

Propelling the Future: Electric Drive Systems for Sustainable Aviation

**Tuesday, September 23,
2025**

**2:00 pm – 3:00 pm
E-Hall 136**

Reception to follow
3:00 pm – 3:20 pm
E-Hall 136



Dr. Nathan Weise

Associate Professor of Electrical and Computer Engineering,
Marquette University

ABSTRACT: As the aviation industry faces increasing pressure to reduce its environmental footprint, the development of sustainable propulsion technologies has become a critical research priority. Electric propulsion systems offer a promising path forward, with the potential for zero-emission flight, lower noise pollution, and reduced operating costs. This talk will present recent research on a novel power electronic drive designed for an all-electric, 3D-printed modular electric drive propulsor aimed at aviation applications. The system integrates advanced cooling and motor-drive technologies to meet the demanding performance and efficiency standards required for next-generation aircraft. This work is supported by the U.S. Department of Energy's Advanced Research Projects Agency–Energy (ARPA-E) through the ASCEND (Aviation-class Synergistically Cooled Electric-motors with iNtegrated Drives) program. The presentation will cover the design principles, performance metrics, and broader implications of this technology for the future of sustainable aviation.

BIOGRAPHY: Nathan Weise (Senior Member, IEEE) received the B.S. degree in computer engineering, the M.S. degree in electrical engineering with an emphasis on wireless, and the Ph.D. degree in electrical engineering with an emphasis on power from the University of Minnesota, Minneapolis, MN, USA, in 2005, 2007 and 2011, respectively. He was an Electrical Engineer with Cummins Power Generation, Minneapolis, and the General Electric Global Research, Niskayuna, NY, USA. He joined Marquette University, Milwaukee, WI, USA, as an Assistant Professor, in 2014. He was promoted to an Associate Professor at Marquette University in 2021. He has obtained and worked on various high-impact federally funded research programs such as ARPA-E CIRCUITS, APRA-E BREAKERS, ARPA-E ASCEND, and DOE Water Power Technology Office. His current research interests include power electronics, power converters, wave energy conversion, electrification of transportation, all-electric aircraft, dc circuit breakers, fault tolerance, control of renewable energy sources, digital control of power electronics, and wide bandgap devices.