
Sept. 2022	**BMS**, Cheshmeh Khosh - Dalpari and East Paydar, *3 months, € 157,000*	*Siemens S7-400H*
Aug. 2022	**PDCS**, Ragsefid 1 Compressor Station and Gas Dehydration, *6 months, € 113,000*	*Siemens S7-400H*
Jul. 2022	**BMS**, Bandar Abbas Sako Desalination Plant, *3 months, € 38,000*	*Siemens S7-1500*
Mar. 2022	**DSC**, Bandar Abbas Sako Desalination Plant, *6 months, € 560,000*	*Siemens S7-400H*
Jan. 2022	**SCS/CSS/PMS**, Aradan Gas Compressor Station, *5 months, € 412,000*	*Siemens S7-400H*

Academic *(Designed, modeled, and presented projects at Clemson University)*

May. 2024	**ECE 6160 - Smart Grid**, Graph models of electric power transmission network	*Clemson, SC, USA*
Dec. 2023	**ECE 6190 - Electric Machines and Drives**, Dynamic performance of a linear electro-mechanical system	*Clemson, SC, USA*
Dec. 2023	**ECE 6190 - Electric Machines and Drives**, Modeling of 3P symmetrical IM in real variables	*Clemson, SC, USA*
Dec. 2023	**ECE 6190 - Electric Machines and Drives**, Modeling of 3P symmetrical IM in qd0 model	*Clemson, SC, USA*
Dec. 2023	**ECE 8640 - Microgrids in Virtual Power Plants**, Microgrid design at Duke Energy's facility in Charlotte, NC	*Clemson, SC, USA*
May. 2023	**ECE 6200 - Renewable Energy**, System design of integrating PV in South Carolina	*Clemson, SC, USA*
May. 2023	**ECE 6710 - Electrification of Transportation**, Control of sensorless brushless motor drive for EVs	*Clemson, SC, USA*
Dec. 2022	**ECE 6610 - Fundamentals of Solar Energy**, Control of hybrid storage systems in PV-based DC microgrid	*Clemson, SC, USA*
Dec. 2022	**ECE 8020 - Electric Motor Control**, Four modulation strategies for a two-level three-phase VSI	*Clemson, SC, USA*
Dec. 2022	**ECE 8020 - Electric Motor Control**, Closed-loop and FOC methods of induction machines	*Clemson, SC, USA*

Skills

Technical

- Power Electronics (DC/DC, DC/AC, AC/AC, and AC/DC Converters, Modular Multilevel Converters (MMC), Power Electronics Building Blocks (PEBB), Dual Active Bridge (DAB)), Impedance-Source Inverters (ZSI, Trans-ZSI, Quasi-ZSI), Electrified Transportation (Shipboard Power Systems, Electric Vehicles), Renewable Energy Systems (PV and Wind Turbine Systems), Power Quality (Dynamic Voltage Restorer, Voltage Sag/Swell)
- Control & Implementation: PWM Techniques, Model Predictive Control, Maximum Power Point Tracking (MPPT) Techniques, Real-Time Simulation, SiL/HiL/CHiL/PHiL Implementation

Software

- MATLAB/Simulink (SimPowerSystems, Simscape), PLECS (Standalone & Blockset, Thermal Modeling, RT Box Integration), Typhoon Control Center (HIL Testing, Schematic Editor, SCADA), LTspice (Circuit Simulation, Transient Analysis), dSPACE ControlDesk (Real-Time Interface, Signal Monitoring), PSCAD/EMTDC (EMT Simulation), Python (NumPy, SciPy, Matplotlib), C/C++, AutoCAD Electrical (2D/3D Schematics, Layouts), KiCad (PCB Design), LaTeX and Overleaf, Microsoft Office

Hardware

- Real-Time Platforms: Typhoon HIL606/604/603, dSPACE MicroLabBox, OPAL-RT OP4510, Speedgoat
- Power Hardware: Dynamometer System with Dual PMSMs, PEBB 6000/1000, Wolfspeed XM3 Three-Phase Inverter
- Industrial Controllers: Siemens PLC (S7-400/400H/400F/400FH/300/1200/1500, ET-200M/200SP/200pro), TI C2000 DSP

Language

- English (Fluent), German (Basic), Persian (Native)

Honors & Awards

May. 2025 **Outstanding Graduate Researcher Award**, Clemson University (1st time in Clemson University history) *Clemson, SC*
Apr. 2025 **Outstanding Graduate Researcher Award**, Holcombe Electrical and Computer Engineering Department *Clemson, SC*
Feb. 2022 **Graduate Research Assistantship**, Holcombe Electrical and Computer Engineering Department *Clemson, SC*
Dec. 2013 **Distinguished Student**, IAU-STB, 1 semester during master's program *Tehran, Iran*
Mar. 2009 **Distinguished Student**, IAU-STB, 1 semester during bachelor's program *Tehran, Iran*

Certificates (Selected)

Nov. 2024 **HIL Specialist 2.0 Certification**, *Typhoon HIL, Inc.* *Clemson, SC*
Feb. 2024 **Communication Protocol**, *Typhoon HIL, Inc.* *Clemson, SC*
Jan. 2024 **HIL for Power Electronics**, *Typhoon HIL, Inc.* *Clemson, SC*
Jan. 2024 **HIL Fundamentals**, *Typhoon HIL, Inc.* *Clemson, SC*
Jan. 2024 **HIL for Microgrids**, *Typhoon HIL, Inc.* *Clemson, SC*
Jan. 2024 **Test Automation**, *Typhoon HIL, Inc.* *Clemson, SC*
Jun. 2023 **Application-Oriented Course (PHIL)**, *OPAL-RT Technologies* *Clemson, SC*

Editorial and Review Service

- **Editorial Board**, *Smart Ship Technologies* (Sep. 2025 – Present)
- **Associate Editor**, *Sustainable Energy Control and Optimization* (Sep. 2025 – Present)
- **Associate Editor**, *American Journal of Electrical Power and Energy Systems* (Jun. 2025 – Present)
- **Section Editor**, *Frontiers in Smart Grids – Smart Grid Technologies* (Jul. 2022 – Present)
- **Reviewer**, top-tier journals and conferences (230+ verified reviews) available on Web of Science (Jun. 2018 – Present)

Professional Membership

- **Member**, Institute for Electrical and Electronics Engineers (IEEE) (Mar. 2023 – Present)
- **Member**, IEEE Young Professionals (IEEE YP) (Jan. 2023 – Present)
- **Member**, IEEE Industrial Electronics Society (IEEE IES) (Mar. 2025 – Present)
- **Member**, IEEE Industry Applications Society (IEEE IAS) (Mar. 2025 – Present)
- **Member**, IEEE Power & Energy Society (IEEE PES) (Mar. 2023 – Present)
- **Member**, IEEE Power Electronics Society (IEEE PELS) (Mar. 2025 – Present)
- **Member**, IEEE Systems Council (Mar. 2023 – Present)

- **Member**, IEEE Transportation Electrification Council (Mar. 2025 – Present)
- **Member**, IEEE Smart Cities Community (Jan. 2025 – Present)
- **Member**, SAE International (Apr. 2023 – May. 2025)
- **Member**, Clemson IEEE Power and Energy Society Student Branch (Apr. 2023 – May. 2025)