

PROGRAM OF THE

12th INTERNATIONAL **MODELICA** CONFERENCE

May 15–17, 2017

Clarion Congress Hotel Prague
Czech Republic

www.modelica.org



ČSKI



POLITECNICO
MILANO 1863

MODELICA

The conference is organized by The Czech Society for Cybernetics and Informatics (ČSKI) and Politecnico di Milano in cooperation with the Modelica Association.

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CONFERENCE BOARD

Doc. MUDr. Jiří Kofránek, CSc., Charles University, Czech Republic (Conference Chair)
Prof. Francesco Casella, Politecnico di Milano, Italy (Program Chair)
Prof. Peter Fritzson, Linköping University, Sweden
Prof. Martin Otter, DLR, Germany
Dr. Hilding Elmqvist, Mogram AB, Lund, Sweden
Dr. Michael Tiller, Xogeny, Michigan, USA

WELCOME



Jiří Kofránek
Conference Chair

We would like to welcome you to Prague for the 12th international Modelica Conference. The conference was organized by the Modelica Association in cooperation with the Czech Society for Informatics and Cybernetics and Politecnico di Milano.

Modelica is not only a unique modeling language, which is widely used in numerous branches of industry and also in research and science, but most of all it is an immensely effective tool for complex simulations in the automotive industry, building energy management, aerospace and many other fields of engineering.

The program of the conference is interesting not only for the participants, who already use Modelica, but also for those who would like to be introduced to the possibilities of this new modern modeling language by our numerous tutorials. The usage of the language is facilitated by Modelica libraries focused on diverse fields. Consequently, an important part of the conference is the traditional Library Award Announcement.

We welcome you to Prague, the city of many historic sites, culture and also the music festival Prague Spring, taking place in Prague this week.



Francesco Casella
Program Chair

The International Modelica Conference is the most important place for the Modelica and FMI communities to meet, exchange ideas and advance the state of the art in object-oriented modelling.

This year we received 129 paper submissions for the scientific program. After a thorough peer review process by the International Program Committee, 83 were accepted for full oral presentation and 19 for poster presentation, with authors coming from 18 different countries in Europe, Asia, America, and Oceania. The scientific program is completed by two distinguished keynote talks, one from industry and one from academia.

The conference also hosts nine tutorials, the FMI User Meeting, as well as vendor presentations and a commercial exhibition.

I warmly welcome you to the 12th International Modelica Conference and I wish you a successful, pleasant, and rewarding stay in Prague!

KEYNOTE SPEAKERS



Challenges of Future Robotics

Presenter:

Bernd Liepert
President of the euRobotics AISB
Chief Innovation Officer at KUKA AG

Abstract: Robotics will change the world! It will unleash the same if not an even more disruptive and transformational power within the next 50 years as mainstream IT-technology and the Internet have over the last half a century. Nurtured by technological breakthroughs in industrial automation, robotics will exhaustively permeate all domains of the human living realm. Hence, our grandchildren will grow up in a society that is enriched and enhanced by assistive technologies in every imaginable way. Robotics and automation will be tailored into many everyday objects, becoming an integral part of all kinds of appliances. This Generation ‚R‘ will be without fear of these technologies perceiving their beneficial nature - they will grow up as Robotic Natives. This implies, that today’s people are already born to become the first society of Robotic Immigrants. Although it is not possible to precisely predict the world of tomorrow, the presented model of the 4 Robotic Revolutions provides a compelling, holistic approach to describe the future phases of robotic evolution, characterizing them according to their technological enablers and underlying interaction paradigms.

Bio: Dr. Bernd Liepert is the Chief Innovation Officer of KUKA AG, a world leading manufacturer of industrial robots. Dr. Liepert earned his diploma in mathematics in 1990 from the University of Augsburg and his honorary doctor degree from University of Magdeburg in 2011. Since 1990 Dr. Liepert has worked in changing positions for KUKA. From 1990 to 1996 he worked as mathematician and developer at KUKA Schweissanlagen + Roboter GmbH before he took charge as head of development of the newly founded company KUKA Roboter GmbH until 1997. From 1998-1999 he was a member of KUKA Roboter GmbH Board of Management, responsible for development and design. From 2000-2009 Dr. Liepert was the CEO of KUKA Roboter GmbH. From 2010 to January 2015 he was the CTO of KUKA AG, responsible for technology and development of the whole KUKA group. As Chief Innovation Officer of KUKA AG, Dr. Liepert is now responsible for expanding innovations at KUKA where he can apply his vast robotics experience at the interface between technology and the market. From 2008-2012 Dr. Liepert was President of EUROP, the European Robotics Technology Platform, and subsequently President of euRobotics AISBL – the European Robotics Association. euRobotics was founded in September 2012 and has become the private side of SPARC, the European Public-Private Partnership in Robotics in 2013. As president of these associations Dr. Liepert has been leading the European robotics community and representing it at high political levels.



Synchronous Programming and its fit with Modeling

Presenter:

Gérard Berry
Paris, France

Abstract: The family of Synchronous programming languages was born in the 1980’s in three different French labs that gathered researchers in Computer Science and Control Theory. The three first languages were Esterel, dedicated to control-dominated problems in embedded systems, telecom protocols and later digital circuit design, Lustre, dedicated to continuous control, and Signal, oriented towards signal processing. They share a common perfect synchrony principle that expresses that the reaction to an input should be viewed as conceptually instantaneous. This simple principle is well-adapted to the targeted applications and greatly simplifies programming by reconciling parallelism and determinism. It also leads to well-defined mathematical semantics that directly ground their formal compiling, simulation and verification environments. Synchronous programming rapidly became used in Industry for safety-critical production systems in avionics (Dassault Aviation, Airbus, etc.), railways, etc., as well as in robotics and circuit design. In the 2000’s, Esterel and Lustre have been unified in two new languages industrialized by Esterel Technologies (now part of Ansys): SCADE 6 for safety critical software and Esterel v7 for hardware design, both also incorporating ideas from Harel’s reactive graphical formalism Statecharts.

The talk will explain the practical and mathematical concepts of synchronous programming and stress its advantages over asynchronous concurrent programming for the considered applications. It will also explore the links between synchronous programming and modeling / simulation. In one direction, synchronous languages are ideal targets to generate embedded code from executable parts of simulation models. In the other direction, embedding synchrony into conventional modelers may be necessary to solve the current tricky issues due to the coupling of discrete and continuous computations in modelers, in particular for the currently mishandled case where external or internal events provoke cascades of discrete reactions. Pouzet and Bourkes’s new Zelus language is a step in this direction.

Bio: Former student of the Ecole polytechnique, Member of the Academy of sciences, of the Academy of technology and the Academia Europaea, CNRS Gold medal 2014, Gérard Berry was a researcher at the Ecole des mines of Paris and INRIA from 1973 to 2000, Chief Scientist of the company Esterel Technologies from 2001 to 2009, then Research Director at INRIA and President of the Evaluation Committee of this Institute from 2009 to 2012. He holds the Chair Algorithms, Machines and Languages at the Collège de France from 2012, after having held two annual chairs in 2007-2008 and 2009-2010.

His scientific contribution concerns four main topics: the formal treatment of programming languages and their relations with mathematical logic, reactive and real-time programming for embedded systems, integrated circuit computer-aided design, and formal verification of programs and circuits. He is the creator of the Esterel programming language.

GENERAL SCHEDULE

MONDAY, MAY 15

13:00-16:30	FMI User Meeting & Tutorials		
16:30-17:00	Coffee Break		
	Zenit	Nadir	Tycho-Kepler
17:00-17:45	Vendor Session I		
17:45-18:30	Vendor Session II		
18:30-19:15	Vendor Session III		
19:30	Welcome Reception will take place at the Foyer of the conference floor		

TUESDAY, MAY 16

	Zenit-Nadir	Tycho-Kepler	Aquarius-Taurus	Leo-Virgo	Foyer-Meridian
9:00-9:20	Opening and Welcome Address				
9:20-9:30	Modelica News				
9:30-10:15	Keynote 1				
10:15-10:45	Coffee Break 1				
10:45-12:25	Automotive I	Buildings I	Process & Chemical Engineering	Control Systems I	
12:25-14:15	Lunch in Veduta Restaurant				
14:15-15:30	Automotive II	Buildings II	Electrical & Power Systems I	Control Systems II	
15:30-16:00	Coffee Break 2				
16:00-17:15	Poster Session				
17:15-18:30	Automotive III	Thermodynamic Systems	Electrical & Power Systems II	Control Systems III	
20:00	Conference Dinner including Library Award Announcement at Národní dům na Vinohradech individual transportation, offered assistance: meeting point at 19.00 by the registration desk				

WEDNESDAY, MAY 17

	Zenit-Nadir	Tycho-Kepler	Aquarius-Taurus	Leo-Virgo	Foyer-Meridian
8:30-9:15	Keynote 2				
9:15-9:20	Short Break				
9:20-10:35	FMI I	Numerical & Symbolic Methods	Acoustic & Medical Systems	Wind & Naval Engineering	
10:35-11:05	Coffee Break 1				
11:05-12:45	FMI II	Modelica Language & Tools	Mechanical Systems Modelling	HVAC Systems	
12:45-14:30	Lunch in Veduta Restaurant				
14:30-16:10	Modelica Tools & GUIs	Power Plants & Energy Systems	Aerospace	Mechanical Systems, Robotics & VR	
16:10-16:15	Short Break				
16:15-16:30	Closing				
16:30	Coffee Break 2				

FMI USER MEETING & TUTORIALS – MONDAY MAY 15

FMI User Meeting and Tutorials will start at 13:00 and last until 16:30 except the KTH tutorial which will start at 15:00

Zenit	Tycho	Aquarius	Leo	Quadrant
FMI User Meeting	OpenModelica Introduction to Modeling, Simulation, Debugging and Optimization with Modelica and OpenModelica	DLR Multilevel modelling using the Actuator Library and systematical introduction of faults using the FaultTriggering Library	OTH Control of Electric Drives	ESI Modeling of a Mobile Inverted Pendulum System (MIPS)
Nadir	Kepler	Taurus	Virgo	Stella
MODELON Optimized control and operation of coupled energy systems	Dassault Systèmes Test-Driven Library Development: Best practices and usage of Modelica testing solutions including the novel Testing Library	Wolfram Build your Own Hardware Lab with Modelica and Arduino!	UDK Continuous Integration: Testing Modelica libraries	KTH Cyber-Physical Modeling of Electrical Power Systems using OpenIPSL and OpenModelica

VENDOR SESSION – MONDAY MAY 15

	Zenit	Nadir	Tycho-Kepler
17:00-17:45	Dymola and 3DEXPERIENCE evolutions - Key messages from Dassault Systèmes Dassault Systèmes	OpenModelica - Status and News on Simulation, Debugging, FMI, and Optimization Open Source Modelica Consortium	DACCOSIM 2017 EDF Lab Paris-Saclay
17:45-18:30	Maplesoft Maplesoft	Modelica and FMI Products from Modelon Modelon	SystemModeler 5 Wolfram Research
18:30-19:15	New in SimulationX 3.8 ESI ITI GmbH	Ricardo - IGNITE Ricardo	XRG Score - A new Excel-based tool for FMU simulations XRG Simulation GmbH

SCIENTIFIC PROGRAM – TUESDAY MAY 16

	Zenit-Nadir		
	Opening and Welcome Address		
	Modelica News		
	Keynote 1: Bernd Liepert: Challenges of Future Robotics		
	Zenit-Nadir	Tycho-Kepler	Aquarius-Taurus
	Leo-Virgo		
	Automotive I Chair: Michael Tiller	Buildings I Chair: Christoph Nytsch-Geusen	Process & Chemical Engineering Chair: Gerhard Schmitz
	Control Systems I Chair: Johan Åkesson		
9:00-9:20			
9:20-9:30			
9:30-10:15			
10:45-11:10	Development of an Integrated Control of Front Steering and Torque Vectoring Differential Gear System Using Modelica Yutaka Hirano	Coupled Simulation between CFD and Multizone Models Based on Modelica Buildings Library to Study Indoor Environment Control Wei Tian, Wangda Zuo, Thomas Sevilla and Michael Sohn	Development of a Thermodynamic Engine in OpenModelica Rahul Jain, Kannan Moudgalya, Peter Fritzon and Adrian Pop
11:10-11:35	Virtual Occupant Model for Riding Comfort Simulation Hyung Yun Choi, Manyong Han, Akinari Hirao and Hisayoshi Matsuoka	Co-Simulation between detailed building energy performance simulation and Modelica HVAC component models Andreas Nicolai and Anne Paepcke	Optimal Control of District Heating Systems using Dynamic Simulation and Mixed Integer Linear Programming Loïc Giraud, Massinissa Merabet, Roland Baviere and Mathieu Vallée
11:35-12:00	A Simulation-Based Digital Twin for Model-Driven Health Monitoring and Predictive Maintenance of an Automotive Braking System Ryan Magargle, Lee Johnson, Padmesh Mandloi, John Batteh and Anand Pitchaikar	Aspects of FMI in Building Simulation Torsten Schwan, René Unger and Jörg Pipiorke	Rapid development of an aircraft cabin temperature regulation concept Alexander Pollok, Daniel Bender, Ines Kerling and Dirk Zimmer
12:00-12:25	Improved Aerodynamic Prediction Through Coupled System and CFD Models Ed Tate, Joaquin Gargoloff, Brad Duncan, Hubertus Tummescheit, John Griffin and John Batteh	Application of Richardson Extrapolation to the Co-Simulation of FMUs from Building Simulation Christoph Clauss, Kristin Majetta and Richard Meyer	Investigation of the Influence of Controller Approaches on Room Thermal Behaviour – A Simulation Study Kristin Majetta, Christoph Clauss and Christoph Nytsch-Geusen

SCIENTIFIC PROGRAM – TUESDAY MAY 16

Zenit-Nadir	Tycho-Kepler	Aquarius-Taurus	Leo-Virgo
<p>Automotive II Chair: Ed Tate</p> <p>Powertrain and Thermal System Simulation Models of a High Performance Electric Road Vehicle Massimo Stellato, Luca Bergianti and John Batteh</p>	<p>Buildings II Chair: Michael Wetter</p> <p>Template based code generation of Modelica building energy simulation models Christoph Nytsch-Geusen, Alexander Inderfurth, Werner Kaul, Katharina Mucha, Jörg Rädler, Matthias Thorade and Carles Ribas Tugores</p>	<p>Electrical & Power Systems I Chair: Dietmar Winkler</p> <p>Simulation of Large Grids in OpenModelica: reflections and perspectives Francesco Casella, Alberto Leva and Andrea Bartolini</p>	<p>Control Systems II Chair: Bernhard Bachmann</p> <p>From system model to optimal control - A tool chain for the efficient solution of optimal control problems Manuel Gräber, Jörg Fritzsche and Wilhelm Tegethoff</p>
<p>Investigating the Effect of a Sonic Restrictor in the Intake of an Engine Maura Gallarotti, Alessandro Picarelli and Mike Dempsey</p>	<p>Modelling and Simulation of Standardised Control Functions from Building Automation Georg Ferdinand Schneider, Georg Ambrosius Peßler and Simone Steiger</p>	<p>A Modelica-based Tool for Power System Dynamic Simulations Gladys E. Leon, Francois P. Beaudé and Jean-Baptiste Heyberger</p>	<p>Nonlinear Model Predictive Control of a Thermal Management System for Electrified Vehicles using FMI Torben Fischer, Tom Kraus, Christian Kirches and Frank Gauterin</p>
<p>Engine thermal shock testing prediction through coolant and lubricant cycling in Dymola Alessandro Picarelli, Eduardo Galindo and Rodolfo Soler</p>	<p>Modelling of Heat Pumps with Calibrated Parameters Based on Manufacturer Data Massimo Cimmino and Michael Wetter</p>	<p>A Modelica VSC-HVDC Average Value Model Implementation and its Software-to-Software Validation using an EMT Power System Domain Specific Simulator Mohammed Ahsan Adib Murad and Luigi Vanifretti</p>	<p>Defining and Solving Hybrid Optimal Control Problems with Higher Index DAEs Radoslaw Pytlak, Damian Suski, Tomasz Tarnawski and Tomasz Zawadzki</p>

14:15-14:40

14:40-15:05

15:05-15:30

SCIENTIFIC PROGRAM – TUESDAY MAY 16

Meridian			
Poster Session			
Zenit-Nadir	Tycho-Kepler		
Aquarius-Taurus	Leo-Virgo		
<p>Automotive III Chair: Mike Dempsey</p> <p>Model Based Design of a Split Carrier Wheel Suspension for Light-weight Vehicles Jakub Tobolar, Daniel Baumgartner, Yutaka Hirano, Tilman Bünte, Michael Fileps-Dezasse and Jonathan Brembeck</p>	<p>Thermodynamic Systems Chair: Wilhelm Tegethoff</p> <p>Optimization-friendly thermodynamic properties of water and steam Marcus Åberg, Johan Windahl, Håkan Runvik and Fredrik Magnusson</p>	<p>Electrical & Power Systems II Chair: Anton Haumer</p> <p>Improved Model of Photovoltaic Systems Dmitry Altshuller, Peter Hüsson, Christopher Jones and Leonard Janczyk</p>	<p>Control Systems III Chair: Hilding Elmqvist</p> <p>Discrete-time models for control applications with FMI Rüdiger Franke, Sven Erik Mattsson, Martin Otter, Karl Wernersson, Hans Olsson, Lennart Ochel and Torsten Blochwitz</p>
<p>Development of hierarchical commercial vehicle model for target cascading suspension design process Kwangchan Ko, Jaehun Jo, Seungjin Heo, Daeh Kang, Minsu Hyun and Jongchan Park</p>	<p>Modeling of a Thermosiphon Based Thermal Battery for a Portable Air Conditioning Device Rohit Dhurmane, Jiazhen Ling, Vikrant Aute and Reinhard Radermacher</p>	<p>Modelling of a Hydro Power Station in an Island Operation Arndis Magnúsdóttir and Dietmar Winkler</p>	<p>Model-based Embedded Control using Rosenbrock Integration Methods Hans Olsson, Sven Erik Mattsson, Martin Otter, Andreas Pfeiffer, Christoff Bürger and Dan Henriksson</p>
<p>Model Based Analysis of Shimmy in a Racing Bicycle Nicolò Tomiati, Gianantonio Magnani, Bruno Scaglioni and Gianni Ferretti</p>	<p>Extended Modelica Model for Heat Transfer of Two-Phase Flows in Pipes Considering Various Flow Patterns Timm Hoppe, Friedrich Gottelt and Stefan Wischhusen</p>	<p>Periodic Steady State Identification of electrical circuits Martin Kuhn</p>	<p>Integration of complex Modelica-based physics models and discrete-time control systems: Approaches and observations of numerical performance Kai Wang, Christopher Greiner, John Batteh and Lixiang Li</p>

16:00-17:15

17:15-17:40

17:40-18:05

18:05-18:30

SCIENTIFIC PROGRAM – WEDNESDAY MAY 17

08:30-09:15		09:20-09:45		09:45-10:10		10:10-10:35	
Keynote 2: Gérard Berry: Synchronous Programming and its fit with Modeling		Keynote 3: Petr Dvořák: The Role of Modelica in the Development of Cyber-Physical Systems		Keynote 4: Peter Baranyi: The Role of Modelica in the Development of Cyber-Physical Systems		Keynote 5: Peter Baranyi: The Role of Modelica in the Development of Cyber-Physical Systems	
Zenit-Nadir		Tycho-Kepler		Aquarius-Taurus		Leo-Virgo	
FMI I Chair: Torsten Blochwitz		Numerical & Symbolic Methods Chair: Hans Olsson		Acoustic & Medical Systems Chair: Marek Mateják		Wind & Naval Engineering Chair: Michael Sietemann	
Improving Interoperability of FMI-supporting Tools with Reference FMUs Christian Bertsch, Awad Mukbil and Andreas Junghanns	Solving large-scale Modelica models: new approaches and experimental results using OpenModelica Willi Braun, Francesco Casella and Bernhard Bachmann	Integrative physiology in Modelica Jiří Kofránek, Tomáš Kulhánek, Marek Mateják, Filip Ježek and Jan Šilar	The DLR RailwayDynamics Library: the Crosswind Stability Problem Andreas Heckmann and Gustav Grether	The Embedded Simulation via FMI and its Application to the Simulation of Lifetime Tests Including Wear Julia Gundermann, Matthias Thiele, Sebastian Fraulob, Susanne Walther, Karsten Todtermuschke and Uwe Schnabel	Transformation of Differential Algebraic Array Equations to Index One Form Martin Otter and Hilding Elmqvist	Sound Source Extension Library for Modelica Johann Emhofer, Raimund Zitzenbacher and Christoph Reichl	The OneWind Modelica Library for Floating Offshore Wind Turbine Simulations with Flexible Structures Mareike Leimeister and Philipp Thomas
Integration Modelica with Digital Mockup Tool using the FMI Shinji Matsuda	Smart Processing of Function Calls to Achieve Efficient Simulation Code Jan Hagemann, Patrick Täuber, Lennart Ochel and Bernhard Bachmann	Towards Medical Cyber-Physical Systems: Modelica and FMI based Online Parameter Identification of the Cardiovascular System Jonas Gesenhues, Marc Hein, Maike Kettelhut, Thivaharan Albin and Dirk Abel	Modelica Based Naval Architecture Library for Small Autonomous Boat Design Thom Trentelman, Joshua Sutherland, Kazuya Oizumi and Kazuhiro Aoyama				

SCIENTIFIC PROGRAM – WEDNESDAY MAY 17

Zenit-Nadir	Tycho-Kepler	Aquarius-Taurus	Leo-Virgo
<p>FMI II Chair: Andreas Junghanns</p>	<p>Modelica Language & Tools Chair: Peter Fritzzon</p>	<p>Mechanical Systems Modelling Chair: Gianni Ferretti</p>	<p>HVAC Systems Chair: Stefan Wischhusen</p>
<p>FMI Go! A simulation runtime environment with a client server architecture over multiple protocols Claude Lacoursière and Tomas Härdin</p>	<p>Innovations for Future Modelica Hilding Elmqvist, Toivo Henningsson and Martin Otter</p>	<p>Object-oriented modelling of a flexible beam including geometric nonlinearities Davide Invernizzi, Bruno Scaglioni, Gianni Ferretti and Paolo Albertelli</p>	<p>Cabin Thermal Needs: Modeling and Assumption Analysis Florent Breque and Maroun Nemer</p>
<p>11:05-11:30</p>	<p>Experimenting with Matryoshka Co-Simulation: Building Parallel and Hierarchical FMUs Virginie Galtier, Michel Ianotto, Mathieu Caujolle, Rémi Corniglion, Jean-Philippe Tavella, José Évora Gómez, José Juan Hernández Cabrera, Vincent Reinbold and Enrique Kremers</p>	<p>Musculoskeletal Modeling of the Hand and Contact Object in Modelica Shashank Swaminathan and Johan Andreasson</p>	<p>Simulative Comparison of Mobile Air-Conditioning Concepts for Mechanical and Electrical Driven Systems Arnim von Manstein, Dirk Limperich and Shivakumar Banakar</p>
<p>11:30-11:55</p>	<p>Hierarchical Semantics of Modelica Christoph Höger</p>	<p>Modelica Spur Gears with Hertzian Contact Forces Markus Dahl, Håkan Wettergren and Henrik Tidefelt</p>	<p>Duty Cycle for Low Energy Operation of a Personal Conditioning Device Rohit Dhumane, Jiazhen Ling, Vikrant Aute and Reinhard Radermacher</p>
<p>11:55-12:20</p>	<p>Towards a Standard-Conform, Platform-Generic and Feature-Rich Modelica Device Drivers Library Bernhard Thiele, Thomas Beutlich, Volker Waurich, Martin Sjölund and Tobias Bellmann</p>	<p>Modelica.university: A Platform for Interactive Modelica Content Michael Tiller and Dietmar Winkler</p>	<p>A Platform for the Agent-based Control of HVAC Systems Roobebeh Sangi, Felix Bünning, Johannes Fütterer and Dirk Müller</p>
<p>12:20-12:45</p>	<p>Scaling FMI-CS Based Multi-Simulation Beyond Thousand FMUs on Infiniband Cluster Stephane Vialle, Jean-Philippe Tavella, Cherifa Dad, Remi Corniglion, Mathieu Caujolle and Vincent Reinbold</p>	<p>Development of an open source multi-platform software tool for parameter estimation studies in FMI models Javier Bonilla, Jose Antonio Carballo, Lidia Roca and Manuel Berenguel</p>	<p>Modeling of Roller Bearings Tobias Weiser and Burkhard Corves</p>

SCIENTIFIC PROGRAM – WEDNESDAY MAY 17

Zenit-Nadir	Tycho-Kepler	Aquarius-Taurus	Leo-Virgo
Modelica Tools & GUIs Chair: Dag Brück	Power Plants & Energy Systems Chair: Hubertus Tummescheit	Mechanical Systems, Robotics & VR Chair: Martin Otter	Aerospace Chair: Dirk Zimmer
14:30-14:55 MoVE – A Standalone Modelica Vector Graphics Editor Nicola Justus, Christopher Schölzel and Andreas Dominik	Component Development for Nuclear Hybrid Energy Systems Scott Greenwood	Interactive FMU-Based Visualization for an Early Design Experience Volker Waurich and Jürgen Weber	The Jet Propulsion Library: Modeling and simulation of aircraft engines Michael Sielemann, Anand Pitchaikani, Nithish Selvan and Majed Sammak
14:55-15:20 MoIE – A Communication Service Between Modelica Compilers and Text Editors Nicola Justus, Christopher Schölzel, Andreas Dominik and Thomas Letschert	Modeling and simulation of fixed bed regenerators for a multi-tower decoupled advanced solar combined cycle Iván Mesonero, Jesús Febres and Susana López Pérez	Using Modelica for advanced Multi-Body modelling in 3D graphical robotic simulators Gianluca Bardaro, Luca Bascetta, Francesco Casella and Matteo Matteucci	Virtual flight testing of a controller for gust load alleviation using FMI for cosimulation Reiko Müller and Markus Ritter
15:20-15:45 Traceability Support in OpenModelica Using Open Services for Lifecycle Collaboration (OSLC) Alachew Mengist, Adrian Pop, Adeel Asghar and Peter Fritzson	Annual Performance of a Solar-Thermochemical Hydrogen Production Plant Based on CeO2 Redox Cycle Alberto de La Calle and Alicia Bayon	A New Object-Oriented Approach for Integrating Discrete Element Method into Modelica Christian Richter, Jürgen Weber, Florian Ohser and Thomas Beutlich	The DLR Environment Library for Multi-Disciplinary Aerospace Applications Läte Evrim Briese, Andreas Klöckner and Matthias Reiner
15:45-16:10 A Simulation Environment for Efficiently Mixing Signal Blocks and Modelica Components Ramin Nikoukhan, Masoud Najafabadi and Fady Nassif	Applying the Power Plant Library ClaRa for Control Optimisation Friedrich Gottelt, Timm Hoppe and Lasse Nielsen	Modeling and Simulation of Wheel Driving Systems based on Terramechanics for Planetary Explanation Rover using Modelica Hiroki Yoshikawa, Takatsugu Oda, Kenichiro Nonaka and Kazuma Sekiguchi	
16:15-16:30 Closing	Zenit-Nadir		

POSTER SESSION – TUESDAY MAY 16

Poster session will start in Meridian at 16:00 and will last until 17:15

1.

Generic FMI-compliant Simulation Tool Coupling

Edmund Widl and Wolfgang Müller

2.

Modelling and Simulation of the passive Structure of a 5-Axis-Milling Machine with rigid and flexible bodies for evaluating the static and dynamic behaviour

Michael Schneider, Anton Haumer and Rupert Köckeis

3.

Simulating a Variable-structure Model of an Electric Vehicle for Battery Life Estimation Using Modelica/Dymola and Python

Moritz Stüber

4.

A Power-Based Model of a Heating Station for District Heating (DH) System Applications

Abdulrahman Dahash, Annette Steingrube and Mehmet Elci

5.

FMI and IP protection of models: A survey of use cases and support in the standard

Erik Durling, Elias Palmkvist and Maria Henningsson

6.

Modeling and simulation of complex ThermoSysPro model with OpenModelica - Dynamic Modeling of a combined cycle power plant

Baligh El Hefni and Daniel Bouskela

7.

Modeling and Simulation on Environmental and Thermal Control System of Manned Spacecraft

Sun Lefeng, Jin Jian, Chen Liping, Liu Wei, Zhou Fanli and Liu Qi

8.

Model Reduction Techniques Applied to a Physical Vehicle Model for HiL Testing

Romain Gillot, Alessandro Picarelli, Mike Dempsey and Stephen Gallagher

9.

Towards Virtual Validation of ECU Software using FMI

Lars Mikelsons and Roland Samlaus

10.

Rotating Machinery Library for Diagnosis

Tatsuro Ishibashi, Bing Han and Tadao Kawai

11.

PDEModelica and Breathing in an Avalanche

Jan Šilar, Filip Ježek and Jiří Kofránek

12.

Failure Modes of Tearing and a Novel Robust Approach

Ali Baharev, Arnold Neumaier and Hermann Schichl

13.

Multirotor Aerial Vehicle modeling in Modelica

Muhamed Kuric, Nedim Osmic and Adnan Tahirovic

14.

EMOTH The EMobility Library of OTH Regensburg

Alexander Grimm and Anton Haumer

15.

Towards Adjoint and Directional Derivatives in FMI utilizing ADOL-C within OpenModelica

Willi Braun, Kshitij Kulshreshtha, Rüdiger Franke, Andrea Walther and Bernhard Bachmann

16.

Model-based virtual sensors by means of Modelica and FMI

Mikel Gonzalez Cocho, Oscar Salgado, Jan Croes, Bert Pluymers and Wim Desmet

17.

Large Scale Training through Spoken Tutorials to Promote and use OpenModelica

Kannan Moudgalya, Bhargava Nemmaru, Kaushik Datta, Priyam Nayak, Rahul Jain, Peter Fritzson and Adrian Pop

18.

Dymola-JADE Co-Simulation for Agent-Based Control in Office Spaces

Ana Constantin, Artur Löwen, Ferdinanda Ponci, Kristian Huchtemann and Dirk Müller

19.

Parameter Estimation based on FMI

Rüdiger Kampfmann, Danny Mösch and Nils Menager

SOCIAL PROGRAM

Welcome Reception Monday May 15, 19.30.

The welcome reception will take place at the Foyer of the conference floor.



Conference Dinner Tuesday May 16, 20.00 at Národní Dům na Vinohradech.

individual transportation, offered assistance: meeting point at 19.00 by the registration desk



PRACTICAL INFORMATION

Application Access

Download from *Google Play* or *App Store* the application **App4Event**. Then select the event **Modelica 2017**



Proceedings

They are available at **Modelica 2017 Proceedings Page** <https://modelica.org/events/modelica2017/proceedings> or in the **App4Event** application for download

WIFI Connection

Free wireless Internet will be available.

Network: Congress

User: modelica2017@clarion.cz

Password: modelica2017

Registration Desk

The registration desk is open from Monday May 15 2017 12:00 throughout the whole conference.

Parking

Hotel is connected with a shopping mall and has its own underground garage.

Voltage

Electricity in Czech Republic 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 (Police, Fire Service, Emergency Medical Service)

158 – Police

150 – Fire and Rescue Service

155 – Emergency Medical Service

1240 – Emergency Road Service

444 – General Information

International Dialing Code of the Czech Republic **+420**

Tourist Information

For more information about Prague, please go to <http://www.prague.eu/en>

Prague City Transport Fares

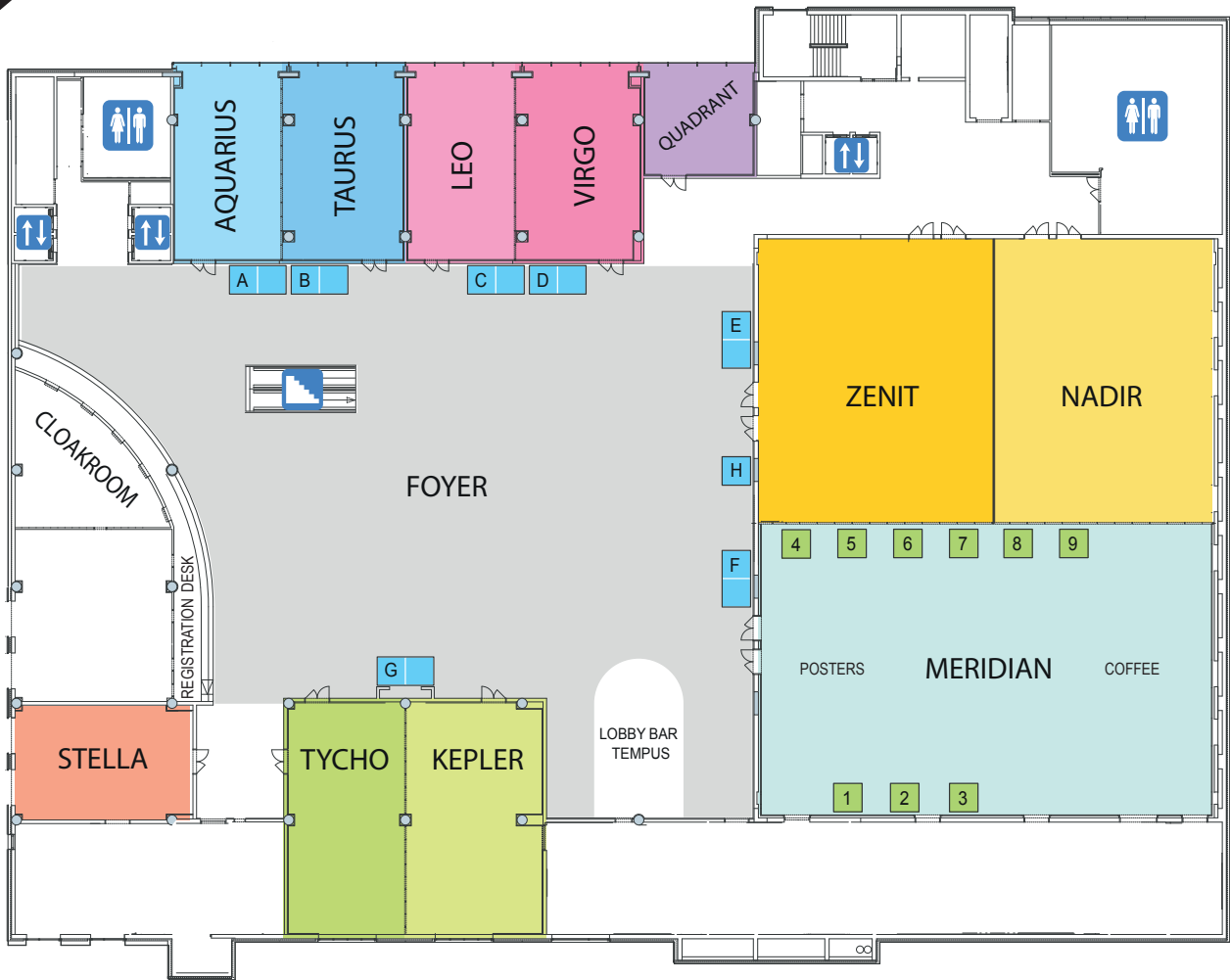
The hotel is located at Metro station Vysočanská and it is advised to travel to the city centre by the public transport. Passengers have to purchase their tickets before boarding the vehicle or entering the Metro system. The ticket is valid only if marked in the validation machine. Tickets can be bought at selected Metro stations or in Dopravní podnik information centres, hotels, at news stands, travel agencies, department stores, etc.

32 CZK - valid for 90 minutes after marking

24 CZK - valid for 30 minutes after marking

All tickets are valid for metro, trams and buses with possible transfer.

SITE PLAN



 AQUARIUS	 LEO	 ZENIT	 TYCHO	 MERIDIAN	 STELLA
 TAURUS	 VIRGO	 NADIR	 KEPLER	 QUADRANT	 FOYER

EXHIBITION

The following companies/institutes will exhibit (alphabetic order):

Altair Engineering	F	LTX Simulation GmbH	B
ANSYS	A	Maplesoft.....	E
CENIT AG	1	Modelon.....	H
Claytex Services.....	4	National Instruments	9
Concurrent Computer	2	Open Source Modelica Consortium.....	5
Dassault Systèmes.....	G	Ricardo Software.....	D
ESI ITI GmbH.....	C	Schlegel Simulation GmbH	7
FAB Bertelmann Technologie.....	3	Wolfram.....	8
FEV SA.....	6		

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Session 4A: Automotive I

Tuesday, May 16th - 10:45

A Simulation-Based Digital Twin for Model-Driven Health Monitoring and Predictive Maintenance of an Automotive Braking System

Ryan Magargle, Lee Johnson - ANSYS

Padmesh Mandloi, John Batteh and Anand Pitchaikani - MODELON



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Altair focuses on the development and application of simulation technology to synthesize and optimize designs, processes and decisions for improved business performance. Privately held, Altair is headquartered in Troy, MI, USA, has more than 2,600 employees in over 45 offices throughout 20 countries, and serves more than 5,000 corporate clients.

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Dassault Systèmes, the 3DEXPERIENCE Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes delivers roles and applications, Dymola and CATIA Dymola Behavior Modeling, for System Modeling and Simulation, using the open Modelica language.

MapleSim is a Modelica-based system-level modeling and simulation tool that applies modern techniques to dramatically reduce model development time, provide greater insight into system behavior, and produce fast, high-fidelity simulations. The combination of Modelica with the symbolic computation power of MapleSim enables a level of understanding, power, and extensibility not possible with "black-box" tools.

SILVER



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Modelon is a global expert in solutions for model-based systems and a leader in developing and supporting the Modelica and FMI open standards. Our open and flexible tools and model libraries for simulation and optimization accelerate virtual product creation and allow our customers to focus on their core business objectives.

Wolfram is the company where computation meets knowledge. For three decades, Wolfram has been a leader in knowledge-based programming, creating innovative technologies like Mathematica and the Wolfram Language. Wolfram SystemModeler brings this tradition of innovation to modeling and simulation.

