

Amir Sajjad Bahman
Lektor
AAU Energi
Det Ingeniør- og Naturvidenskabelige Fakultet
Applied Power Electronic Systems
Applied Power Electronic Systems
EMI/EMC in Power Electronics
Reliability of Power Electronic Components
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Forskningsprofil

Biography

Amir Sajjad Bahman (Senior Member, IEEE) is an Associate Professor at the Center of Reliable Power Electronics (CORPE), Aalborg University, Denmark. His research interests include electro-thermo-mechanical modeling, packaging, and reliability of power electronic systems and components. Dr. Bahman received a B.Sc. from Iran University of Science and Technology, in 2008, an M.Sc. from Chalmers University of Technology, Sweden in 2011, and a Ph.D. from Aalborg University, Denmark, in 2015 all in electrical engineering. He was a Visiting Scholar in the Department of Electrical Engineering, University of Arkansas, USA, in 2014. Moreover, he was with Danfoss Silicon Power, Germany in 2014 as the Thermal Design Engineer. Dr. Bahman is a senior member of the IEEE and currently serves as an Associate Editor for the IEEE Transactions on Transportation Electrification and Elsevier Microelectronics Reliability.

Vice Leader of Reliability of Power Electronic Components Research Group (REPEC)

Coordinator and Lab Manager of the Danish Power Electronics Reliability Test Facilities (X-Power)

Positions

Associate Professor in Reliable Power Electronics, AAU Energi, Aalborg University, 2020 – present

Assistant Professor in Reliable Power Electronics, AAU Energi, Aalborg University, 2017 – 2020

Postdoctoral Fellow in Reliable Power Electronics, AAU Energi, Aalborg University, 2015 – 2017

Ph.D. Fellow in Reliable Power Electronics, AAU Energi, Aalborg University, 2012 – 2015

Visiting Scholar, Mixed-Signal Computer-Aided Design Research Lab, University of Arkansas, USA, 2014

Thermal Engineer, Danfoss Silicon Power, Germany, 2014

Research interests

Reliability and lifetime prognostics of power electronic systems and components

WBG devices and applications in power electronics converters

Physics-of-failure and fatigue analysis of power electronic components

Multiphysics modeling of power electronic systems

CFD and thermal management of power electronics

Ansættelse

Lektor

Lektor

AAU Energi

Det Ingeniør- og Naturvidenskabelige Fakultet

Aalborg Øst, Danmark

1 nov. 2012 → 31 dec. 4712

Lektor

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Det Ingeniør- og Naturvidenskabelige Fakultet
Aalborg Øst, Danmark

1 nov. 2012 → 31 dec. 4712

Applied Power Electronic Systems

Det Ingeniør- og Naturvidenskabelige Fakultet
Aalborg Øst, Danmark

1 jan. 2021 → present

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Applied Power Electronic Systems

Det Ingeniør- og Naturvidenskabelige Fakultet
Aalborg Øst, Danmark

1 nov. 2012 → 31 dec. 4712

EMI/EMC in Power Electronics

Det Ingeniør- og Naturvidenskabelige Fakultet
Aalborg Øst, Danmark

1 jan. 2021 → present

Reliability of Power Electronic Components

Det Ingeniør- og Naturvidenskabelige Fakultet
Aalborg Øst, Danmark

1 jan. 2021 → present

Publikationer

Failure mechanism analysis of fuses subjected to manufacturing and operational thermal stresses

Bahman, A. S., Jensen, S. M. & Iannuzzo, F., sep. 2018, I: *Microelectronics Reliability*. 88-90, s. 304-308 5 s.

Computer-aided engineering simulations

Bahman, A. S. & Iannuzzo, F., jun. 2018, *Wide Bandgap Power Semiconductor Packaging: Materials, Components, and Reliability*. Sukanuma, K. (red.). Woodhead Publishing, s. 199 - 223 25 s. (Elsevier).

A Lumped Thermal Model Including Thermal Coupling and Thermal Boundary Conditions for High Power IGBT Modules

Bahman, A. S., Ma, K. & Blaabjerg, F., mar. 2018, I: *IEEE Transactions on Power Electronics*. 33, 3, s. 2518 - 2530 13 s., 7903728.

Modeling of Short-Circuit-Related Thermal Stress in Aged IGBT Modules

Bahman, A. S., Iannuzzo, F., Uhrenfeldt, C., Blaabjerg, F. & Munk-Nielsen, S., sep. 2017, I: *IEEE Transactions on Industry Applications*. 53, 5, s. 4788 - 4795 8 s.

Reliability-oriented environmental thermal stress analysis of fuses in power electronics

Bahman, A. S., Iannuzzo, F., Holmgaard, T., Nielsen, R. Ø. & Blaabjerg, F., sep. 2017, I: *Microelectronics Reliability*. 76-77, s. 25-30 6 s.

Fuse Modeling for Reliability Study of Power Electronic Circuits

Bahman, A. S., Iannuzzo, F. & Blaabjerg, F., mar. 2017, *Proceedings of the 2017 IEEE Applied Power Electronics Conference and Exposition (APEC)*. IEEE Press, s. 829-836 8 s. (IEEE Applied Power Electronics Conference and Exposition (APEC)).

A 3D Lumped Thermal Network Model for Long-term Load Profiles Analysis in High Power IGBT Modules

Bahman, A. S., Ma, K., Ghimire, P., Iannuzzo, F. & Blaabjerg, F., sep. 2016, I: I E E E Journal of Emerging and Selected Topics in Power Electronics. 4, 3, s. 1050 - 1063 14 s.

Mission-profile-based stress analysis of bond-wires in SiC power modules

Bahman, A. S., Iannuzzo, F. & Blaabjerg, F., sep. 2016, I: Microelectronics Reliability. 64, s. 419–424 6 s.

Optimization Tool for Direct Water Cooling System of High Power IGBT Modules

Bahman, A. S. & Blaabjerg, F., sep. 2016, *Proceedings of the 18th European Conference on Power Electronics and Applications (EPE'16 ECCE-Europe), 2016*. IEEE Press, 10 s.

Prediction of Short-Circuit-Related Thermal Stress in Aged IGBT Modules

Bahman, A. S., Iannuzzo, F., Uhrenfeldt, C., Blaabjerg, F. & Munk-Nielsen, S., sep. 2016, *Proceedings of IEEE Energy Conversion Congress and Exposition (ECCE), 2016*. IEEE Press, 7 s.

Electrical Parasitics and Thermal Modeling for Optimized Layout Design of High Power SiC Modules

Bahman, A. S., Blaabjerg, F., Dutta, A. & Mantooth, A., mar. 2016, *Proceedings of the 31st Annual IEEE Applied Power Electronics Conference and Exposition (APEC)*. IEEE (Institute of Electrical and Electronics Engineers), s. 3012 - 3019 8 s.

General 3D Lumped Thermal Model with Various Boundary Conditions for High Power IGBT Modules

Bahman, A. S., Ma, K. & Blaabjerg, F., mar. 2016, *Proceedings of the 31st Annual IEEE Applied Power Electronics Conference and Exposition (APEC)*. IEEE (Institute of Electrical and Electronics Engineers), s. 261 - 268 8 s.

Multidisciplinary Modelling Tools for Power Electronic Circuits: with Focus on High Power Modules

Bahman, A. S., nov. 2015, Department of Energy Technology, Aalborg University. 151 s.

A Novel 3D Thermal Impedance Model for High Power Modules Considering Multi-layer Thermal Coupling and Different Heating/Cooling Conditions

Bahman, A. S., Ma, K. & Blaabjerg, F., mar. 2015, *Proceedings of the 2015 IEEE Applied Power Electronics Conference and Exposition (APEC)*. IEEE Press, s. 1209-1215 7 s. (I E E E Applied Power Electronics Conference and Exposition. Conference Proceedings).

Thermal Impedance Model of High Power IGBT Modules Considering Heat Coupling Effects

Bahman, A. S., Ma, K. & Blaabjerg, F., nov. 2014, *Proceedings of the 2014 International Power Electronics and Application Conference and Exposition (PEAC2014)*. IEEE Press, s. 1382-1387 6 s.

FEM Thermal Modeling and Improvement for High Power IGBT Modules Used in Wind Turbine Systems

Bahman, A. S., Ma, K. & Blaabjerg, F., okt. 2014, *Proceedings of the International Conference on Wind Energy Grid-Adaptive Technologies, WEGAT 2014*. Chungbuk University, Korea, s. 1-7 7 s.

Loss comparison of different nine-switch and twelve-switch energy conversion systems

Bahman, A. S., Loh, P. C., Qin, Z. & Blaabjerg, F., mar. 2014, *Proceedings of the 2014 29th Annual IEEE Applied Power Electronics Conference and Exposition (APEC)*. IEEE Press, s. 309-314 6 s. (I E E E Applied Power Electronics Conference and Exposition. Conference Proceedings).

Comparison between 9-level hybrid asymmetric and conventional multi-level inverters for medium voltage application

Bahman, A. S. & Blaabjerg, F., 2013, *Proceedings of the 2013 IEEE International Symposium on Industrial Electronics (ISIE)*. IEEE Press, s. 1-7 7 s. (Industrial Electronics (ISIE), IEEE International Symposium on).

Bevillinger

HiPower 5.0: Leading edge Semiconductor, Integration, and Control System Technologies for highly compact and smart eDrive Components towards more sustainable Power Electronics 5.0

Bahman, A. S. (PI (principal investigator)), Zhou, D. (CoPI), Sadeghi, S. (Projektdeltager) & Steffensen, B. (Projektkoordinator)
European Commission: 123.951.651,00 kr.
01/07/2025 → 30/06/2028

Projekter

AMCOOL: Advanced Module Cooling

Bahman, A. S. (PI (principal investigator)), Sadeghi, S. (Projektdeltager), Du, S. (Projektdeltager) & Steffensen, B. (Projektkoordinator)
EUDP
01/01/2025 → 31/12/2027

APETT: Advanced Power Electronic Technology and Tools

Blaabjerg, F. (PI (principal investigator)), Munk-Nielsen, S. (CoI (co-investigator)), Iannuzzo, F. (Projektdeltager), Wang, H. (Projektdeltager), Uhrenfeldt, C. (Projektdeltager), Beczkowski, S. M. (Projektdeltager), Zhou, D. (Projektdeltager), Choi, U. (Projektdeltager), Jørgensen, A. B. (Projektdeltager), Vernica, I. (Projektdeltager), Sangwongwanich, A. (Projektdeltager), Christensen, N. (Projektdeltager), Ceccarelli, L. (Projektdeltager), Nielsen, C. K. (Projektdeltager), Bahman, A. S. (Projektdeltager), Pedersen, K. (Projektdeltager), Pedersen, K. B. (Projektdeltager) & Kristensen, P. K. (Projektdeltager)
Innovationsfonden
01/01/2017 → 30/06/2021

ALL2GaN: Affordable smart GaN IC solutions as enabler of greener applications

Bahman, A. S. (PI (principal investigator)), Zhou, D. (PI (principal investigator)), Iannuzzo, F. (PI (principal investigator)), Novak, M. (Projektdeltager), Sangwongwanich, A. (Projektdeltager), Zhao, S. (Projektdeltager), Zhang, K. (Projektdeltager), Du, S. (Projektdeltager), Steffensen, B. (Projektkoordinator) & Frøstrup, S. (Projektkoordinator)
Horizon - Chips Joint Undertaking
01/05/2023 → 30/04/2026

Condition Monitoring & Remaining Useful Life Estimation for Power Electronic Components

Loghmani Moghaddam Toussi, A. (PI (principal investigator)), Bahman, A. S. (Supervisor), Blaabjerg, F. (Supervisor) & Iannuzzo, F. (Supervisor)
01/06/2019 → 30/06/2023

ELMAC: Electronics Manufactured for Climate

Bahman, A. S. (PI (principal investigator)), Iannuzzo, F. (PI (principal investigator)), Blaabjerg, F. (CoI (co-investigator)), Wang, H. (CoI (co-investigator)), Török, L. (Projektdeltager), Zhang, K. (Projektdeltager) & Xue, P. (Projektdeltager)
Department of Energy Technology
01/06/2019 → 01/12/2023

TEAMING: e-powerTrain prEdictive mAintenance using physics inforMed learning

Zhao, S. (PI (principal investigator)), Wang, H. (Projektdeltager), Blaabjerg, F. (Projektdeltager), Bahman, A. S. (CoPI), Sangwongwanich, A. (Projektdeltager) & Frøstrup, S. (Projektkoordinator)
Horizon Europe
01/01/2024 → 31/12/2027

MERSEN: Fatigue reliability of fuses

Bahman, A. S. (PI (principal investigator)), C, P. (Projektdeltager) & Frøstrup, S. (Projektkoordinator)
Mersen France SB SAS
15/11/2021 → 14/05/2023

HiPower 5.0: Leading edge Semiconductor, Integration, and Control System Technologies for highly compact and smart eDrive Components towards more sustainable Power Electronics 5.0

Bahman, A. S. (PI (principal investigator)), Zhou, D. (CoPI), Sadeghi, S. (Projektdeltager) & Steffensen, B. (Projektkoordinator)
European Commission, Innovationsfonden
01/07/2025 → 30/06/2028

WOODWARD: Modelling and Optimization of the Water Cooling System for the Wind Power Converter

Bahman, A. S. (PI (principal investigator)) & Blaabjerg, F. (Projektdeltager)

Woodward Kempen GmbH

01/04/2017 → 30/03/2018

Multi-Time Scale Modelling of Power Electronic Converters in Power System Applications

Fogsgaard, M. B. (PI (principal investigator)), Bahman, A. S. (Supervisor), Blaabjerg, F. (Supervisor) & Iannuzzo, F. (Supervisor)

01/09/2019 → 31/08/2022

AIRBUS: Reliability Evaluation and Health Monitoring for Aircraft Converters (ZEROe Project)

Bahman, A. S. (PI (principal investigator)), Wei, X. (Projektdeltager) & Steffensen, B. (Projektkoordinator)

01/12/2023 → 31/05/2025

Thermal Management of Power Electronics - with Focus on Forced Convection and Two Phase Cooling Applications

Nujukambari, A. Y. (PI (principal investigator)), Bahman, A. S. (Supervisor), Sørensen, H. (Supervisor) & Hærvig, J. (Supervisor)

15/12/2018 → 14/12/2021

X-POWER – Power Electronics Reliability Test Facilities

Blaabjerg, F. (PI (principal investigator)), Bahman, A. S. (CoI (co-investigator)), Iannuzzo, F. (CoI (co-investigator)), Wang, H. (CoI (co-investigator)), Zhang, K. (Projektdeltager), Steffensen, B. (Projektkoordinator) & Ravn, T. K. (Projektkoordinator)

Uddannelses- og Forskningsministeriet

01/01/2019 → 31/12/2023