

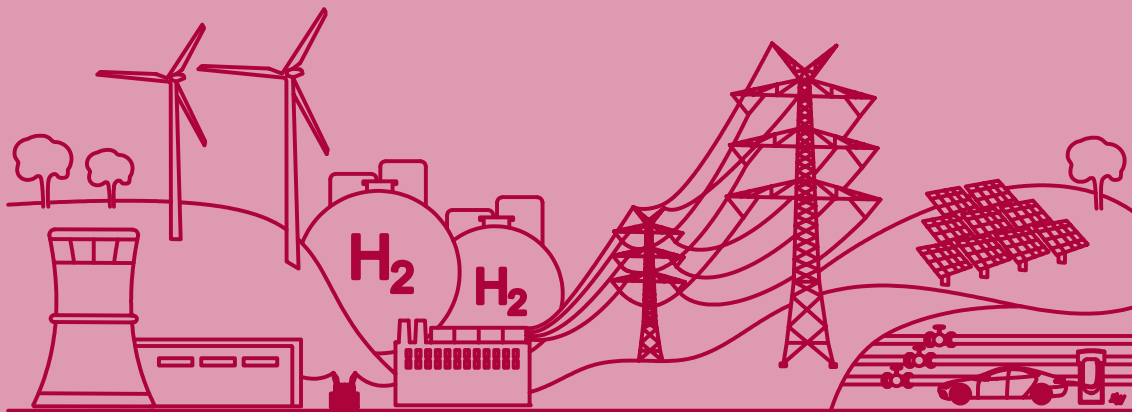


PROGRAMME 2024

NEIS CONFERENCE

on Sustainable Energy Supply
and Energy Storage Systems

since 2013



Officers Home Society of the University of the Bundeswehr Hamburg e.V.
Rodigallee 98, 22043 Hamburg

Monday, September 16th 2024

Conference and Morning Session Opening, Sessions 1 and 2

9:00
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9:10

Conference Opening

Detlef Schulz; Chair of Electrical Power Systems, Helmut Schmidt University Hamburg

Session 1

Operation of Future AC and DC Grids

9:20
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10:30

Stability Improvement of a Dynamic Low-Voltage Power Hardware-in-the-Loop Environment

Lucas Braun, Sebastian Kist, Daniela Eser, Michael Suriyah, Thomas Leibfried;
Karlsruhe Institute of Technology (KIT), Institute of Electric Energy Systems and High-Voltage Technology (IEH), Karlsruhe, Germany

Stabilizing Power of Grid-connected Power Systems

Daniel Vahle, Volker Staudt, Constantinos Sourkounis;
Ruhr-University, Bochum, Germany

Analysis of the Impact of Widespread Residential Heat Pumps and Photovoltaics on the Electricity Distribution Grid in Hamburg

Nicholas Tedjosantoso, Martin Grasenack and Hans Schäfers;
Hochschule für Angewandte Wissenschaften Hamburg, Competence Center für Erneuerbare Energien und EnergieEffizienz (CC4E), Hamburg, Germany

Fault mitigation in Multiterminal DC systems using DC Breakers

Klaus Vennemann¹, Michael Baranski¹, Tobias Hennig¹, Volker Staudt², Daniel Meyer³, Carsten Heising³;
¹Amprion GmbH, Dortmund, Germany, ²Ruhr-University Bochum (RUB), Bochum, Germany, ³Avasition GmbH, Dortmund, Germany

Session 2

On-board Grid Systems: Vehicles, Vessels, Aircraft

10:50
–
11:40

Load Distribution and Operating Point Estimation in Inverter-Dominated Grids by Electrical Signature Analysis

Christoph Klie, Tim Engemann, Christian Becker;
Institute of Electrical Power and Energy Technology, Hamburg University of Technology, Hamburg, Germany

Characterization of a Power-Hardware-in-the-Loop Testbed Including Time Delays

Marc René Lotz^{1,2}, Michael Kurrat¹, Martin Könemund²;
¹TU Braunschweig, Germany
²Ostfalia University of Applied Sciences, Wolfenbüttel, Germany

Distributed Control Algorithm Validation for Voltage Regulation and Load Sharing in Series-Hybrid-Electric Aircraft Propulsion Systems

Herman Jiopé¹, Wasif Haider Syed², Fanke Zeng¹, Fabian Witt¹, Ekrem Hanli³, Michael Kurrat¹, Michael Terörde¹;
¹TU Braunschweig, Braunschweig, Germany
²Brandenburg University of Technology Cottbus-Senftenberg, Cottbus, Germany

Lunch Break and Group Photo

11:40 – 13:10

Post-Lunch Session Opening, 1st Keynote Address, Session 3, Poster Session

13:15 – 13:55 1st Keynote Address
Jian Sun; Professor; Director of the Center for Future Energy Systems (CFES),
Rensselaer Polytechnic Institute, Troy, USA

Session 3
Power System Operation and Measurement

14:10 – 15:20

An Automated Technical Prequalification Process for Balancing Services by Small-scale Flexible Assets tested on a Redox Flow Battery
Robert Jahn, Pauline Segbert, Alfio Spina, Oliver Kraft, Julia Schmeing, Christian Rehtanz;
Institute of Energy Systems, Energy Efficiency and Energy Economics, TU Dortmund University,
Dortmund, Germany

Instantaneous Reserve Implementations: Method for Testing Worst-Case Resilience Scenarios
Christoph Sauer¹, João P. S. Cipriani², Gabriel Maier Cocco^{1,2}, Humberto Pinheiro², Martin Wolter¹;
¹Otto von Guericke University Magdeburg, Magdeburg, Germany
²Federal University of Santa Maria, Santa Maria, Brazil

Impact of Smart Metering on Home Energy Management: A Comparison to State-of-the-Art Power Sensors
Julien Essers, Eike Niehs, Bernd Engel;
elenia Institute, TU Braunschweig, Braunschweig, Germany

Common Mode Disturbances at Medium Voltage Transformers
Tobias Haas¹, Henning Kasten¹, Ansgar Ackva¹, Michael Terörde²;
¹Technische Hochschule Würzburg-Schweinfurt, Schweinfurt, Germany
²TU Braunschweig, Braunschweig, Germany

Poster Session
Starting with Poster Pitches



15:35 – 17:00

Poster 1: An Accessible PyTorch Implementation of Automatic Differentiation for Power System Model Parameter Identification and Optimization
Georg Kordowich, Johann Jaeger;
Institute of Electrical Energy Systems, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen,
Germany

Poster 2: Flexibility Demand and Availability for Congestion Management in Low Voltage Grids Considering Future Load Scenarios
Sina Steidle, Lando Werthmann, Michael R. Suriyah, Thomas Leibfried;
Institute of Electric Energy Systems and High Voltage Technology, Karlsruhe Institute of Technology,
Karlsruhe, Germany

Poster 3: Minimum CO₂ Saving Requirement for the Hydraulic-Pneumatic Flywheel System in the Rotor of a Wind Turbine
Abhinay Goga¹, Clemens Jauch¹, Laurence Alhrshy¹, Andreas Gagel², Peter Kloft³;
¹Wind Energy Technology Institute, Flensburg University of Applied Sciences, Flensburg, Germany
²AEROVIDE GmbH, Rendsburg, Germany
³HYDAC Technology GmbH, Sulzbach, Germany

Poster 4: FFR Coordination with Energy Storage Systems for Grid-Supporting Control of Inverter-Based Resources
Gabriel Maier Cocco^{1,2}, João Pedro Scherer Cipriani², Christoph Sauer¹, Humberto Pinheiro², Martin Wolter¹;
¹Otto-von-Guericke University Magdeburg, Magdeburg, Germany
²Federal University of Santa Maria, Santa Maria, Brazil

16:00 – 17:00	<p>Poster 5: Automated Test Method for Determining the Capacitive State of Health of Electric Vehicle Batteries for Second-Life Applications <u>Andreas Bammes</u>, Gert Mehlmann, Matthias Luther; Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen, Germany</p>
	<p>Poster 6: Study of the current density distribution of a PEM fuel cell with variation of temperature and partial pressure <u>Zak Andrew Bushell</u>, Emma Davies, Kersten Kröger; University of Applied Sciences and Arts, Bielefeld, Germany</p>
	<p>Poster 7: Experimental Assessment of Parallel Operation of Grid-Forming and Grid-Following Inverters in an Islanded Microgrid <u>Dalia Salem</u>, Detlef Schulz; Faculty of Electrical Engineering, Helmut Schmidt University, Hamburg, Germany</p>
	<p>Poster 8: Pilot Node Control for Frequency-Constant Grid Operation in Power Systems with Zero Inertia <u>Nizam Halawi</u>, Hassan Alhomsy, Franz Linke, Steffen Schlegel, and Dirk Westermann; Power System Group, TU Ilmenau, Ilmenau, Germany</p>
	<p>Poster 9: Probabilistic determination of critical states in electrical grids using ensemble-based power forecasts <u>Kurt Brendlinger</u>^{1,2}, Mike Vogt¹, Arne Wessel³, Sebastian Wende-von Berg^{1,4}; ¹Grid Planning and Grid Operation, Fraunhofer IEE, Kassel, Germany ²Technische Hochschule Lübeck, Lübeck, Germany ³Forecasts for Energy Systems, Fraunhofer IEE, Kassel, Germany ⁴Energy Management and Power System Operation, University of Kassel, Kassel, Germany</p>
	<p>Poster 10: WebRTC-based plug-&-play signal transport for peer-to-peer connectivity between DRTSs, IEDs and operators Steffen Vogel¹, Felix Wege², Antonello Monti^{2,3}; ¹OPAL-RT Germany GmbH, Nürnberg, Germany ²Institute of Automation of Complex Power Systems, RWTH Aachen University, Aachen, Germany ³Fraunhofer Institute for Applied Information Technology, Aachen, Germany</p>
	<p>Poster 11: Enhanced method to specify location and size of reactive power sources in electrical transmission systems Bader Sager, Hendrik Vennegeerts; University of Duisburg-Essen, Duisburg, Germany</p>
	<p>Poster 12: Effects of the use of grid-forming converters on the islanding detection of existing low-voltage systems Björn Oliver Winter, <u>Nelly Schulz</u>, Bernd Engel; TU Braunschweig, Braunschweig, Germany</p>
	<p>Poster 13: Electric Vehicles Future Trends in Germany: Forecast and Regional Distribution in Hamburg Meriam Jebali Samet, Amra Jahic, Maik Plenz, Detlef Schulz; Faculty of Electrical Engineering, Helmut Schmidt University, Hamburg, Germany</p>
	<p>Poster 14: Impacts of Distribution Grid Congestion Management on Charging Efficiency of Private Electric Vehicles Tom Steffen, Béla Wiegel, Payam Teimourzadeh Baboli, Christian Becker; Institute of Electrical Power and Energy Technology, Hamburg University of Technology, Hamburg, Germany</p>
 17:15  Departure for Evening Event by the Harbour	

Tuesday, September 17th 2024

Morning Session Opening, 2nd Keynote Address, Sessions 4 and 5

9:00 – 9:10	Conference Opening Detlef Schulz ; Chair of Electrical Power Systems, Helmut Schmidt University Hamburg
9:10 – 9:50	2 nd Keynote Address Volker Staudt ; Professor for Power Engineering and Power Electronics, Faculty of Electrical Engineering and Information Technology, Ruhr-University Bochum (RUB), Bochum, Germany

Session 4
Energy Storage Applications

	Estimating State of Charge for Lithium Iron Phosphate Batteries with Extended Kalman Filter <u>Muhammad Hamid</u> , Maria Qibtia Tahir, Jian Xie; University of Ulm, Ulm, Germany
	Towards Efficient Aggregation of Storage Flexibilities in Power Grids <u>Emrah Öztürk</u> ¹ , Kevin Kaspar ¹ , Timm Faulwasser ² , Karl Worthmann ³ , Peter Kepplinger ¹ , and Klaus Rheinberger ¹ ; ¹ Energy Research Centre, Vorarlberg University of Applied Sciences, illwerke vkw Endowed Professorship for Energy Efficiency, Dornbirn, Austria ² Institute of Energy Systems, Energy Efficiency and Energy Economics, TU Dortmund University, Dortmund, Germany ³ Institute of Mathematics, TU Ilmenau, Ilmenau, Germany
10:00 – 11:25	BattProDeep: A Deep Learning-Based Tool for Probabilistic Battery Aging Prediction <u>Houman Heidarabadi</u> , Melina Graner, and Holger Hesse; Department of Mechanical Engineering, Institute for Energy and Propulsion Technologies (IEAT), Kempten University of Applied Sciences, Kempten, Germany
	Behind-the-Meter and Front-of-the-Meter Applications in the Multi-Use of Residential Battery Storage Systems Considering the Legal Framework in Germany <u>Henrik Wagner</u> ¹ , Merle Ferk ¹ , Alexandra Scheunert ² , Bernd Engel ¹ , Hartmut Weyer ² ; ¹ elenia Institute for High Voltage Technology and Power Systems, TU Braunschweig, Braunschweig, Germany ² Institute for German and International Mining and Energy Law, TU Clausthal, Clausthal-Zellerfeld, Germany
	Hierarchical Energy Management for the Multi-Use-Application of a PV Park with hybridized Large-scale Battery Storage and Power-to-Gas plant in the MW range <u>Tim Biermann</u> , Thilo Bocklisch; Chair of Energy Storage Systems, Dresden University of Technology (TUD), Dresden, Germany

Session 5
Modern Power Systems

Bridging Synthetic Training and Real-World Application: Applied Simulation-based Neural State Estimation

Thomas Oberliessen¹, Sebastian Peter¹, Marc-Aurel Frankenbach², Karen auf der Horst², Christian Rehtanz¹;

¹TU Dortmund University, Dortmund, Germany

²Netze BW, Stuttgart, Germany

11:45
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12:55

Quantifying the Impact of Bidirectional Charging on the Degradation of LiFePO₄ Electric Van Batteries in LMD Operations

Andres F. Londono M.^{1,2}, Krzysztof Rudion¹;

¹University of Stuttgart, Institute of Power Transmission and High Voltage Technology (IEH), Stuttgart, Germany

²Mercedes-Benz AG, Sindelfingen, Germany

Scaleable Load Signature Generation with Low-Cost Meters for Machine-Learning-Based Load-Detection

Mathias Herget, Raphael Kress, Lukas Böhning, Ulf Schwalbe;

University of Applied Sciences Fulda, Fulda, Germany

Architecting a drone-transported mobile sensor box for remote monitoring of power grids

Khaled Osmani, Detlef Schulz;

Faculty of Electrical Engineering, Helmut Schmidt University, Hamburg, Germany

13:00
Closing Address and Farewell