
MODELICA
6th
INTERNATIONAL
MODELICA
CONFERENCE
March 3-4, 2008
Bielefeld, Germany
Program
AMMO
Applied Mathematical Modeling & Optimization

6th INTERNATIONAL MODELICA CONFERENCE

MODELICA

Welcome to the Modelica Conference 2008!

The first International Modelica Conference took place in October 2000 in Lund, Sweden. Since then, Modelica has increasingly become the preferred language tool for physical modelling of complex systems. This is indicated by the high number of registrations from industry and science at the 6th International Modelica Conference held between 3rd and 4th March 2008 at the University of Applied Sciences, Bielefeld, Germany. It is also indicated by the number of excellent papers submitted to the program committee which made the task of selecting papers for oral and poster presentation very difficult and, last but not least, by the exhibition during the conference at which several companies will be represented. This volume contains the papers of the 68 oral presentations and 14 poster presentations at the conference. The ability of Modelica as a multi domain simulation language is demonstrated impressively by the various fields the papers are covering.

Due to the special features of the Modelica language, such as object-oriented modelling and the ability to reuse and exchange models, Modelica strongly supports an integrated engineering design process. Thus in various fields Modelica has become the standard tool for model exchange between suppliers and OEM's. A key issue for the success of Modelica is the continuous development of the Modelica language as well as the Modelica Standard Library under strict observance of compatibility to previous versions by the Modelica Association. The broad base of private and institutional members of the Modelica Association as a non-profit organization ensures language stability and security in software investments.

The 6th International Modelica conference was organized by the Modelica Association and the University of Applied Sciences, Bielefeld, Germany. I would like to thank the local organizing committee, the technical program committee and the reviewers for offering their time and expertise throughout the organization of the conference. Together with the entire team of the local organizing committee I would like to wish all participants an excellent and fruitful conference.

Bielefeld, March 1st, 2008

Bernhard Bachmann

Program Chair

Prof. Dr. Bernhard Bachmann
University of Applied Sciences
Bielefeld, Germany

Program Board

- Prof. Martin Otter, DLR, Oberpfaffenhofen, Germany
- Prof. Peter Fritzson, Linköping University, Sweden
- Dr. Hilding Elmqvist, Dynasim AB, Lund, Sweden
- Dr. Michael Tiller, Emmeskay Inc., Michigan, USA

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- Dr. Rüdiger Franke, ABB, Heidelberg, Germany
- Rui Gao, Dassault Systèmes K.K., Nagoya, Japan
- Anton Haumer, Technical Consulting, Vienna, Austria
- Dr. Christian Kral, arsenal research, Vienna, Austria
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- Kilian Link, Siemens AG, Erlangen, Germany
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- Dr. Ramine Nikoukhah, INRIA, Le Chesnay Cedex, France
- Franz Pirker, arsenal research, Vienna, Austria
- Prof. Gerhard Schmitz, Technical University Hamburg-Harburg, Germany
- Peter Schneider, Fraunhofer IIS/EAS, Dresden, Germany
- Dr. Edward D. Tate, General Motors, Michigan, USA
- Dr. Wilhelm Tegethoff, TLK-Thermo GmbH, Braunschweig, Germany
- Dr. Hubertus Tummescheit, Modelon AB, Lund, Sweden
- Dr. Andreas Uhlig, ITI GmbH, Dresden, Germany

Local Organizing Committee

- Prof. Dr. Bernhard Bachmann
- Dr. Elke Koppenrade
- Jens Schönbohm
- Ralf Derdau
- Eveni, Konferenz-Management-Software, www.eveni.com
- Bielefeld Marketing GmbH, www.bielefeld-marketing.de

Technical Program

Sunday, March 2nd	
17:00-20:00	Reception, Hotel Mercure Bielefeld City
Monday, March 3rd	
08:15 -11:00	Tutorial 1 • Introduction to O-O Modeling and Simulation with OpenModelica
	Tutorial 2 • Mathematical Aspects of Modeling and Simulation with Modelica
	Tutorial 3 • Simulation of Electric Machines and Drives using the Machines …
	Tutorial 4 • Modeling of Thermodynamic Systems using Modelica_Fluid …
	Tutorial 5 • Simulation of Rigid and Flexible Multibody Systems
11:00-11:20	Coffee Break
11:20-11:35	Welcome and opening of the Conference
11:35-12:05	Keynote Ulrich Kramer, Christian Schröder | FH Bielefeld
12:05-12:20	Keynote Martin Otter | Chairman of the Modelica Association
12:20-13:20	Lunch
13:20-14:35	Session 1a • Language, Tools and Algorithms
	Session 1b • Language, Tools and Algorithms
	Session 1c • Automotive Applications
	Session 1d • Electric Systems & Applications
14:35-15:00	Coffee Break
15:00-16:15	Session 2a • Language, Tools and Algorithms
	Session 2b • Thermodynamic Systems & Applications
	Session 2c • Mechanical Systems & Applications
	Session 2d • Electric Systems & Applications
16:15-16:25	Coffee Break
16:25-16:55	Vendor Session
16:55-17:00	Coffee Break
17:00-18:00	Vendor Session
18:00-20:00	Transfer to hotels, then to Ravensberger Park
20:00-23:00	Conference Dinner and Award Ceremony
Tuesday, March 4th	
08:30-10:10	Session 3a • Language, Tools and Algorithms
	Session 3b • Thermodynamic Systems & Applications
	Session 3c • Automotive Applications
	Session 3d • Electric Systems & Applications
10:10-10:40	Coffee Break
10:40-12:20	Session 4a • Language, Tools and Algorithms
	Session 4b • Thermodynamic Systems & Applications
	Session 4c • Automotive Applications
	Session 4d • Mechanical Systems & Applications
12:20-13:20	Lunch
13:20-14:20	Poster Session
14:20-14:35	Coffee Break
14:35-15:50	Session 6a • Language, Tools and Algorithms
	Session 6b • Language, Tools and Algorithms
	Session 6c • Thermodynamic Systems & Applications
	Session 6d • Mechanical Systems & Applications
15:50-16:00	Coffee Break
16:00	Closing the Modelica'2008 conference

Tutorial 1
Introduction to Object-Oriented Modeling and Simulation with OpenModelica

Tutors	Adrian Pop, Håkan Lundvall, Peter Bunus, Peter Fritzson University of Linköping, Sweden
Time	Monday, 08:15-11:00
Location	E01-108

The tutorial presents gives an introduction to object-oriented component-based computer supported mathematical modeling and simulation through the powerful Modelica language and its associated technology. Modelica can be viewed as an almost universal approach to high level computational modeling and simulation, by being able to represent a range of application areas and providing general notation as well as powerful abstractions and efficient implementations. The tutorial gives an introduction to the Modelica language to people who are familiar with basic programming concepts. It gives a basic introduction to the concepts of modeling and simulation, as well as the basics of object-oriented component-based modeling for the novice, and an overview of modeling and simulation in a number of application areas. The OpenModelica open-source environment will be used for textual modeling exercises and MathModelica for graphical hands-on exercises.

Tutorial 2
Mathematical Aspects of Modeling and Simulation with Modelica

Tutor	Bernhard Bachmann University of Applied Sciences, Bielefeld, Germany
Time	Monday, 08:15-11:00
Location	H4

The investigation of dynamical systems in mechanical, electrical or chemical engineering usually requires mathematical modeling of the system behavior. The object-oriented modeling language Modelica provides powerful features which make it possible to build up very complex even hybrid systems quite easily. But, what happens if a Modelica tool is not capable to compile and/or correctly simulate the system of interest? Reasons can be i.e. modeling errors, wrong parameter values and/or numerical instabilities. Automatic problem detection is usually not possible and only understanding of symbolical and numerical techniques behind the scene can help in resolving this issue. This tutorial provides a basic understanding on the mathematical aspects of object-oriented modeling and simulation. Different phenomena are explained in detail using simple examples which can be thoroughly analyzed during hand-out exercises.

Tutorial 3
Simulation of Electric Machines and Drives using the Machines and the SmartElectricDrives Libraries

Tutors Anton Haumer, Johannes Gragger, Harald Giuliani, Hansjörg Kapeller, Thomas Bäuml | arsenal research, Vienna, Austria
Time Monday, 08:15-11:00
Location H5
Prerequisites
Basic knowledge of the Modelica language and some experience in using Dymola

The tutorial starts with an introduction to electric machines. This includes DC machines, asynchronous machines and permanent magnet synchronous machines. Simple applications of starting and operating the machines will be presented using the Machines package of the Modelica Standard Library. The limits of operation of open loop and mains supplied machines will be discussed. For operating electric machines at variable speed (or torque) usually closed loop drives are used. The basic principle of a closed loop drive system will be explained. For the examples presented in this tutorial the SmartElectricDrives (SED) library will be used. An overview of the structure of the basic components (source, converter, machine, control unit, sensor and load) of the SED library will be given. The basics of controlling DC machines are outlined, followed by an introduction to space phasors (as the reference frames get explained the transformation blocks in the SED library get pointed out). The torque controlled drive models of a DC machine, an asynchronous induction machine and a permanent magnet synchronous machine are presented. For these drive types the differences between TransientDrives and QuasiStationaryDrives will be compared. Then the Sources models will be explained and their parameterization will be discussed. After this two examples using an asynchronous induction machine and a permanent magnet induction machine are shown. These examples will demonstrate the correct use of the bus connectors and the supplementary functions for estimating the control and machine parameters.

Tutorial 4
Modeling of Thermodynamic Systems using Modelica_Fluid and Modelica.Media

Tutors Hubertus Tummescheit, Jonas Eborn | Modelon AB, Lund, Sweden
Time Monday, 08:15-11:00
Location H7
Prerequisites
Basic knowledge of the Modelica language and some experience in using Dymola

The goal of the tutorial is to get an overview over Modelica libraries for thermodynamic system modeling and show how to make use of Modelica's unique features in thermodynamics modeling. Compared to traditional, specialized flow sheeting tools, Modelica offers increased flexibility. The new Media and Fluid libraries make this flexibility accessible without the drawback of laborious model implementation. We will explain the design ideas behind the libraries and, through a series of hands-on exercises, learn to use the libraries for simple examples. Using these examples, we will investigate typical modeling trade-offs in thermodynamics between models intended for component design use and models intended for system design use. The same examples will be used to demonstrate typical numerical pitfalls in thermo-fluid systems.

Tutorial 5
Simulation of Rigid and Flexible Multibody Systems

Tutor Andreas Heckmann | German Aerospace Center, Oberpfaffenhofen, Germany
Time Monday, 08:15-11:00
Location H6

Quite often the mechanical components are the core elements of a complex technical system. Therefore a modeling language such as Modelica relies on the capability to systematically treat the dynamic behavior of interconnected bodies influenced by various physical quantities. In order to answer this purpose the Modelica Multibody Library and the Modelica FlexibleBodies Library provide a range of modeling elements to describe rigid or flexible bodies respectively which may undergo large 3-dimensional translational and rotational displacements. The tutorial will give an introduction to these capabilities. The presentation and the hands-on exercises will be focused on the FlexibleBodies Library from the DLR under consideration of its basis given in the Modelica Multibody Library for rigid bodies. In particular the goals of the tutorial are:

- to present the main modeling components from the user's point of view.
- to provide initial hands-on experience.
- to describe the main underlying concepts and their theoretical background.
- to discuss essential details of the imple mentation.

As a common platform for exercises, software with both libraries and a test version of the simulation environment Dymola will be provided (MS Windows operating system). Please bring a laptop with CD-reader in order to participate in the exercises.

Welcome
Opening of the Conference

Time Monday, 11:00-12:20
Location H4

11:20-11:35
Opening of the Conference
Prof. Dr. Bernhard Bachmann, Prof. Dr. Beate Rennen-Allhoff | University of Applied Sciences Bielefeld

11:35-12:05
Object-Oriented Modelling in the Context of Networked Simulations
Keynote Prof. Dr. Ulrich Kramer, Prof. Dr. Christian Schröder | University of Applied Sciences Bielefeld

12:05-12:20
Status and Future of Modelica
Keynote Prof. Dr. Martin Otter | German Aerospace Center, Oberpfaffenhofen, Germany
Chairman of the Modelica Association

Session 1a
Language, Tools and Algorithms

Session Chair
Denis Fargeton | LMS Imagine, Roanne, France
Time Monday, 13:20-14:35
Location H4

13:20-13:45
Design Considerations for Dimensional Inference and Unit Consistency Checking in Modelica
D. Broman | Linköping University, Linköping, Sweden
P. Aronsson | Mathcore Engeneering, Linköping, Sweden
P. Fritzson | Linköping University, Linköping, Sweden

13:45-14:10
Unit Checking and Quantity Conservation
S.E. Mattsson, H. Elmqvist | Dynasim AB, Lund, Sweden

14:10-14:35
Balanced Models in Modelica 3.0 for Increased Model Quality
H. Olsson | Dynasim AB, Lund, Sweden
M. Otter | German Aerospace Center, Oberpfaffenhofen, Germany
S.E. Mattsson, H. Elmqvist | Dynasim AB, Lund, Sweden

Session 1b
Language, Tools and Algorithms

Session Chair
Dr. Michael Tiller | Emmeskay Inc., Michigan, USA
Time Monday, 13:20-14:35
Location H7

13:20-13:45
Initialization of Modelica Models in Scicos
M. Najafi, R. Nikoukhah | INRIA, Le Chesnay Cedex, France

13:45-14:10
Introducing Sol: A General Methodology for Equation-Based Modeling of Variable-Structure Systems
D. Zimmer | ETH Zürich, Zürich, Switzerland

14:10-14:35
Optimica - An Extension of Modelica Supporting Dynamic Optimization
J. Åkesson | Lund University, Lund, Sweden

Session 1c
Automotive Applications

Session Chair
Mike Dempsey, Claytex Services Limited, Leamington, United Kingdom
Time Monday, 13:20-14:35
Location H6

13:20-13:45
Detailed Simulation of Turbocharged Engines with Modelica
J. Batteh, C. Newman | Ford Motor Company, Dearborn, USA

13:45-14:10
Thermal Modelling of an Automotive Nickel Metall Hydrid Battery in Modelica using Dymola
H. Oberguggenberger, D. Simic | arsenal research, Vienna, Austria

14:10-14:35
Object Oriented Modeling of a Gasoline Direct Injection System
M. Corno, F. Casella, S.M. Savaresi, R. Scattolini | Politecnico di Milano, Milano, Italy

Session 1d
Electric Systems & Applications

Session Chair
Prof. François E. Cellier | ETH Zürich, Zürich, Switzerland
Time Monday, 13:20-14:35
Location H5

13:20-13:45
A Multi Level Approach for Aircraft Electrical Systems Design
M. Kuhn, M. Otter | German Aerospace Center, Oberpfaffenhofen, Germany
L. Raulin | Airbus, Toulouse, France

13:45-14:10
Incorporation of Reliability Analysis Methods with Modelica
C. Schallert | German Aerospace Center, Oberpfaffenhofen, Germany

14:10-14:35
Simulation of Distributed Automation Systems in Modelica
F. Wagner, L. Liu, G. Frey | Kaiserslautern University of Technology, Kaiserslautern, Germany

Session 2a
Language, Tools and Algorithms

Session Chair
Dr. Hilding Elmqvist | Dynasim AB, Lund, Sweden
Time Monday, 15:00-16:15
Location H4

15:00–15:25
Study of a Sizing Methodology and a Modelica Code Generator for the Bond Graph Tool MS1
A. Jardin, W. Marquis-Favre, D. Thomasset | AMPERE INSA-Lyon, Villeurbanne Cedex, France
F. Guillemard | PSA Peugeot Citroën, Vèlizy-Villacoublay Cedex, France
F. Lorenz | LorSim, Liège, France

15:25-15:50
Integrating Models and Simulations of Continuous Dynamics into SysML
T. Johnson, C. Paredis | Georgia Institute of Technology, Atlanta, USA
R. Burkhart | Deere & Company, Moline, USA

15:50-16:15
Modelica Library for Logic Control Systems written in the FBD Language
A. Leva, F. Donida, M. Bonvini, L. Ravelli | Politecnico di Milano, Milano, Italy

Session 2b
Thermodynamic Systems & Applications

Session Chair
Dr. Wilhelm Tegethoff | TLK-Thermo GmbH, Braunschweig, Germany
Time Monday, 15:00-16:15
Location H7

15:00–15:25
ExternalMedia: A Library for Easy Re-Use of External Fluid Property Code in Modelica
F. Casella | Politecnico di Milano, Milano, Italy
C. Richter | Braunschweig University of Technology, Braunschweig, Germany

15:25-15:50
ThermoBondLib - A New Modelica Library for Modeling Convective Flows
F. Cellier | ETH Zürich, Zürich, Switzerland
J. Greifeneder | Kaiserslautern University of Technology, Kaiserslautern, Germany

15:50-16:15
FluidDissipation - A Centralised Library for Modelling of Heat Transfer and Pressure Loss
T. Vahlenkamp, S. Wischhusen | XRG Simulation GmbH, Hamburg, Germany

Session 2c
Mechanical Systems & Applications

Session Chair
Prof. Martin Otter | DLR, Oberpfaffenhofen, Germany
Time Monday, 15:00-16:15
Location H6

15:00–15:25
Development of an Aircraft and Landing Gears Model with Steering System in Modelica-Dymola
G. Verzichelli | Airbus, Filton, United Kingdom

15:25-15:50
The New DLR Flight Dynamics Library
G. Looye | German Aerospace Center, Oberpfaffenhofen, Germany

15:50-16:15
Implementation of the Hertz Contact Model and Its Volumetric Modification on Modelica
I. Kosenko, E. Alexandrov | Moscow State University of Tourism and Service, Moscow, Russian Federation

Session 2d
Electric Systems & Applications

Session Chair
Dr. Ingrid Bausch-Gall | Bausch-Gall GmbH, Munich, Germany
Time Monday, 15:00-16:15
Location H5

15:00–15:25
Modeling of Electric Drives using freeFOClib
D. Winkler, C. Gühmann | Technische Universität Berlin, Berlin, Germany

15:25-15:50
Electromagnetic Actuator Modeling with the Extended Modelica Magnetic Library
T. Bödrich | Dresden University of Technology, Dresden, Germany

15:50-16:15
Quasi-Stationary Modeling and Simulation of Electrical Circuits using Complex Phasors
A. Haumer, C. Kral, J. Gragger, H. Kapeller | arsenal research, Vienna, Austria

Vendor Session 1
MathCore

Time Monday, 16:25-16:55
Location H4

**MathModelica by MathCore –
Your Experts in Modelling and Simulation**

- Modelling, simulation, analysis, and documentation
- Seamless integration with Mathematica, gives unparalleled analysis capabilities, covering frequency analysis, optimization, control system design, and much more
- Strong consultancy support, including library development and problem solving

Vendor Session 2
ITI GmbH

Time Monday, 16:25-16:55
Location H7

ITI GmbH: SimulationX 3.0 - The Driving Force in System Simulation

- Fully integrated design, modeling and analysis platform
- Modelica development on the fly
- Time and frequency domain analysis
- Model integration from other simulators

Vendor Session 3
TLK-Thermo GmbH

Time Monday, 16:25-16:55
Location H6

TLK-Thermo GmbH: Engineering Services and Software for Thermal Systems

- TISC is a co-simulation environment for controlling different simulation applications and exchanging data between them
- TILFLuids is an interface library to provide fluid properties from various existing fluid property databases to different applications
- StateViewer is an advanced software tool for graphical presentation of transient thermodynamic measurements or simulation data in different types of state charts
- TIL is a Modelica library for modeling advances thermal systems.

Vendor Session 4
OpenModelica

Time Monday, 16:25-16:55
Location H5

OpenModelica

- Overview of the OpenModelica environment, including compiler, user interface, development environment
- Short demo
- Information about the Open Source Modelica Consortium behind OpenModelica
- Questions and answers

Vendor Session 5
Dynasim and Partners

Time Monday, 17:00-18:00
Location H4

Dymola Vendor Session

- New and coming features of Dymola
- Updates on model libraries and tools:
  - Modelon
  - arsenal research
  - DLR
  - Schlegel Simulation

Modelica'2008 Exhibitors

Time Monday, 08:00-18:00
Tuesday, 08:00-16:00
Location University Hall

arsenal research
http://www.arsenal.ac.at/

Bausch-Gall GmbH
http://www.bausch-gall.de/

Dynasim AB
http://www.dynasim.se/

ITI GmbH Dresden
http://www.iti.de/

LMS Imagine
http://www.lmsintl.com/

MathCore Engineering AB
http://www.mathcore.com/

Modelon AB
http://www.modelon.se/

OpenModelica
http://www.ida.liu.se/labs/pelab/modelica/OpenModelica.html

Schlegel Simulation GmbH
http://www.schlegel-simulation.de/

Scientific Computers GmbH
http://www.scientific.de/

TlkThermo GmbH
http://www.tlk-thermo.de/

Session 3a
Language, Tools and Algorithms

Session Chair
Dr. Hans Olsson | Dynasim AB, Lund, Sweden
Time Tuesday, 08:30-10:10
Location H4

08:30-08:55
HyAuLib: Modelling Hybrid Automata in Modelica
T. Pulecchi, F. Casella | Politecnico di Milano, Milano, Italy

08:55-09:20
Application of Neural Networks to model Catamaran Type Powerboats
G. Fish, M. Dempsey | Claytex Services Ltd, Leamington Spa, United Kingdom

09:20-09:45
ModeGraph - A Modelica Library for Embedded Control Based on Mode-Automata
M. Malmheden, H. Elmqvist, S. E. Mattsson, D. Henriksson | Dynasim AB, Lund, Sweden
M. Otter | German Aerospace Center, Oberpfaffenhofen, Germany

09:45-10:10
A new Approach for Modeling and Verification of Discrete Control Components within a Modelica Environment
U. Donath, J. Haufe | Fraunhofer Institut, Dresden, Germany
T. Blochwitz, T. Neidhold | ITI GmbH, Dresden, Germany

Session 3b
Thermodynamic Systems & Applications

Session Chair
Dr. Hubertus Tummescheit | Modelon AB, Lund, Sweden
Time Tuesday, 08:30-10:10
Location H7

08:30-08:55
Model-Based Online Applications in the ABB Dynamic Optimization Framework
R. Franke | ABB Power Technology Systems, Mannheim, Germany
B.S. Babij | ABB Corporate Research, Bangalore, India
M. Antoine | ABB Power Technology Systems, Mannheim, Germany
A. Isaksson | ABB Corporate Research, Bangalore, India

08:55-09:20
Using Modelica/Matlab for Parameter Estimation in a Bioethanol Fermentation Model
J.I. Videla, B. Lie | Telemark University College, Porsgrunn, Norway

09:20-09:45
Model-Based Optimizing Control and Estimation using Modelica Models
L. Imsland, P. Kittilsen, T. Steinar Schei | Cybernetica AS, Trondheim, Norway

09:45-10:10
Overdetermined Steady-State Initialization Problems in Object-Oriented Fluid System Models
F. Casella, F. Donida | Politecnico di Milano, Milano, Italy
B. Bachmann | Bielefeld University of Applied Sciences, Bielefeld, Germany
P. Aronsson | Mathcore Engeneering, Linköping, Sweden

Session 3c
Automotive Applications

Session Chair
Dr. Andreas Uhlig | ITI GmbH, Dresden, Germany
Time Tuesday, 08:30-10:10
Location H6

08:30-08:55
Modelling of Conventional Vehicle in Modelica
W. Chen, G. Qin, L. Li, Y. Zhang, L. Chen | Huazhong University of Science and Technology, Wuhan, China

08:55-09:20
Vehicle Model for Limit Handling: Implementation and Validation
J. Andreasson | Modelon AB, Lund, Sweden
M. Jonasson | Volvo Car Corporation, Göteborg, Sweden

09:20-09:45
Modelling of a Double Clutch Transmission with an Appropriate Controller for the Simulation of Shifting Processes
H. Isernhagen, C. Gühmann | Technische Universität Berlin, Berlin, Germany

09:45-10:10
TestWeaver - A Tool for Simulation-Based Test of Mechatronic Designs
A. Junghanns, J. Mauss, M. Tatar | QTronic GmbH, Berlin, Germany

Session 3d
Electric Systems & Applications

Session Chair
Peter Schwarz | Fraunhofer Institut, Dresden, Germany
Time Tuesday, 08:30-10:10
Location H5

08:30-08:55
Simulation of Electrical Rotor Asymmetries in Squirrel Cage Induction Machines with the ExtendedMachines Library
C. Kral, A. Haumer | arsenal research, Vienna, Austria

08:55-09:20
Modeling and Simulation of a Large Chipper Drive
H. Kapeller, A. Haumer , C. Kral, G. Pascoli, F. Pirker | arsenal research, Vienna, Austria

09:20-09:45
Simulation and Validation of Power Losses in the Buck-Converter Model included in the SmartElectricDrives Library
H. Giuliani, C. J. Fenz, A. Haumer, H. Kapeller | arsenal research, Vienna, Austria

09:45-10:10
Real-Time Modelica Simulation on a Suse Linux Enterprise Real Time PC
A. Ebner, M. Ganchev, H. Oberguggenberger, F. Pirker | arsenal research, Vienna, Austria

Session 4a
Language, Tools and Algorithms

Session Chair
Dr. Rüdiger Franke | ABB, Heidelberg, Germany
Time Tuesday, 10:40-12:20
Location H4

10:40-11:05
Frequency-Domain Analysis Methods for Modelica Models
A. Abel, T. Nähring | ITI GmbH, Dresden, Germany

11:05-11:30
World3 in Modelica: Creating System Dynamics Models in the Modelica Framework
F. Cellier | ETH Zürich, Zürich, Switzerland

11:30-11:55
Modelica as a Host Language for Process/ Control Co-Simulation and Co-Design
F. Donida, A. Leva | Politecnico di Milano, Milano, Italy

11:55-12:20
Exception Handling for Modelica
A. Pop, K. Stavåker, P. Fritzson | Linköping University, Linköping, Sweden

Session 4b
Thermodynamic Systems & Applications

Session Chair
Prof. Gerhard Schmitz | Technical University Hamburg-Harburg, Germany
Time Tuesday, 10:40-12:20
Location H7

10:40-11:05
Modelling of the Gasification Island with Modelica
J. Fahlke, S. Püschel | Freiberg University of Technology, Freiberg, Germany
F. Hannemann | Siemens Fuel Gasification Technology, Freiberg, Germany
B. Meyer | Freiberg University of Technology, Freiberg, Germany

11:05-11:30
Transient Modelling of a Controllable Low Pressure Accumulator in CO2 Refrigeration Cycles
M. Bockholt, W. Tegethoff | Braunschweig University of Technology, Braunschweig, Germany
N. Lemke | TLK-Thermo GmbH, Braunschweig, Germany
N.-C. Strupp, C. Richter | Braunschweig University of Technology, Braunschweig, Germany

11:30-11:55
Modeling and Simulation of a Thermoelectric Heat Exchanger using the Object-Oriented Library TIL
C. Junior, C. Richter, W. Tegethoff, N. Lemke, J. Köhler | Braunschweig University of Technology, Braunschweig, Germany

11:55-12:20
Dynamic Modeling and Self-Optimizing Control of Air-Side Economizers
P.Li, Y. Li | University of Wisconsin, Milwaukee, USA
J. Seem | Building Efficiency Research Group, Milwaukee, USA

Session 4c
Automotive Applications

Session Chair
Jakob Mauss | QTronic GmbH, Berlin, Germany
Time Tuesday, 10:40-12:20
Location H6

10:40-11:05
Using Modelica for Modeling and Simulation of Spark Ignited Engine and Drilling Station in IFP
M. Najafi, Z. Benjelloun-Dabaghi | INRIA, Le Chesnay Cedex, France

11:05-11:30
Controller Development for an Automotive Ac-system using R744 as Refrigerant
S. Karim, H. Tummescheit | Modelon AB, Lund, Sweden

11:30-11:55
Implementation of a Modelica Online Optimization for an Operating Strategy of a Hybrid Powertrain
H. Wigermo, J. von Grundherr, T. Christ | BMW Hybrid Cooperation, Troy, USA

11:55-12:20
Model Embedded Control: A Method to Rapidly Synthesize Controllers in a Modeling Environment
E. Tate | General Motors, Michigan, USA
M. Sasena, J. Gohl, M. Tiller | Emmeskay Inc., Plymouth, USA

Session 4d
Mechanical Systems & Applications

Session Chair
Dr. Christian Kral | arsenal research, Vienna, Austria
Time Tuesday, 10:40-12:20
Location H5

10:40-11:05
High-Accuracy Orbital Dynamics Simulation through Keplerian and Equinoctial Parameters
F. Casella, M. Lovera | Politecnico di Milano, Milano, Italy

11:05-11:30
Rotational3D - Efficient Modelling of 3D Effects in Rotational Mechanics
J. Andreasson, M. Gäfvert | Modelon AB, Lund, Sweden

11:30-11:55
Methods of Sensitivity Calculation Applied to a Multi-Axial Test Rig for Elastomer Bushings
S. Wolf, J. Haase, C. Clauß, Fraunhofer Institut, Dresden, Germany
M. Jöckel, J. Lösch | Fraunhofer Institut, Darmstadt, Germany

11:55-12:20
Implementation of a Modelica Library for Simulation of High-Lift Drive Systems
M. Pfennig, F. Thielecke | Hamburg University of Technology, Hamburg, Germany

Session 5
Poster Session

Time Tuesday, 13:20-14:20
Location University hall

4-Dimensional Table Interpolation with Modelica
T. Hirsch, M. Eck | German Aerospace Center, Stuttgart, Germany

PlanarMultiBody - A Modelica Library for Planar Multi-Body Systems
M. Höbinger | Vienna University of Technology, Vienna, Austria
M. Otter | German Aerospace Center, Oberpfaffenhofen, Germany

Implementation of Hybrid Electric Vehicles using the VehicleInterfaces and the SmartElectricDrives Libraries
D. Simic, T. Bäuml | arsenal research, Vienna, Austria

Modeling of CO2 Reduction Impacts on Energy Prices with Modelica
P. Machanick, A. Liebman | University of Queensland, Brisbane, Australia
P. Fritzson | Linköping University, Linköping, Sweden

Modelling of an Adsorption Chiller with Modelica
M. Schicktanz | Fraunhofer Institut, Freiburg, Germany

An External Model Interface for Modelica
T. Blochwitz, G. Kurzbach, T. Neidhold | ITI GmbH, Dresden, Germany

Two Steady State CHP Models with Modelica: Mirafiori overall Model and Multi-configuration Biomass Model
B. El Hefni, B. Bride, B. Pechine | EDF R&D, Chatou, France

Efficient Analysis of Harmonic Losses in PWM Voltage Source Induction Machine Drives with Modelica
J. Gragger, A. Haumer, C. Kral, F. Pirker | arsenal research, Vienna, Austria

Monte Carlo Simulation with Modelica
J. Haase, S. Wolf, C. Clauß | Fraunhofer Institut, Dresden, Germany

Comparisons of Different Modelica-Based Simulators Using Benchmark Tasks
O. Enge-Rosenblatt, C. Clauß, P. Schwarz | Fraunhofer Institut, Dresden, Germany
F. Breitenecker | Vienna University of Technology, Vienna, Austria
C. Nytsch-Geusen | Fraunhofer Institut, Berlin, Germany

Modelica Wind Turbine Models with Structural Changes Related to Different Operating Modes
O. Enge-Rosenblatt, P. Schneider | Fraunhofer Institut, Dresden, Germany

ExcelInterface - A Tool for Interfacing Dymola through Excel
K. Tuszynski | Modelon AB, Lund, Sweden

Modeling of Cold Plates for Power Electronic Cooling
K. Dietl, J. Vasel, G. Schmitz, W. Casas, C. Mehrkens | Hamburg-Harburg University of Technology, Hamburg, Germany

Heavy Vehicle Modeling with VehicleDynamics Library
N. Philipson, J. Andreasson, M. Gäfvert, A. Woodruff | Modelon AB, Lund, Sweden

Session 6a
Language, Tools and Algorithms

Session Chair
Dr. Peter Aronsson | Mathcore Engeneering, Linköping, Sweden
Time Tuesday, 14:35-15:50
Location H4

14:35-15:00
Compiling and Using Pattern Matching in Modelica
K. Stavåker, A. Pop, P. Fritzson | Linköping University, Linköping, Sweden

15:00-15:25
Patterns and Anti-Patterns in Modelica
M. Tiller | Emmeskay Inc., Plymouth, USA

15:25-15:50
Comment- and Indentation Preserving Refactoring and Unparsing for Modelica
P. Fritzson, A. Pop, K. Norling, M. Blom | Linköping University, Linköping, Sweden

Session 6b
Language, Tools and Algorithms

Session Chair
Prof. Dr. Francesco Casella | Politecnico di Milano, Milano, Italy
Time Tuesday, 14:35-15:50
Location H7

14:35-15:00
Sensitivity Analysis of Modelica Applications via Automatic Differentiation
A. Elsheikh | Siegen University, Siegen, Germany
S. Noack | Research Center Jülich GmbH, Jülich, Germany
W. Wiechert | Siegen University, Siegen, Germany

15:00-15:25
Synchronous and Asynchronous Events in Modelica: Proposal for an Improved Hybrid Model
R. Nikoukhah | INRIA, Le Chesnay Cedex, France
S. Furic | LMS-Imagine, Roanne, France

15:25-15:50
Support for Dymola in the Modeling and Simulation of Physical Systems with Distributed Parameters
F. Dshabarow | ABB Turbo Systems AG, Baden, Switzerland
F. Cellier, D. Zimmer | ETH Zürich, Zürich, Switzerland

Session 6c
Thermodynamic Systems & Applications

Session Chair
Dr. Jonas Eborn | Modelon AB, Lund, Sweden
Time Tuesday, 14:35-15:50
Location H6

14:35-15:00
Simulation of Peak Stresses and Bowing Phenomena during the Cool Down of a Cryogenic Transfer System
H. Tummescheit, K. Tuszynski | Modelon AB, Lund, Sweden
P. Arnold | Linde Kryotechik AG, Pfungen, Switzerland

15:00-15:25
Enhancement of a Modelica Model of a Desiccant Wheel
A. Joos, G. Schmitz, W. Casas | Hamburg University of Technology, Hamburg, Germany

15:25-15:50
Real-Time HWIL Simulation of Liquid Food Process Lines
M. Gäfvert | Modelon AB, Lund, Sweden
T. Skoglund | Tetra Pak Procesing Systems, Lund, Sweden
H. Tummescheit, J. Windahl | Modelon AB, Lund, Sweden
H. Wikander | Avensia Innovation AB, Lund, Sweden
P. Reuterswärd | Modelon AB, Lund, Sweden

Session 6d
Mechanical Systems & Applications

Session Chair
Anton Haumer | Technical Consulting, Vienna, Austria
Time Tuesday, 14:35-15:50
Location H5

14:35-15:00
Automatic Model Conversion to Modelica for Dymola-based Mechatronic Simulation
T. Juhász, U. Schmucker | Fraunhofer Institut, Magdeburg, Germany

15:00-15:25
Modelica Implementation of the Skateboard Dynamics
I. Kosenko | Moscow State University of Tourism and Service, Moscow, Russian Federation
A.S. Kuleshov | Lomonosov Moscow State University, Moscow, Russian Federation

15:25-15:50
Design and Validation of an Annotation-Concept for the Representation of 3D-Geometries in Modelica
T. Hoeft C. Nytsch-Geusen | Fraunhofer Institut, Berlin, Germany

Registration and Reception

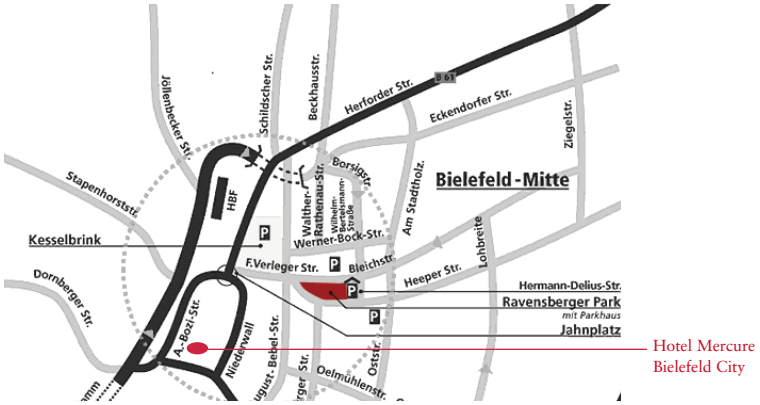
Time
Sunday, March 2nd, 17:00 – 20:00

Location Hotel Mercure Bielefeld City
Waldhof 15, 33602 Bielefeld

Conference Dinner

Time
Monday, March 3rd, 20:00 – 23:00

Conference Dinner
Location Ravensberger Park, 33607 Bielefeld

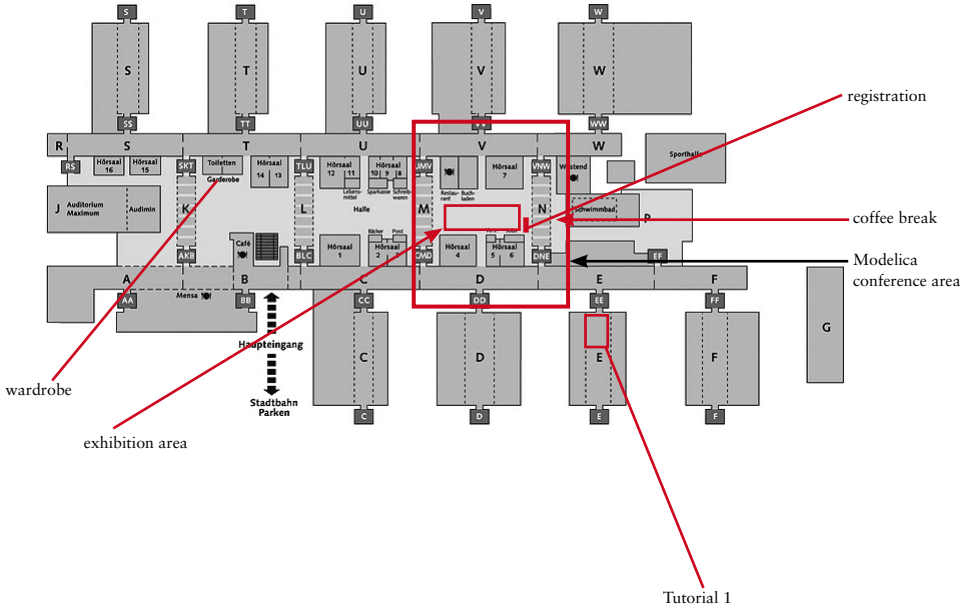


Program

- The governing mayor of Bielefeld welcomes the conference attendees
- Library award ceremony

Orientation

The Modelica conference takes place on the ground floor in the building of the university of Bielefeld.
The main area is bold marked. Entering through the main entrance you may use the wardrobe left. Going right from the main entrance you find the registration desk and information. There are four great lecture halls (short H4, H5, H6 and H7) for the sessions and tutorials. In the area E there is one more seminar room E01-108 for Tutorial 1.



Modelica Association

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University of Applied Sciences

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AMMO
Applied Mathematical Modeling & Optimization