

IEEE-PEAL Chapter Technical Talk



Presentation: Exploring the Physical Limitations of Electric Machines

Who: Dr. David Torrey, General Electric – Global Research Center

Date: Monday, August 2, 2021

When: 5:00 pm EDT (GMT-4)

Place: Zoom — <https://udayton.zoom.us/j/85699356162?pwd=MnYrbGdBNDdBsaUNzMDg4eDNNWEI2dz09>
- Call-in info far below

When: 5:00 pm EDT (GMT-4)

RSVP: Please reply through the PEAL website (<http://sites.ieee.org/dayton-peal/rsvp/>) Questions should be directed to Kevin.J.Yost@ieee.org

Abstract: Motivated by a deceptively simple expression for the power conversion by an electric machine, we will develop from first principles a deeper understanding of what ultimately limits electric machine performance and where targeted research can diminish these limitations. Using motivating examples from aviation and renewable energy, we will examine the issues of how to balance the competing structural, thermal, and field constraints on an electric machine while driving toward increased torque and power densities. Choices to be discussed include whether it is better to separate constraints or to simultaneously address constraints through co-design.

Keywords: Permanent magnet machines, superconducting generators, hybrid electric flight, boundary layer ingestion, insulation systems, thermal management systems, direct liquid cooling

Speaker's Bio:



David Torrey is a Senior Principal Engineer in the Electrical Systems organization at GE Research. His research interests are in the design and control of electric machines, particularly within the context of integrated energy conversion systems. His application experience ranges from machine design for subsea hydrocarbon pumping, electric submersible pumps, to design of next-generation generators for offshore wind turbines, to design of engine-embedded generators to support hybrid electric aircraft. He holds several awarded and pending patents in the fields of electric machines, power electronics, and control related to applications in transportation, renewable energy, oil and gas, and micro-grids. He has authored over 40 journal papers, over 70 conference papers, 3 book chapters, and one textbook in these areas. He supervised 13 doctoral theses while on the faculty at Rensselaer Polytechnic Institute. He is a fellow of IEEE and IET.

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