Munich Hydrogen Symposium 2024

Empowering the FUTURE with HYDROGEN

h2symposium.les@ed.tum.de
<table>
<thead>
<tr>
<th>MONDAY</th>
<th>TUESDAY</th>
<th>WEDNESDAY</th>
<th>THURSDAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00 - 11:00</td>
<td>T.1a Hydrogen Production</td>
<td>W.1a Plasma Utilization</td>
<td>TOUR 1</td>
</tr>
<tr>
<td>REGISTRATION</td>
<td>T.1b Hydrogen Production</td>
<td>W.1b Utilization in Biotechnology</td>
<td>ChemDelta Bavaria</td>
</tr>
<tr>
<td>WELCOME COFFEE</td>
<td>COFFEE BREAK</td>
<td>COFFEE BREAK</td>
<td>• The ChemDelta Bavaria is one of the largest chemical sites in Germany</td>
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<td></td>
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<td>• Different companies will be visited</td>
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<tr>
<td>11:00 - 12:30</td>
<td>Keynote 04 Prof. Dr. Hubert Gasteiger</td>
<td>LUNCH BREAK</td>
<td>• Insight into the transformation and the application of current research in a real environment</td>
</tr>
<tr>
<td>Welcome Speech Prof. Spleithoff / Dr. Fendt</td>
<td>Keynote 03 Prof. Dr. Jakub Kupecki</td>
<td>LUNCH BREAK</td>
<td>09:00 - 17:00</td>
</tr>
<tr>
<td>Keynote 01 Dr. Alexander Tremel</td>
<td>T.2a Synthetic Energy Carrier</td>
<td>LUNCH BREAK</td>
<td>TOUR 2</td>
</tr>
<tr>
<td>keyote 02 t.</td>
<td>T.3a Power-to-X</td>
<td>LUNCH BREAK</td>
<td>TUM CAMPUS TOUR</td>
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<td>LUNCH BREAK</td>
<td>COFFEE BREAK</td>
<td>LUNCH BREAK</td>
<td>• Visit of several institutes from the fields of mechanical engineering, chemistry and process engineering</td>
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<tr>
<td>13:30 - 15:00</td>
<td>W.2a Research Projects</td>
<td>COFFEE BREAK</td>
<td>• From laboratory-scale fundamental research to demonstration plants</td>
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<tr>
<td>PANEL DISCUSSION Importance of Hydrogen in Future Energy Systems</td>
<td>W.2b Alternative Solid Feedstocks</td>
<td>COFFEE BREAK</td>
<td>• Topics range from hydrogen production to technologies for closed carbon cycles</td>
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<td>COFFEE BREAK</td>
<td>T.3a Energy Supply Chains</td>
<td>COFFEE BREAK</td>
<td>09:00 - 18:00</td>
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<tr>
<td>15:30 - 17:10</td>
<td>W.3a Gasification</td>
<td>W.4a Innovative Technologies &amp; Applications</td>
<td>TOUR 2</td>
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<tr>
<td>M.1a System Studies</td>
<td>W.3b Energy Supply Chains</td>
<td>CONFERENCE DINNER</td>
<td>TUM CAMPUS TOUR</td>
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<td>COFFEE BREAK</td>
<td>CLOSING &amp; AWARDS</td>
<td>• Visit of several institutes from the fields of mechanical engineering, chemistry and process engineering</td>
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## AGENDA

**MONDAY**

### 09:00 - 11:00

**REGISTRATION**

Registration desk open from 9-11 A.M.

### 11:00 - 12:30

**OPENING**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speakers</th>
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</thead>
<tbody>
<tr>
<td>11:00</td>
<td>Welcome Speech</td>
<td>Prof. Dr. Hartmut Spliethoff / Dr. Sebastian Fendt</td>
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<tr>
<td>11:30</td>
<td>Keynote 01</td>
<td>How do hydrogen projects become reality?</td>
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<td>Dr. Alexander Tremel / Deputy Chief Innovation Officer / HIF Global</td>
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<td>12:00</td>
<td>Keynote 02</td>
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### 11:00 - 12:30

**WELCOME COFFEE**

### 13:30 - 15:00

**PANEL DISCUSSION**

Importance of Hydrogen in Future Energy Systems

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<tr>
<th>Chair: Dr. Christian Hackl</th>
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### 13:30 - 15:00

**LUNCH BREAK**

### 15:30 - 17:10

**COFFEE BREAK**

### 15:30 - 17:10

**M.1a**

H2 System Studies

<table>
<thead>
<tr>
<th>Chair: Prof. Dr. Hartmut Spliethoff</th>
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<tbody>
<tr>
<td>15:30 Social acceptance of green hydrogen in Europe</td>
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<td>Lydia Maketo / TUM</td>
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<td>15:50 Emissions along the green hydrogen value chain and their regulatory relevance in the EU</td>
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<td>Regina Reck / FfE</td>
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<td>16:10 Open-source energy system model for evaluation of gigawatt-scale hydrogen production in Brazil</td>
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<td>Simon Herzog / UnternehmerTUM</td>
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<td>16:30 Scotland can meet its 5 GW hydrogen target sooner than 2030!</td>
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<td>Arash Badakhsh / University of Strathclyde</td>
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<tr>
<td>16:50 Macroeconomic Implications of Implementing 40t Fuel-Cell Trucks: Simulation Analyses of Roll-Out Scenarios for Austria</td>
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<td>Katharina Rusch / Energieinstitut (JKU Linz)</td>
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</table>
**Hydrogen Production**

**Chair:** Dr. Stephan Herrmann

- **09:05** CO2 recovery and H2 generation by perovskite solar-assisted looping  
  Massimo Santarelli / Politecnico di Torino

- **09:25** Generating Predictive Chemical Kinetic Models for Quaternary Ammonium Degradation in Anion Exchange Membranes  
  Lilach Naamat / Technion - IIT

- **09:45** Thermal Complications in Direct Ammonia-Fed Solid Oxide Fuel Cells Elaborated by Numerical Modelling  
  Özgür Aydin / Karadeniz Technical University

- **10:05** Electrochemical Investigation of Ni-GDC Electrodes on Fuel Electrode-Supported Solid Oxide Cells  
  Benjamin Steinrücken / TUM

- **10:25** Harnessing Physics-Based AI and Multiphysics Modelling for Empowering Solid Oxide Cell Technology  
  Murphy Peksen / TUM

**Coffee Break**

**Synthetic Energy Carrier**

**11:20 - 12:40**

**T.2a**

**Chair:** Dr. Sebastian Fendt

- **11:20** Keynote 03  
  Advancing Production of e-Fuels through Pressurized Co-Electrolysis in Solid Oxide Electrochemical Cells  
  Prof. Dr. Jakub Kupecki / Director of the Institute of Power Engineering (Poland)

- **11:50** Hydrogen and syngas retrieval from methanol with electrically heated steam reforming reactors  
  Eduardo Arango Durango / Luleå University of Technology

- **12:10** Particle circulation in a new reactor concept for sorption-enhanced Fischer-Tropsch synthesis  
  Wiebke Asbahr / KIT

**Lunch Break**
T.3a
Power-to-X

13:40 - 15:10

Chair: Prof. Dr. Jakub Kupecki

13:40  Power-to-X Technologies for a sustainable future
       Sebastian Pichler / MAN Energy Solutions

14:00  Power-to-X: From cement flue gas to value added products
       Alexander Beck / Net Zero Emission Labs

14:20  Design Parameter Optimization of a Membrane Reactor for
       Methanol Synthesis Using a Sophisticated CFD Model
       Theresa Hauth / TUM

14:45  A predictive chemical kinetic model for hydrazine
       decomposition
       Michal Keslin / Technion - IIT

15:10 - 17:00

POSTER SESSION
List can be found at the end of the document

COFFEE BREAK

15:30 - 17:00
Internal Project Meeting
REDEFINE H2E
Team & Strategic Advisory Board Meeting

CONFERENCE DINNER
The FACULTY Restaurant & Bar, next to the conference center.
**WEDNESDAY**

**09:00 - 10:30**

**PARALLEL SESSION**

**W.1a**  
**Plasma Utilization**

- **Chair:** Prof. Dr. Kentaro Umeki  
- **09:00**  
  A 50 kW Arc-Heated Plasma Torch for Hydrogen and Carbon Production via Methane Pyrolysis and for the Electrification of High Temperature processes  
  Hamid Reza Yousefi / PlasmaAir AG

- **09:20**  
  Plasma Reforming Technologies for Low Carbon Hydrogen Production  
  Bader Araisheed / Uni College London

- **09:40**  
  Green Hydrogen as an Alternative for Sustainable Glass Production  
  Nerijus Stirügas / Lithuanian Energy Institute

- **10:00**  
  Integration of electrically assisted processes coupled with the use of Hydrogen in the Glass-Making Industry  
  Andrius Tamosiunas / Lithuanian Energy Institute

**W.1b**  
**Biotechnology**

- **Chair:** Prof. Dr. Volker Sieber  
- **09:00**  
  Hydrogen-driven isobutanol production  
  Tenuun Bayaraa / TUM Campus Straubing

- **09:20**  
  Hydrogen-driven synthesis of chemicals in whole cells  
  Ammar Al-Shameri / TUM Campus Straubing

- **09:40**  
  Hydrogen-driven Isobutanol Production  
  Mayla Schulz / TUM Campus Straubing

- **10:00**  
  Hydrogen-driven synthesis of chemicals in whole cells  
  Dominik Siebert / TUM Campus Straubing

**COFFEE BREAK**

**11:00**  
**Keynote 04**  
R&D challenges for global-scale proton exchange membrane (PEM) based water electrolysis  
Prof. Dr. Hubert Gasteiger / Head of Chair of Technical Electrochemistry / TUM

**11:35 - 12:20**

**PARALLEL SESSION**

**W.2a**  
**Research Projects**

- **Chair:** Dr. Sebastian Fendt  
- **11:35**  
  H2-Reallabor Burghausen: Transformation of the chemical industry towards a hydrogen-based circular economy  
  Christian Hackl / Reallabor gGmbH

- **11:55**  
  SynergyFuels: where the bioeconomy meets the hydrogen economy  
  Júnior Staudt / TUM Campus Straubing

**W.2b**  
**Alternative Solid Feedstocks**

- **Chair:** tba.  
- **11:35**  
  Waste-to-Methanol: Techno-economic Comparison of Promising Methanol-Production Processes from Municipal Solid Waste  
  Sebastian Basteck / TUM

- **11:55**  
  High-Purity Hydrogen Production from Bark via Dual Fluidized Bed Steam Gasification  
  Veronica Gubin / TU Wien

**LUNCH BREAK**
### PARALLEL SESSION

#### AGENDA

**WEDNESDAY**

**13:20 - 15:10**

**W.3a**

**Chair:** tba.

- **13:20**
  - Entrained flow gasification of circular raw materials in the Swedish chemical industry
  - Frederik Welland / RISE

- **13:40**
  - Kinetics of Biomass Devolatilization with Thermal Plasma
  - Kentaro Umeki / Luleå University of Technology

- **14:00**
  - Numerical simulations of plasma-assisted biomass gasification in a vertical entrained flow gasifier
  - Robert Lewtak / Institute of Power Engineering

- **14:20**
  - Aleksandra Kiedrzynska / Institute of Power Engineering

**W.3b**

**Chair:** Prof. Dr. P.V. Aravind

- **13:20**
  - Dimethyl Ether as a Potential Vector for Large-Scale Hydrogen Import: Leveraging LNG Terminals for Hydrogen Import
  - Patrick Preuster / University of Applied Science Rosenheim

- **13:40**
  - Hydrogen and PtX fuel logistics for optimized Sustainable Aviation Fuel production for Bavaria
  - Leonard Moser / Bauhaus Luftfahrt

- **14:00**
  - A Concept for Data-Driven Decision Support in Renewable Hydrogen Supply Chains
  - Julian Stang / TUM

- **14:20**
  - Circular economy strategies for green electrolyzer supply chains
  - Sarah Hasslacher / TUM Campus Straubing

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**COFFEE BREAK**

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**15:30 - 17:00**

**W.4a**

**Chair:** Prof. Dr. Johannes Völkl

- **15:30**
  - Techno-economic and profitability assessment of stand-alone photoelectrochemical hydrogen generation technology
  - Chun Ting Yang / Fraunhofer CSP

- **16:10**
  - Optimal RES-Electrolyser Coupling- A Flexible Technoeconomic Assessment Tool
  - Nikolaos Skordoulas / NTUA

- **15:50**
  - Utilization of Oxygen from water electrolysis for applications in the chemical industry
  - Farnaz Badavi / University of Applied Science Rosenheim

- **16:30**
  - Reflecting the potential role of REDEFINE technologies in future low-emission energy system
  - Iryna Doronina / TUM

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**CLOSED & AWARDS**
Technical Tours

Please note:
The registration for the technical tour can be made via Converia

ChemDelta Bavaria

08:00
Meeting point in Garching in front of conference centre

08:15
Transfer to Gendorf

10:00 - 12:00
Visit of Westlake Vinnolit in Gendorf

12:00 - 14:00
Lunch break and transfer to Burghausen

14:00 - 16:00
Visit of WACKER Chemie in Burghausen

16:00
Transfer back to Garching (arrival before 18:00)

- The ChemDelta Bavaria is one of the largest chemical sites in Germany and only a short bus ride away from the conference venue
- Different companies will be visited
- Insight into the transformation and the application of current research in a real environment

TUM Campus Tour

09:30
Meeting point in Garching in front of conference centre

10:00 - 11:30
Max Planck IPP, nuclear fusion reactor

12:00 - 12:30
Chair of Energy Systems (Lab tour SOC)

12:30 - 13:30
Lunch break and networking

14:00 - 14:30
Chair of Energy Systems (Demo plants)

15:00 - 16:00
Chair of Technical Electrochemistry (Lab tour PEM)

- Tour includes several institutes from the fields of mechanical engineering, chemistry and process engineering
- It covers everything from laboratory-scale fundamental research to demonstration plants
- Topics range from hydrogen production to technologies for closed carbon cycles
<table>
<thead>
<tr>
<th>Title</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novel Definition of Renewable Energy and Sustainable Hydrogen Potential</td>
<td>Alina Kerschbaum</td>
</tr>
<tr>
<td>Optimization of Manifold Design to Minimize Thermal Gradients within a Solid Oxide Fuel Cell (SOFC) Stack</td>
<td>Chen Lin</td>
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<tr>
<td>Few layer MoS2 as a catalyst for the hydrodeoxygenation of fatty acids to alkanes</td>
<td>Fuli Deng</td>
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<tr>
<td>Investigations on Ce-doping of NiAlOx Catalysts for CO2 Methanation</td>
<td>Heike Piendl</td>
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<tr>
<td>Investigating the Influence of Thermal Plasma on Biomass Particles</td>
<td>Johannes Waßmuth</td>
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<td>Experimental Comparison of Plasma-Assisted Entrained Flow Gasification and Conventional Entrained Flow Gasification in a Pilot-Scale Gasifier</td>
<td>Jonas Brandstetter</td>
</tr>
<tr>
<td>Dynamic Operation and Optimization of a Containerized Pilot Plant for CO2-Based Methanol Production</td>
<td>Lukas Anthofer</td>
</tr>
<tr>
<td>Investigating Pyrolysis for Sustainable Waste-to-X Solutions</td>
<td>Lukas Martetschlager</td>
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<tr>
<td>Biomass-to-Liquid Opportunities: Sustainable Aviation Fuel from Queensland's Sugar Industry</td>
<td>Marcel Dossow</td>
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<td>Long-term optimization of an ideal chemical park considering various transformation paths to climate-neutrality</td>
<td>Maximilian Kerschbaum</td>
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<td>CFD Modeling of Plasma-Assisted Entrained Flow Gasification</td>
<td>Sebastian Willhelm</td>
</tr>
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<td>Sewage sludge treatment – substantial potential for phosphorous recovery and renewable synthesis of base chemicals</td>
<td>Simon Meillinger</td>
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<td>Electrolysis vs. Battery: Flexibility dynamics in Europe’s energy system amid varying renewable expansion rates</td>
<td>Stephan Mohr</td>
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<tr>
<td>Simulative comparison of Power-and-Biomass-to-Liquid pathways to produce sustainable aviation fuel from straw residues</td>
<td>Vincent Eyberg</td>
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<tr>
<td>Development and Design of a Pressurized Test Rig for Reversible Solid-Oxide Short Stacks</td>
<td>Sören Ohmstedt</td>
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