THE
UNIVERSITY
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COLLEGE OF
ENGINEERING

The College of Engineering Presents a Seminar from Visiting Professor:

Dr. Daniel Schroeder
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Process Systems Engineering
TU Braunschweig

Insight Into Battery Cell Production and Battery Performance with Digital Twins and Operando Measurement Techniques

August 25, 2022, 12:45-1:45 pm, Viets Conference Room, Bliss Hall

Abstract: Lithium-ion batteries have been consecutively optimized in the past decades and are close to reach their maximum practical energy density. However, more insight into the relation of production parameters and battery performance is still required. Likewise, more and more methods – both modelbased and analytical – are developed to gain understanding of the physio-chemical interactions, which take place within the battery and how these affect performance and durability. In this talk, two examples for the model-based analysis of lithium-ion batteries (numerical optimization of NMC cathode composition; fast charge of graphite anode) and one example for their advanced experimental analysis (acoustic emission scanning) will be presented. The underlying approaches and the potential of the methods will be outlined, and an outlook on their use in the context of battery recycling will be given. The tools presented can be further adapted to account for different cell chemistries / cell materials as well as different routes of manufacturing and different use cases of the battery cells.

Bio: **Professor Daniel Schroeder** is head of the Institute of Energy and Process Systems Engineering at TU Braunschweig, and board member of the Battery LabFactory Braunschweig, Germany. He received his Ph.D. with distinction in 2015 at TU Braunschweig and stayed afterward at the JustusLiebig-University Giessen, Germany as a junior group leader until the beginning of 2021. In 2017, he had a brief research stay at Kyoto University, Japan. His research focuses on the fundamental understanding and optimization of electrochemical energy systems, such as metal oxygen batteries and redox flow batteries as well as fuel cells and electrolyzers, by using a combination of model-based and operando techniques.