

KEYNOTE 1: Prof. Annette Muetze, AUSTRIA

From Backstage to Center Stage: Auxiliary Automotive Drives

While the important role of electric machines on transportation electrification has risen to the foreground on many fronts, the millions of auxiliary drives used in automotive application have continued to remain one of the industry's best kept secrets hidden under the hood. With more than 100 of such auxiliary drives in typical mid-size and large executive cars, their role in enabling today's modern car's performances is of exceptional importance.

Given the additional design freedom and performance spaces opened up by the use of power electronics, the number of such small electric drives in automotive applications has at least doubled over the course of the past two decades. Performance, safety, and comfort related drives become distinguished, and interest has spiked in terms of energy conversion efficiency, size, and cost, as well as when it comes to electromagnetic emission, noise, and fault tolerance.

In this talk, we will discuss how these seemingly unnoticed small drives have been completely revolutionized within the recent years, where the beauty and power often emerge in rediscovering simplicity itself. Some examples explored in this talk include a simple drive re-design that can be considered during manufacturing, experimental determination of these drives' cogging torque, which are in the sub-milli Newtonmeter range, as well as increasing drive efficiency by reducing the control to its essence.

Short Bio:

Annette Muetze received a Dipl.-Ing. degree in electrical engineering from Darmstadt University of Technology, Germany, and a degree in general engineering from Ecole Centrale de Lyon, France, both in 1999, and her Dr.-Ing. degree from Darmstadt University of Technology in 2004. She has been a Full Professor at Graz University of Technology, Austria, since 2010 where she heads the Electric Drives and Machines Institute and currently serves as vice-dean of the department. Prior to joining Graz University of Technology, she was an Assistant Professor at the University of Wisconsin-Madison, USA, and an Associate Professor at the University of Warwick, Coventry, U.K. Over the years, Dr. Muetze has held several roles within different IEEE committees. She is a Fellow of the IEEE and a recipient of a NSF Career as well as a 6th Nagamori Award.