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Dr. Davari Receives an NSF Award

August 17, 2022

Dr. Masoud Davari, the lead principal investigator and the Associate Professor in Power Electronics Applications in the Department of Electrical and Computer Engineering, has been awarded funding from the Office of International Science and Engineering (OISE) in the United States National Science Foundation (U.S. NSF) for his proposal entitled "Collaborative Research: IRES Track I: ***U.S.-Denmark program for advanced reliability analysis of ac/dc converters with INNOVAtive conTrols in glObe-spanning supergRid (INNOVATOR)***." In this **$300k**, four-year, U.S.-NSF-OISE-funded project, U.S. citizen/national/permanent resident graduate and/or undergraduate students will research reliability analysis of power electronic systems in an international program between two (2) countries, the U.S. and the Kingdom of Denmark.

The student participants will be technically and culturally prepared in the leading site in the U.S.—i.e., the Laboratory for Advanced Power and Energy Systems (LAPES) in the newly established Engineering and Research Building at Georgia Southern University—to conduct cohort-based research projects at the international site in Aalborg, Denmark. The international site is the Center of Reliable Power Electronics (CORPE) in the AAU Energy Department at Aalborg University (AAU). AAU's power engineering program is one of the largest and youngest in Europe—consistently ranked among the best across the continent and Best Global Universities. The student participants supported by this U.S.-NSF-OISE funding will form partnerships with CORPE's international industrial partners, e.g., ABB, Schneider Electric, Mitsubishi Electric, Fairchild Semiconductor, Danfoss, Vestas, and more, as well as CORPE's academic networks.

Their projects in the CORPE at AAU will be associated with ac/dc power electronic converters [voltage-source converters (VSCs)] in a possible globe-spanning supergrid (GS^2G)—an essential component of the energy sector to integrate renewables to respond to urgent environmental concerns caused by global warming at an alarming rate and international agreements. Under the umbrella of smart grids, they assess and improve the reliability of VSCs with innovative controls in GS^2G. The proposed research will advance fundamental knowledge related to

1. enhancing the stability and performance of VSCs in GS^2G,
2. integrating renewables into power and energy systems via GS^2G's ac/dc grids,
3. achieving more reliable energy exchange and secure power transfer through VSCs, and
4. employing state-of-the-art technologies to test VSC performance and analyze and improve VSC reliability, including approaches based on machine learning techniques.

Graduate and undergraduate students will rigorously investigate technical aspects of VSCs with advanced controls and novel reliability analysis techniques for GS^2G's VSCs. For example, they deploy artificial intelligence (AI) algorithms to simplify the analysis and make it computationally viable when many components are considered. AI-based analysis of the reliability of power electronics systems is now among the most sophisticated existing methodologies—thus becoming adopted by the power electronics industry more and more.

NOTE: Please stay tuned for more information on eligibility, the necessary application process, stipends, and logistics, which will be posted and added soon. Meanwhile, please do not hesitate to contact Dr. Masoud Davari at mdavari@georgiasouthern.edu to gain more details about this exciting project and how to get involved.

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