24th International Conference on Electrical Machines (ICEM'2020)
Gothenburg, Sweden, August 23rd-26th, 2020

Tutorial-5: Sunday, 23rd August 2020, 12:00-14:30 CET.

Click to joining this on-line tutorial

Optimised Electrical Machine Designs for E-mobility Applications

Name: **Dr Mircea Popescu & Dr Melanie Michon**
Company: Motor Design Ltd
E-mail: Mircea.Popescu@motor-design.com, Melanie.Michon@motor-design.com

Tutorial Abstract:
Transport electrification is seen as one of the main solutions to reduce global CO2 emissions and increased demand of mechanical energy can be provided by electrical energy. The best energy conversion systems are undoubtedly the combination: electrical machines + power electronics + batteries.

The increasing demand of full electric vehicles arises specific challenges in terms of design for manufacturing, low weight, material costs and material supply chain. There is a strong interest to reduce the volume and cost of active materials in propulsion motor technologies beyond their current state-of-art, with a strong focus on industrial feasibility for mass production. Potential solutions include increased motor speeds and higher pole numbers and/or the adoption of rare earth free typologies such as reluctance (switched and synchronous) and induction machines.

Cutting-edge sensitivity analysis and multi-objective optimisation techniques will be applied in the design of an electric motor for a PHEV traction application. Each candidate solution will be evaluated in terms of electromagnetic, thermal and mechanical behaviour across the full operating envelope. The optimisation will generate a pareto front which allows efficiency over a drive cycle to be traded off against motor cost. This approach utilises a high performance or cloud computing infrastructure to deliver a truly revolutionary design workflow.

Biographies:

Dr. Mircea Popescu is Chief Technology Officer for Motor Design, Ltd., UK and has more than 35 years of engineering experience. Dr. Popescu published 150+ papers and his publications have received three IEEE best paper awards. His consultancy contributions for industry are incorporated in many state-of-the-art products. Current major projects include ReFreeDrive, rare-earth free e-drives featuring low cost manufacturing, under EGVI Horizon 2020 program. An IEEE Fellow, Dr. Popescu acted as 2010-2017 IEEE IAS Electrical Machines Committee Officer and 2013-2016 Prominent Lecturer IEEE IAS Region 8.

Dr. Melanie Michon, is Head of Engineering for Motor Design, Ltd., UK. Melanie has gained a PhD degree in Electrical Engineering from the University of Sheffield. She has 20 years of combined academic and industrial experience enabling her to provide thought leadership and to drive innovation with a clear focus on IP development and commercialisation. She joined MDL in April 2019 in the position of Head of Engineering, where she heads the engineering team and is responsible for delivering grant funded and large engineering projects, as well as technical pre-sales support.