Electrical and Computer Engineering Research Seminar

Supported by the ECE Advisory Board

High-performance, Intelligent Controllers for Grid-Integration of Renewable Energy Systems

When: 11 am, Friday, November 10, 2023

Where: Room 1245, Patrick F. Taylor Hall

ABSTRACT

The future standard of living hinges on our ability to harness energy sustainably, with a primary focus on clean sources such as wind, solar, and ocean waves. Renewable energy systems are pivotal in this transition, offering a promising path toward reduced carbon emissions and a more sustainable energy future. At the heart of these systems lie power electronic converters (PECs), which play a critical role in efficiently converting and integrating renewable energy into the grid.

PECs are far more than mere energy conversion devices. To fully realize the potential of renewable energy sources, PECs must facilitate dynamic control of both active and reactive power, allowing for precision in managing energy output. They also need to facilitate active participate of renewable energy resources in grid-balancing acts, taking on responsibilities like frequency control. This critical function of PECs is paramount to ensure the stability and reliability of the power grid as we transition to a more renewable-centric energy landscape.

The control systems governing PECs are the linchpin for efficient power flow and grid management, allowing renewable energy systems to not only generate clean electricity but also actively contribute to grid ancillary services. In this presentation, we will delve into high-performance control of PECs and explore strategies that ensure a seamless integration of renewable energy systems into the power grid.

Dr. Mehdi Farasat

Dr. Mehdi Farasat (Senior Member, IEEE) received the Ph.D. degree in electrical engineering from the University of Nevada, Reno, in 2014. He is currently an Associate Professor with the Division of Electrical & Computer Engineering. His research interests are modeling and control of power electronics converters in renewable energy and electrified transportation systems.