
Electrical & Computer Engineering

SEMINAR

Louisiana State University

Pathways to Realize High-Performance and Sustainable Electro-Mechanical Systems

Nishanth Gadiyar

Oak Ridge National Laboratory

Abstract—Electro-mechanical energy conversion systems are integral to modern transportation and industrial applications. Traditionally, key components of these systems are designed and optimized separately and then coupled, often leading to inefficiencies and redundancies that limit overall system performance. This seminar presents a multi-physics, system-level electro-mechanical co-design approach, highlighted through a case study of an integrated electro-hydraulic machine for off-highway vehicle electrification that demonstrates significant system-level performance gains. The seminar then explores how advances in manufacturing and materials science, particularly additive manufacturing, can be leveraged to push the performance limits of electric machines and electro-mechanical systems. Finally, the concept of multi-harmonic electric machines is introduced as a promising pathway towards sustainable, high-performance electrified systems.

Bio—Dr. Nishanth Gadiyar is an Electric Machinery Design R&D Staff Member at the Oak Ridge National Laboratory (ORNL), where he also holds the Alvin M. Weinberg Distinguished Staff Fellowship. He received the M.S. and Ph.D. degrees in Electrical and Computer Engineering from the University of Wisconsin-Madison. His research interests are at the intersection of electric machine design, power-electronic drives, and physics-based control.

Before joining ORNL in 2024, Dr. Gadiyar worked in the industry as a Research Engineer with the GE Aerospace Research Center in Niskayuna, NY. He is actively involved with the IEEE and serves as an Associate Editor for the IEEE Transactions on Transportation Electrification and the IEEE Transactions on Industry Applications. He is a member of multiple IEEE standards working groups and conference committees, and has been elected as the General Co-Chair for the 2029 IEEE Electric Machines and Drives Conference (IEMDC).

When: Thursday, 15 January 2026, 10:00 - 11:00
Where: Room 3216E Patrick F. Taylor Hall
Info: <https://www.lsu.edu/eng/ece/seminar>
Food: *Refreshments will be served.*

