

Exponent®
Engineering & Scientific Consulting

Alex Dahlmann, Ph.D., CFEI

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Professional Profile

Dr. Alex Dahlmann's expertise is within the realm of power electronics for usage in renewable energy systems, with an emphasis in utility-scale solar photovoltaics. His background is focused primarily on utility-scale systems and predictive control techniques for power grid integration. Dr. Dahlmann's experience ranges from renewable sources, such as solar photovoltaic and wind turbines, to electric vehicle design and control. Additionally, he has experience with power system design and distributed energy source integration. Dr. Dahlmann has worked extensively with predictive control schemes, developing a novel modulated model predictive control for multilevel converters in photovoltaic systems and a novel deadbeat control scheme for multilevel converters in multi-string photovoltaic systems.

Dr. Dahlmann's research background has been focused on next-generation power electronics and control schemes. His dissertation research focused on multilevel power converters (multilevel boost converters and multilevel inverters) in utility-scale photovoltaic systems with predictive control schemes to achieve a constant switching frequency. This work was achieved for both the multi-string configuration and the central inverter configuration for photovoltaics.

Since joining Exponent, Dr. Dahlmann has contributed his experience on consumer electronics failures and safety reviews, battery system safety and standards review, IP infringement litigation, power electronics and systems failures, and vehicle failures to name a few. He maintains a vital understanding of power electronics for both grid connected and energy storage systems, including power electronics utilized in electric vehicles.

Prior to joining Exponent, Dr. Dahlmann worked in the AMPERE lab at the Northern Arizona University where he conducted experiments related to his graduate research. As part of his graduate studies, Dr. Dahlmann gained expertise in numerous programs such as MATLAB/Simulink, dSPACE ControlDesk, and PowerWorld. Additionally, he is proficient in numerous hardware devices such as dSPACE (1103 and MicroLabBox), MagnaPower PV Emulator, and Arduino systems. Dr. Dahlmann has worked with numerous individuals to help develop courses for photovoltaic energy and power systems. Lastly, Dr. Dahlmann has managed the electrical laboratory equipment for the Northern Arizona University, where he analyzed faulty equipment and either repaired it or salvaged materials for student usage depending on the circumstances.

Academic Credentials & Professional Honors

Ph.D., Informatics and Computing, Northern Arizona University, 2024

M.S., Electrical Engineering, Northern Arizona University, 2020

B.S., Electrical Engineering, Northern Arizona University, 2018

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Licenses and Certifications

Certified Fire and Explosion Investigator (CFEI)

Professional Affiliations

The Institute of Electrical and Electronics Engineers (IEEE) Member

National Association of Fire Investigators (NAFI)

Society of Automotive Engineers (SAE)

Publications

S. Lele and A. Dahlmann, “Electric Vehicles – Risks, Unknowns, Safety & Emergency Preparedness Considerations”, 28th International Technical Conference on the Enhanced Safety of Vehicles, Toronto, Canada, 2026, pp. 1-13

Dahlmann, A.D. and Lele, S., “Electric Vehicles & the Grid - Synergy or Strain?,” SAE Technical Paper 2026-01-0398, 2026, doi:10.4271/2026-01-0398.

A. Dahlmann, V. Yaramasu and K. Yadlapati, "Predictive Control of Three-Level Boost and T-type Converters with Constant Switching Frequency for Photovoltaic Energy Systems," 2025 7th International Conference on Energy, Power and Environment (ICEPE), Sohra (Cherrapunjee), India, 2025, pp. 1-6, doi: 10.1109/ICEPE65965.2025.11139502.

A. Dahlmann and V. Yaramasu, "Modulated Predictive Current Control of Photovoltaic Central NPC Inverter With Reduced Computational Burden," in IEEE Access, vol. 12, pp. 90596-90605, 2024, doi: 10.1109/ACCESS.2024.3421317.

A. Dahlmann, V. Yaramasu, S. Kouro and M. Aguirre, "Computationally Efficient Predictive Control of Photovoltaic Central NPC Inverter with Constant Switching Frequency," 2022 IEEE 7th Southern Power Electronics Conference (SPEC), Nadi, Fiji, 2022, pp. 1-6, doi: 10.1109/SPEC55080.2022.10058462.

A. Dahlmann, V. Yaramasu, S. Kouro, M. Aguirre and T. Pidikiti, "Modulated Model Predictive Current Control of a Three-Phase Photovoltaic Central Inverter," 2020 IEEE International Power and Renewable Energy Conference, Karunagappally, India, 2020, pp. 1-6, doi: 10.1109/IPRECON49514.2020.9315279.

A. Dahlmann, V. Yaramasu, A. Dekka, S. Kouro and S. Padmanaban, "Predictive Control of Two-Stage Grid-Connected Photovoltaic Energy System with Constant Switching Frequency," 2020 IEEE 11th International Symposium on Power Electronics for Distributed Generation Systems (PEDG), Dubrovnik, Croatia, 2020, pp. 346-351, doi: 10.1109/PEDG48541.2020.9244445.

V. Yaramasu, A. Dahlmann, A. Dekka, M. Rivera, T. Dragicevic and J. Rodriguez, "Modulated Predictive Voltage Control of a Four-Leg Inverter with Fixed Switching Frequency," 2020 11th Power Electronics, Drive Systems, and Technologies Conference (PEDSTC), Tehran, Iran, 2020, pp. 1-6, doi: 10.1109/PEDSTC49159.2020.9088438.

A. Dahlmann, V. Yaramasu, A. Dekka and K. Yadlapati, "Modulated Model Predictive Control of a Two-Level Inverter with Even-Order Harmonic Elimination," 2020 International Conference on Power Electronics & IoT Applications in Renewable Energy and its Control (PARC), Mathura, India, 2020, pp. 508-513, doi: 10.1109/PARC49193.2020.236665.

Presentations

A. Dahlmann. Modulated Model Predictive Current Control of a Three-Phase Photovoltaic Central Inverter. Poster presentation, 2021 Arizona Student Energy Conference (AZSEC), Flagstaff, AZ, 2021.