13th INTERNATIONAL MODELICA CONFERENCE
March 4–6, 2019
Ostbayerische Technische Hochschule Regensburg, Germany
Chair: Prof. Anton Haumer
PREFACE

The Modelica Conference is the main event for users, library developers, tool vendors and language designers to share their knowledge and learn about the latest scientific and industrial progress related to Modelica and to the Functional Mockup Interface.

Since the start of the collaborative design work for Modelica in 1996, Modelica has matured from an idea among a small number of dedicated enthusiasts to a widely accepted standard language for the modeling and simulation of cyber-physical systems. In addition, the standardization of the language by the non-profit organization Modelica Association enables Modelica models to be portable between a growing number of tools. Modelica is now used in many industries including automotive, energy and process, aerospace, and industrial equipment. Modelica is the language of choice for model-based systems engineering.

Highlights of the Conference:
- 76 oral presentations and 13 poster presentations,
- 4 libraries for the Modelica Library Award
- 2 Keynotes
- 7 Tutorials and 2 Industrial User Presentations Sessions
- 14 vendor sessions and 17 sponsors & exhibitors

CONFERENCE BOARD

- Prof. Anton Haumer, OTH Regensburg, Germany
- Dr. Hilding Elmqvist, Mogram, Sweden
- Prof. Peter Fritzson, Linköping University, Sweden
- Prof. Martin Otter, DLR, Germany
- Dr. Michael Tiller, Xogeny, USA

CONTENTS

Preface ................................................................. 2
Welcome .......................................................... 3
Modelica News .................................................. 3
Keynote: Modelica and virtual education ................. 4
Keynote: Simulation Guided Design for New Automotive Applications ........................................... 4
General Schedule ................................................ 5
Schedule / Program ............................................. 6
Social Program .................................................. 15
Practical Information .......................................... 15
Site Plan .......................................................... 16
Sponsors & Exhibitors ........................................ 18
I warmly welcome you to Regensburg, a city with history going back to Roman times, and to OTH the Technical University of Applied Sciences Regensburg. Starting with this conference, you will notice some changes: First, we are going to organize the International Modelica Conference every two years in spring. In the years between International Modelica Conferences, Modelica Conferences are organized on other continents with country specific focus.

Although in 2018 there have been two very successful conferences in Japan and the United States, we received 101 submissions from authors all over the world which have been thoroughly reviewed: 76 oral presentations and 13 posters will be presented.

Second, additional to the tutorials and vendor presentations on the first day of the conference, we are going to have Industrial User Presentations related to the Modelica Association Projects. These presentations are not included in the proceedings, but they should provide a nucleus for discussions and broadening the users groups.

I want to thank the members of the Program Committee for their work during the review process, as well as the members of the Organizing Committee – without their support this conference wouldn’t have been a success.

In the name of the Modelica Association that is co-organizing this event, I also would like to welcome you in Regensburg. It is now already the 13th conference on Modelica, the Functional Mockup Interface and related technology. Since the number of projects and standards of the Modelica Association is growing, we would like to give you an overview about the current status in the traditional “Modelica Association News” section on Tuesday morning: All the Modelica Association Project leaders will give a short overview about their project and about their future plans.
Modelica and virtual education

Dr. Christian Kral
TGM, Vienna, Austria

Abstract: Good education of engineering students requires theoretical knowledge and lots of calculation experience to better understand theory and applications. Laboratory courses are offered to better relate theory and practical understanding. Simulations even more improve the linking of theory and practice, as systemic thinking is supported. Students learn to understand the interaction of simple models and more advanced systems.

In the keynote speech two virtual education scenarios in engineering will be presented: First, a workflow of creating and evaluating calculation and simulation examples is proposed. The workflow is based on Modelica and the online tool Letto. Second, virtual lab experiments of electric machines and drives are shown. In the virtual lab Modelica variables are controlled and visualized by Labview. The presented approaches are possible steps in the direction of virtual education to improve and strengthen the students’ expertise and knowledge and with the particular intention to motivate students.

Bio: Christian Kral received the diploma and doctoral degrees from the Vienna University of Technology, Vienna, Austria, in 1997 and 1999, respectively. From 1997 to 2000, he was a Scientific Assistant in the Institute of Electrical Drives and Machines, Vienna University of Technology. Since 2001, he has been with the AIT Austrian Institute of Technology GmbH (the former Arsenal Research) in Vienna. From January 2002 until April 2003, he was a Visiting Professor at the Georgia Institute of Technology, Atlanta. Dr. Kral is teaching electric machines and drives at the higher college of engineering »TGM« in Vienna and the university of applied research, »Technikum Wien« since 2013. His research interests include the modeling and simulation of electrical systems, machines and drives. He is a member of the Austrian Electrotechnical Association (OVE) and the Modelica Association. Dr. Kral published over 150 scientific papers and one book on Modelica and the object oriented modeling of electric machines.

Simulation Guided Design for New Automotive Applications

Dr. Gerd Rösel
Continental, Regensburg, Germany

Abstract: The Automotive Industry has to cope with disruptive technology and business changes within the next decade. Connected vehicles become reality and drive the development to automated driving. New mobility solutions will have to answer shared economy demands. The regulatory requirement on significant reduction of CO₂- and pollutant emission leads to fast changing parallel development of additional propulsion systems in the same period. Consequently, the variety of solutions within a vehicle will have to serve a furthermore increasing complexity from embedded-systems to system-of-systems to cyber-physical-systems.

Simulation guided design is the key to handle such complexity in all areas of application for an automotive supplier to keep quality, time to market and costs under control. The speech covers the main directions of disruptive technology changes and examples of dedicated solutions. There will be examples given which cover virtual function development for embedded systems as well as solutions for predictive maintenance and connected energy management as system-of-systems. The focus will be to point out the necessity to design and optimize such systems by simulation.

Bio: Dr. Gerd Rösel is heading the departments Advanced System Engineering for Engine Systems (since 2015) as well as Hybrid Electric Vehicle Business Unit (since 2018) for Continental Powertrain. The application and further development of simulation methodologies is a significant building block in these responsibilities. The variety in simulation technology covers propulsion system simulation as well as specialized simulation in areas like electric machines, mixture formation and NVH.

From 1996 until 2015 he has been responsible in different positions for Gasoline- and Diesel-System-Development for serial and advanced applications. From 1992 to 1997 he was a research associate at Technical University of Dresden and finished with the graduation of Dr.-Ing. in 1997. The Diploma degree in electrical engineering from Technical University of Dresden was achieved in 1992.
### GENERAL SCHEDULE

**Monday, March 4**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>13:00 – 16:30</td>
<td>Industrial User Presentations and Tutorials</td>
</tr>
<tr>
<td>16:30 – 17:00</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>17:00 – 19:15</td>
<td>Vendor Sessions</td>
</tr>
<tr>
<td>19:15 – 19:30</td>
<td>Short Break</td>
</tr>
<tr>
<td>19:30</td>
<td>Welcome Reception</td>
</tr>
</tbody>
</table>

**Tuesday, March 5**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:00 – 09:15</td>
<td>Welcome</td>
</tr>
<tr>
<td>09:15 – 09:45</td>
<td>Modelica News</td>
</tr>
<tr>
<td>09:45 – 10:30</td>
<td>Keynote 1: Dr. Christian Kral, Vienna, Austria Modelica and virtual education</td>
</tr>
<tr>
<td>10:30 – 11:00</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>11:00 – 12:15</td>
<td>Session 1A: Buildings 1  Session 1B: Power&amp;Energy 1  Session 1C: FMI 1  Session 1D: Automotive 1</td>
</tr>
<tr>
<td>12:15 – 13:45</td>
<td>Lunch</td>
</tr>
<tr>
<td>13:45 – 15:00</td>
<td>Session 2A: Buildings 2  Session 2B: Power&amp;Energy 2  Session 2C: FMI 2  Session 2D: Electrical Power 2</td>
</tr>
<tr>
<td>15:00 – 15:30</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>15:30 – 17:00</td>
<td>Postersession</td>
</tr>
<tr>
<td>17:00 – 18:40</td>
<td>Session 3A: HVAC  Session 3B: Language  S. 3C: Mechanics&amp;Transport  Session 3D: New Applications</td>
</tr>
<tr>
<td>18:40 – 20:00</td>
<td>Transfer to Dinner Location</td>
</tr>
<tr>
<td>20:00</td>
<td>Conference Dinner at the Castle of Emmeram</td>
</tr>
</tbody>
</table>

**Wednesday, March 6**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 09:15</td>
<td>Keynote 2: Dr. Gerd Rösel, Regensburg, Germany Simulation Guided Design for New Automotive Applications</td>
</tr>
<tr>
<td>09:15 – 09:30</td>
<td>Short Break</td>
</tr>
<tr>
<td>09:30 – 10:45</td>
<td>Session 4A: Power&amp;Energy 3  Session 4B: Automotive 2  Session 4C: Aerospace  Session 4D: Numerical Methods</td>
</tr>
<tr>
<td>10:45 – 11:15</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>11:15 – 12:30</td>
<td>Session 5A: Buildings 3  Session 5B: Power&amp;Energy 4  Session 5C: Thermodynamic 1  Session 5D: Electrical Power 2</td>
</tr>
<tr>
<td>12:30 – 14:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>14:00 – 15:15</td>
<td>Session 6A: Buildings 4  Session 6B: Thermodynamic 2  Session 6C: Tools  Session 6D: Automotive 3</td>
</tr>
<tr>
<td>15:15 – 15:30</td>
<td>Short Break</td>
</tr>
<tr>
<td>15:30 – 15:45</td>
<td>Closing Session</td>
</tr>
</tbody>
</table>
13:00 –16:30  Industrial User Presentations and Tutorials

**Industrial User Presentations**
- FMI+DCP+SSP

**Tutorial**
- Livio Mariano / Altair
  Connecting Separated Worlds for True Multidisciplinary System Simulation – by Using Altair Activate™

**Tutorial**
- Peter Fritzson / OSMC et al
  Introduction to Modeling, Simulation, Debugging, and Julia Interoperability with Modelica and OpenModelica

**Tutorial**
- Livio Mariano / Altair
  LANG+LIB

**Tutorial**
- Peter Fritzson / OSMC et al
  Introduction to FMI including Model-Exchange and Co-simulation, SSP, and Graphic Editing of Composite FMI Models

**Tutorial**
- Thomas Beutlich / ESI Group
  Creating and Working with Modelica-State-Machines

**Tutorial**
- Edmund Widl / AIT
  The FMI++ Python Interface: A Python package for importing and exporting FMUs

**Tutorial**
- Lennart Ochel and Robert Braun / OSMC
  Hacking FMI

**Tutorial**
- Peter Fritzson / OSMC et al
  OpenModelica Status and News

**Tutorial**
- Edmund Widl / AIT
  The FMI++ Python Interface: A Python package for importing and exporting FMUs

**Tutorial**
- Lennart Ochel and Robert Braun / OSMC
  Introduction to FMI including Model-Exchange and Co-simulation, SSP, and Graphic Editing of Composite FMI Models

**Tutorial**
- Torsten Sommer / Dassault Systemes
  Hacking FMI

**Tutorial**
- Andreas Heckmann / DLR
  Modeling and Simulation of Railway Dynamics in Modelica

16:30 –17:00  Coffee Break

17:00 –19:15  Vendor Sessions

**Altair**
- Michael Hoffmann
  Altair’s Open Integration Platform for Multi-Disciplinary System Simulation

**ESI Group**
- Alex Magdanz
  SimulationX 4.0: What’s new?

**OSMC**
- Peter Fritzson et al
  OpenModelica Status and News

**Modelon**
- Jiří Navrátil and Johan Windahl
  Making an Impact with Modelica and FMI

**Manentia**
- Jose Juan Hernandez Cabrera
  Daccsim NG: co-simulation made simpler and faster

**Dassault Systemes**
- Dag Brück et al
  Recent updates and candidate directions for development in Dymola and 3DEXPERIENCE

**Wolfram**
- Jan Brugard
  Providing Modelica to millions of users

**Maplesoft**
- Thomas Richard
  MapleSim 2018 and Expanded FMI Support

**Berühren de Transport d’Electricité RTE**
- Adrien Guiroonnet et al
  Dynauo, an open source hybrid C++/Modelica tool for power system simulations

**Concurrent**
- Ramesh Praveenkumar
  Running FMUs in real-time under Simulation Workbench (SimWB)

18:30 –19:15  Short Break

19:15 –19:30  Welcome Reception

19:30  Welcome Reception
INDUSTRIAL USER PRESENTATIONS

<table>
<thead>
<tr>
<th>FMI + DCP + SSP</th>
<th>LANG + LIB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Torsten Blochwitz, Andreas Junghanns, Martin Krammer, Jochen Köhler</td>
<td>Hans Olsson and Thomas Beutlich</td>
</tr>
<tr>
<td>Overview over standards FMI + DCP + SSP</td>
<td>Status and further development of Language and Libraries</td>
</tr>
<tr>
<td>Dirk Frerichs, Giuseppe Maggi Trovato, Samuel Lago Places and Karl Michael Hahn</td>
<td>Mathieu Caujolle and Markus Andres</td>
</tr>
<tr>
<td>Quality Assurance trough Management of Model Meta Data</td>
<td>Modeling and simulating hybrid distribution networks with EPSL</td>
</tr>
<tr>
<td>Christian Bertsch</td>
<td>Manuel Gräber, Jennifer Puschke, Tobias Henß, Eugen Dering, Andreas Pillekeit, Christian Schulze</td>
</tr>
<tr>
<td>Tim Schenk, Andrés Botero Halblaub and Jan Christoph Wehrstedt</td>
<td>Jungdo Kee, Daeh K Kang, Kwang-Woo Lee and Seung-Jin Heo</td>
</tr>
<tr>
<td>Co-Simulation scenarios in industrial production plants</td>
<td>Development of MODELICA based vehicle dynamic model considering limited handling for FAD controller</td>
</tr>
<tr>
<td>Magnus Eek and Robert Hällqvist</td>
<td>Rafal Bryk, Holger Schmidt, Thomas Mull, Ingo Ganzmann and Oliver Herbst</td>
</tr>
<tr>
<td>Enhancing the Model Integration Workflow in Aircraft System Simulation using FMI &amp; SSP</td>
<td>Modeling of Self-Driven Processes in Passive Safety Systems of III+ Generation BWR</td>
</tr>
<tr>
<td>Nadja Marko, Hannes Schneider, Andreas Biehn and Jonas Rübsam</td>
<td></td>
</tr>
<tr>
<td>Simulation of sensor models for testing ADAS using DCP</td>
<td></td>
</tr>
<tr>
<td>Juan Carlos Mendo, Barja Garcia and Alejandro Torres</td>
<td></td>
</tr>
<tr>
<td>Enabling Standardized Distributed Co-Simulation at Boeing</td>
<td></td>
</tr>
<tr>
<td>Andreas Soppa, Sinan Balci and Martin Benedikt</td>
<td></td>
</tr>
<tr>
<td>DCP application use-cases at Volkswagen AG</td>
<td></td>
</tr>
</tbody>
</table>
**SCIENTIFIC PROGRAM – TUESDAY MORNING**

**9:00 – 09:15**  Welcome

**9:15 – 09:45**  Modelica News

**9:45 – 10:30**  Keynote 1: Dr. Christian Kral, Vienna, Austria | Modelica and virtual education

**10:30 – 11:00**  Coffee Break

**11:00 – 12:15**
- Raymond Sterling, Jesús Febres, Andrea Costa, Adeleh Mohammadi, Rafael Carrillo, Baptiste Schubnel, Yves Stauffer, Pietro De Cinque, Krzysztof Klobut, Marcus Keane
  - A virtual test-bed for building Model Predictive Control developments

- Jovan Brkic, Muaz Ceran, Mohamed Elmoghazy, Anton Haumer, Christian Kral
  - Open Source PhotoVoltaics Library for Systemic Investigations

- Lennart Ochel, Robert Braun, Bernhard Thiele, Adeel Asghar, Lena Buffoni, Magnus Eek, Peter Fritzson, Dag Fritzson, Sune Horkeby, Robert Hällquist, Åke Kinnander, Arunkumar Palanisamy, Adrian Pop, Martin Sjölund
  - OMSimulator – Integrated FMI and TLM-based Co-simulation with Composite Model Editing and SSP

**10:00 – 10:25**
- Moritz Lauter, Dirk Müller
  - Characterization of Linear Reduced Order Building Models Using Bode Plots

- Mareike Leimeister
  - Python-Modelica Framework for Automated Simulation and Optimization

- Lars Haraldsdóttir, Houxiang Zhang, Arne Styve, Geir Hovland
  - FMU-proxy: A Framework for Distributed Access to Functional Mock-up Units

**11:25 – 11:50**
- Christoph Nytsch-Geusen, Jörg Rödler, Martin Thoms, Carles Ribas Lagopes, Christoph Nytsch, Stefan Curtius, Robert Fritzsche, Sune Hørkeby, Robert Hallquist, Åke Kinnander, Arunkumar Palanisamy, Adrian Pop, Martin Sjölund
  - Anti-Roll Bar Model for NVH and Vehicle Dynamics Analyses

  - System level test-pump model for investigations into thermal management of flow temperatures

**11:50 – 12:15**
- Christoph Nytsch-Geusen, Jörg Rödler, Martin Thoms, Carles Ribas Lagopes, Christoph Nytsch, Stefan Curtius, Robert Fritzsche, Sune Hørkeby, Robert Hallquist, Åke Kinnander, Arunkumar Palanisamy, Adrian Pop, Martin Sjölund
  - Diesel Cooling System Modeling for Electrification Potential

- John Batteh, Aishok Kumari Rao, Dale Pickelman
  - Demand-oriented Modelling of Coupled Energy Grids

- Martin Krammer, Klaus Schuch, Christian Kater, Khaled Alekeish, Torsten Blochwitz, Stefan Materne, Andreas Soppa, Martin Benedikt
  - Standardized Integration of Real-Time and Non-Real-Time Systems: The Distributed Co-Simulation Protocol

**12:15 – 13:45**  Lunch

**10:00 – 10:15**  Welcome

**10:15 – 10:45**  Modelica News

**10:45 – 11:30**  Keynote 1: Dr. Christian Kral, Vienna, Austria | Modelica and virtual education

**11:30 – 12:00**  Coffee Break

**12:00 – 13:00**  Keynote 2: Prof. Dr. Christian Kral, Vienna, Austria | Modelicaags and virtual education
<table>
<thead>
<tr>
<th>Time</th>
<th>Session 2A: Buildings 2</th>
<th>Session 2B: Power&amp;Energy 2</th>
<th>Session 2C: FMI 2</th>
<th>Session 2D: Electrical Power 2</th>
</tr>
</thead>
</table>
| 13:45–15:00 | Nadine Aoun, Roland Bavière, Mathieu Vallée, Adrien Brun, Guillaume Sandou  
Dynamic Simulation of Residential Buildings Supporting the Development of Flexible Control in District Heating Systems | Torsten Schwan, Ole Ziesler, Tom Eckhardt, Rene Unger  
A Modelica-Based Framework for District Heating Grid Simulation | Claire-Eleuthériane Gerrer, Sylvain Girard  
Non Linear Dimension Reduction of Dynamic Model Output | Alexander Grimm, Anton Haumer  
Parametrization of a Simplified Physical Battery Model |
| 13:45–14:10 | Filip Jorissen, Lieve Helsen  
Integrated Modelica Model and Model Predictive Control of a Terraced House Using IDEAS | Abdulrahman Dahash, Annette Steingrube, Mehmet Elci, Fabian Ochs  
Relative Consistency and Robust Stability Measures for Sequential Co-simulation | Mads Nannestad, Benoît Bidoggia, Zhe Zhang, Tiberiu-Gabriel Zsurzsan, Kasper Skriver  
Modeling of transformer-rectifier sets for the energization of electrostatic precipitators using Modelica |
| 14:10–14:35 | Scott Bortoff, Christopher Laughman  
An Extended Luenberger Observer for HVAC Application using FMI | Michael Mans, Tobias Blacha, Peter Remmen, Dirk Müller  
Automated model generation and simplification for district heating and cooling networks | Kenji Sawada, Mamoru Sakura, Osamu Kaneko, Seichi Shin, Isao Matsuda, Toru Murakami  
Energy balance based Verification for Model Based Development | Alberto Romero, Alejandro Goldar, Emanuele Garone  
A Model Predictive Control Application for a Constrained Fast Charge of Lithium-ion Batteries |

**15:00 - 15:30** Coffee Break

**15:30 - 17:00** Postersession | Forum Building K
10:00 – 17:00

Hans Olsson
Flow Network based Diagnostics for Incorrect Synchronous Models

Masatomo Inui, Tomohisa Fujinuma
Study on Efficient Development of 1D CAE Models of Mechano-Electrical Products

Jan-Peter Heckel, Christian Becker
Advanced Modeling of Electric Components in Integrated Energy Systems with the TransiEnt Library

Andreas Nicolai, Anne Paepcke, Hauke Hirsch
Robust and accurate co-simulation master algorithms applied to FMI slaves with discontinuous signals using FMI 2.0 features

Yutaka Watanabe, Toru Takahashi

Jose Evora, Jose Juan Hernandez Cabrera, Jean-Philippe Tavella, Stéphane Vialle, Enrique Kremers, Loïc Frayssinet
Daccosim NG: co-simulation made simpler and faster

Atiyah Elsheikh
der(x,p) ? Applications and Computational Methods of Dynamic Parameter Sensitivities

Bingrui Bao, Junfeng Guo, Boakun Zhang, Fanli Zhou
Frequency Response Estimation Method for Modelica Model and Frequency Estimation Toolbox Implementation

Yangyang Fu, Xing Lu, Wangda Zuo
Modelica Models for the Control Evaluations of Chilled Water System with Waterside Economizer

Sooncheol Park, Youngwon Jeon, Dae-Oh Kang, Min-Su Hyun, Seung-Jin Heo
Predicting the vehicle performance at an early stage of development process via suspension bush design tool

Yuhui Liu, Liping Chen, Yan Zhao, Shanshan Liu, Fanli Zhou, Duansen Shangguan
Modelica-Based Modeling and Application Framework on the Hybrid Electric Vehicles

John Webster, Carsten Bode
Implementation of a Non-Discretized Multiphysics PEM Electrolyzer Model in Modelica

Jean-Philippe Chancellor, Sébastien Furic, Pierre Weis
Translating Simulink Models to Modelica using the \{NSP\} Platform
### Session 3A: HVAC

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:25 – 17:50</td>
<td>Wenyi Wang, Yaoyu Li</td>
<td>Real-time optimization of intermediate temperature for a cascade heat pump via extreme seeking</td>
</tr>
<tr>
<td>17:50 – 18:15</td>
<td>Zhenning Li, Hongtao Qiao, Vikrant Aute</td>
<td>Tube-fin Heat Exchanger Circuitry Optimization For Improved Performance Under Frosting Conditions</td>
</tr>
<tr>
<td>18:15 – 18:40</td>
<td>Hongtao Qiao, Saleh Nabi, Xu Han, Christopher Laughman</td>
<td>Coupled Simulation of a Room Air-conditioner with CFD Models for Indoor Environment</td>
</tr>
</tbody>
</table>

### Session 3B: Language

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:00 – 17:25</td>
<td>Christoff Bürger</td>
<td>Modelica language extensions for practical non-monotonic modelling: on the need for selective model extension</td>
</tr>
<tr>
<td>17:25 – 17:50</td>
<td>Peter Fritzson, Adrian Pop, Martin Sjölund, Adee Asghar</td>
<td>MetaModelica – A Symbolic-Numeric Modelica Language and Comparison to Julia</td>
</tr>
<tr>
<td>17:50 – 18:15</td>
<td>Bernhard Thiele, Bernt Lie, Martin Sjölund, Adrian Pop, Peter Fritzson</td>
<td>Controller Design for a Magnetic Levitation Kit using OpenModelica's Integration with the Julia Language</td>
</tr>
</tbody>
</table>

### Session 3C: Mechanics & Transport

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:00 – 17:25</td>
<td>Andreas Heckmann, Marc Ehret, Gustav Grether, Alexander Keck, Daniel Lüdicke, Christoph Schwarz</td>
<td>Overview on the DLR RailwayDynamics Library</td>
</tr>
<tr>
<td>17:25 – 17:50</td>
<td>Scott Bortoff</td>
<td>Using Baumgarte’s Method for Index Reduction in Modelica</td>
</tr>
<tr>
<td>17:50 – 18:15</td>
<td>Tatsuro Ishibashi, Tadao Kawai</td>
<td>Modeling of Rotating Shaft with Partial Rubbing</td>
</tr>
<tr>
<td>18:15 – 18:40</td>
<td>Martin Kuhn, Yang Ji, Bo Wang, Xiang Li, Bohui Liu, Feng Sha, Dunwen Gan, Feng Gao</td>
<td>Aspects of Train Systems Simulation</td>
</tr>
</tbody>
</table>

### Session 3D: New Applications

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>17:00 – 17:25</td>
<td>Andreas Heckmann, Marc Ehret, Gustav Grether, Alexander Keck, Daniel Lüdicke, Christoph Schwarz</td>
<td>Overview on the DLR RailwayDynamics Library</td>
</tr>
<tr>
<td>17:25 – 17:50</td>
<td>Michael Tiller</td>
<td>Modeling Supply and Demand in Modelica</td>
</tr>
<tr>
<td>17:50 – 18:15</td>
<td>John Redford, Ana Bisinella, Jean-Philippe Saut, Jacques Robert, Maria Albuquerque, Jean-Pierre Merland, Jean-Michel Ghidaglia</td>
<td>Modelica Modelling of an Ammonia Stripper</td>
</tr>
<tr>
<td>18:15 – 18:40</td>
<td>Andrea Neumayr, Martin Otter</td>
<td>Algorithms for Component-Based 3D Modeling</td>
</tr>
</tbody>
</table>

### Other Events

- **18:40 – 20:00** Transfer to Dinner Location
- **20:00** Conference Dinner at the Castle of Emmeram
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30 – 09:15</td>
<td>Keynote 2: Dr. Gerd Rösel, Regensburg, Germany</td>
</tr>
<tr>
<td>09:15 – 09:30</td>
<td>Short Break</td>
</tr>
<tr>
<td>09:30 – 10:45</td>
<td>Session 4A: Power &amp; Energy 3</td>
</tr>
<tr>
<td></td>
<td>Johan Windahl, Håkan Runvik, Stephane Velut</td>
</tr>
<tr>
<td></td>
<td>Romain Gillot, Alessandra Picarelli, Mike Dempsey</td>
</tr>
<tr>
<td></td>
<td>Duansen Shangguan, Liping Chen, Jianwan Ding, Yuhui Liu</td>
</tr>
<tr>
<td></td>
<td>Erik Henningsson, Hans Olsson, Luigi Vanfretti</td>
</tr>
<tr>
<td>09:30 – 10:45</td>
<td>Session 4B: Automotive 2</td>
</tr>
<tr>
<td></td>
<td>Carsten Bode, Gerhard Schmitz</td>
</tr>
<tr>
<td></td>
<td>Nikolas Schröder, Oliver Lenord, Ralph Lange</td>
</tr>
<tr>
<td></td>
<td>Max Arzberger, Dirk Zimmer</td>
</tr>
<tr>
<td></td>
<td>Rebeka Farkas, Gábor Bergmann, Ákos Horváth</td>
</tr>
<tr>
<td>09:30 – 10:45</td>
<td>Session 4C: Aerospace</td>
</tr>
<tr>
<td></td>
<td>Anh Nguyen, John Batteh</td>
</tr>
<tr>
<td></td>
<td>Artem Kolesnikov, Dzmitry Tretiak, Morgan Cameron</td>
</tr>
<tr>
<td></td>
<td>Daniel Milz, Christian Weiser, Franciscus van der Linden, Matthias Hellerer, Andreas Seefried, Tobias Berlmann</td>
</tr>
<tr>
<td></td>
<td>Christian Schulze, Andreas Varchmin, Wilhelm Tegethoff</td>
</tr>
<tr>
<td>10:45 – 11:15</td>
<td>Coffee Break</td>
</tr>
</tbody>
</table>
**11:15 – 12:30**

<table>
<thead>
<tr>
<th>Session 5A: Buildings 3</th>
<th>Session 5B: Power&amp;Energy 4</th>
<th>Session 5C: Thermodynamic 1</th>
<th>Session 5D: Electrical Power 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hauke Hirsch, Andreas Nicolai, Hans Petzold</td>
<td>Luis Corona Mesa-Moles, Jean-Philippe Argaud, Audrey Jardin, Amine Benissy, Yulu Dong</td>
<td>Dirk Zimmer</td>
<td>Biswarup Mukherjee, Luigi Vanfretti</td>
</tr>
</tbody>
</table>

11:15 – 11:40

| Queralt Altes-Buch, Sylvain Quoilin, Vincent Lemort | Yangyang Fu, Sen Huang, Draguna Vrabie, Wangda Zuo | Martin Otter, Hilding Elmqvist, Dirk Zimmer, Christopher Laughman | Marcelo de C. Fernandes, Luigi Vanfretti, Janaina G. de Oliveira, Maxime Baudette |

11:40 – 12:05

| Ryan Rogers, Vickram Lakhian | Tobias Ramm, Mathias Ehrenwirth, Tobias Schrag | Maximilian Hebeler, Christian Schulze, Wilhelm Tegethoff, Jürgen Köhler | Andrea Bartolini, Francesco Casella, Adrien Guironnet |

12:05 – 12:30

**Lunch**
## Session 6A: Buildings 4

**Bruno Hadengue, Andreas Scheidegger, Eberhard Morgenroth, Tove A. Larsen**

The WaterHub Modules: Material and Energy Flow Analysis of Domestic Hot Water Systems

**Maximilian Kormann, Imke Lisa Krüger**

Application of a Real Gas Model by Van-der-Waals for a Hydrogen Tank Filling Process

**Maximilian Kormann, Imke Lisa Krüger**

Application of a Real Gas Model by Van-der-Waals for a Hydrogen Tank Filling Process

**Adrian Pop, Per Östlund, Francesco Casella, Martin Sjölund, Rüdiger Franke**

A New OpenModelica Compiler High Performance Frontend

**Weitao Chen, Shenhai Ran, Bengt Jacobson**

Integration and Analysis of EPAS and Chassis System in FMI-based co-simulation

### 14:00 – 15:15

- 14:00 – 14:25
  - Anna Vannahme, Tobias Schrag, Mathias Ehrenwirth, Tobias Ramm
  - Comparison of a usual heat-transfer-station with a hydraulic modified version under the aspect of exergy saving

- 14:25 – 14:50
  - Sukhwinder Singh, Gerhard Schmitz, Bodo Mickan
  - Modeling of the Flow Comparator Prototype as New Primary Standard for High Pressure Natural Gas Flow Metering

- 14:50 – 15:15
  - Theodor Ensbury, Mike Dempsey, David Briant
  - Virtual Proving Ground Testing: Deploying Dymola and Modelica to recreate Full Vehicle Proving Ground Testing Procedures

### 14:25 – 14:50

- 14:25 – 14:50
  - Bernt Lie, Arunkumar Palanisamy, Alachew Mengist, Lena Buffoni, Martin Sjölund, Adeel Asghar, Adrian Pop, Peter Fritzson
  - OMJulia: An OpenModelica API for Julia-Modelica Interaction

### 14:50 – 15:15

- 14:50 – 15:15
  - Anne Senkel, Carsten Bode, Gerhard Schmitz
  - Evaluating the Resilience of Energy Supply Systems at the Example of a Single Family Dwelling Heating System

- 15:15 – 15:30
  - Short Break

- 15:30 – 15:45
  - Closing Session
The Conference Dinner will take place on Tuesday, March 5, 2019, 20:00 in the riding hall of the Castle of Emmeram, Emmeramsplatz, Regensburg.

It is located in walking distance (approximately 2 km) from the Conference venue as well as from many hotels.

However, for your convenience we will provide a bus shuttle from the Conference venue to the Dinner location. We ask for your understanding that the bus can’t stop at the hotels during this short ride. After the dinner, we provide a bus shuttle from the Dinner location at least to the recommended hotels:
https://www.modelica.org/events/modelica2019/subpages/travellingaccomodation

Application Access
Download from Google Play or App Store the application Modelica 2019.

Proceedings

WiFi Connection
Information about the free wireless Internet will be available at the Conference Registration desk.

Registration Desk
The registration desk is open from Monday March 4 2019 12:00 throughout the whole conference.

Parking
Visitors coming by car should use the A3 and A93 “Autobahnen”. Take the “Universität/Klinikum” exit then follow the signs to “Universität/Fachhochschule”. This takes you to Galgenbergstrasse. The car park is on Galgenbergstrasse on the left hand side between the buildings of the University of Regensburg and OTH Regensburg.

Voltage
Electricity in Germany is 230 Volts, alternating at 50 Hertz. The used power sockets are 2 round pin plugs (Type C and E).

Emergency Numbers
112 – European Emergency Number
(Fire Service, Emergency Medical Service)
110 – Police
International Dialing Code of Germany +49

Tourist Information
For more information about Regensburg, please go to http://www.tourismus.regensburg.de

Regensburg City Transport Fares
Take bus number 6 operated by Regensburg Integrated Transport. Then alight at the „Tech Campus“ (Galgenbergstraße).
Passengers have to purchase their tickets before boarding the vehicle or entering the RVV system. The ticket is valid only if marked in the validation machine. Tickets can be bought in the bus or via RVV-App.
For more information: http://www.rvv.de
Or download the application RVV-App from Google Play or App Store.
to reach S053: some steps downstairs  

to reach S101 | S103: first staircase on the left
SPONSORS & EXHIBITORS

Bronze Sponsors & Exhibitors

Silver Sponsors & Exhibitors
Gold Sponsors & Exhibitors

Gaio Technology provides tools and engineering services for Model-based development and System/Software Verification and Evaluation. Our biggest customer is the automotive industry, including both classic domains as well as the newer fields like AD/ADAS. We developed our own simulator for more than a hundred different MPU/MCU's, and use this technology to provide tools and solutions for Virtual Testing and ECU Simulation. We have enough experience and many successful projects using mathematical, E/E or physical models allowing coupled simulation. For more details and/or tool demos please come visit our booth or our Vendor Session on Monday March 4th, 18:30.

Today's dreams need tomorrow's engineering.

Simcenter: Engineer innovation.

Getting a dream rolling has never been more challenging. Products are smarter. Manufacturing processes are more complex. And design cycles are shorter than ever. Simcenter software can help. With its unique combination of multi-disciplinary simulation, advanced testing and data analytics, Simcenter gives you the power to explore alternatives faster, predict performance more accurately... and deliver innovation with greater confidence.
Platin Sponsors & Exhibitors

An Open Integration Platform for Multi-Disciplinary System Simulation

Download a free trial at altair.com/Activate

DYMOLA and MODELICA
Since 1999

LTX
Simulation GmbH

- Modelica Libraries from DLR, TLK, XRG and others
- Sales & technical support for Dymola
- Automation and post-processing based on SCORE
  DaVE
  MoBA Lab
- Model development for thermal systems
- Training on Modelica and Dymola

Please visit our booth for hands-on experience of our tools.