

Modelica 2021 program

Monday, 20/09, time zone CEST

Tutorials					
9.00-10:30	Room A: FMI in the Cloud, Torsten, Sommer	Room B : Introduction to Modeling, Simulation, Debugging, and Interoperability with Modelica and OpenModelica	Room C : Modelica Buildings Library	Room D: Introduction to Modelica with Modelon Impact	Room E: Energy and thermal management of an electrical vehicle
Break on wonder.me					
11.00-12:30	Room A: FMI in the Cloud, Torsten, Sommer	Room B : Introduction to Modeling, Simulation, Debugging, and Interoperability with Modelica and OpenModelica	Room C : Modelica Buildings Library	Room D: Introduction to Modelica with Modelon Impact	Room E: Energy and thermal management of an electrical vehicle
Lunch					
13:30- 14:15	<i>Opening introduction from chairs, Modelica Association News</i>				
14:15-15:00	<i>Keynote: New Horizons in Modeling and Simulation with Julia, Viral Shah, Chris Rackauckas and Chris Laughman</i>				
Break on wonder.me					
Session 1A: open standards (1) FMI/SSP, chair Henrik Tidefelt			Session 1B: Julia, chair Peter Frizson		
15:30-15:50	10 - <i>The Functional Mock-up Interface 3.0 - New Features Enabling New Applications</i> , Andreas Junghanns, Torsten Blochwitz, Christian Bertsch, Torsten Sommer, Karl Wernersson, Andreas Pillekeit, Irina Zacharias, Matthias Blaesken, Pierre R. Mai, Klaus Schuch, Christian Schulze, Cláudio Gomes and Masoud Najafi		49 - <i>Modia - Equation Based Modeling and Domain Specific Algorithms</i> , Hilding Elmqvist, Martin Otter, Andrea Neumayr and Gerhard Hippmann		
15:50-16:10	4 - <i>The FMI 3.0 Standard Interface for Clocked and Scheduled Simulations</i> , Cláudio Gomes, Masoud Najafi, Torsten Sommer, Matthias Blesken, Irina Zacharias, Oliver Kotte, Pierre R. Mai, Klaus Schuch, Karl Wernersson, Christian Bertsch, Torsten Blochwitz and Andreas Junghanns		65 - <i>Modia and Julia for Grey Box Modeling</i> , Frederic Bruder and Lars Mikelsons		
16:10-16:30	42 - <i>Engineering Domain Interoperability Using the System Structure and Parameterization (SSP) Standard</i> , Robert Hällqvist, Raghu Chaitanya Munjulury, Robert Braun, Magnus Eek and Petter Krus		79 - <i>Composing Modeling and Simulation with Machine Learning in Julia</i> , Chris Rackauckas, Ranjan Anantharaman, Alan Edelman, Shashi Gowda, Maja Gwozdz, Anand Jain, Chris Laughman, Yingbo Ma, Francesco Martinuzzi, Avik Pal, Utkarsh Rajput, Elliot Saba and Viral Shah		
16:30-16:50	18 - <i>Modelica, FMI and SSP for LOTAR of analytical mBSE models: First implementation and feedbacks</i> , Clément Coïc, Adrian Murton, Juan Carlos Mendo, Mark Williams, Hubertus Tummescheit and Kurt Woodham		75 - <i>OpenModelica.jl: A modular and extensible Modelica compiler framework in Julia targeting ModelingToolkit.jl</i> , John Tinnerholm, Adrian Pop, Andreas Heuermann and Martin Sjölund		
16:50-17:10	34 - <i>eFMI: An open standard for physical models in embedded software</i> , Oliver Lenord, Martin Otter, Christoff Bürger, Michael Hussmann, Pierre Le Bihan, Jörg Niere, Andreas Pfeiffer, Robert Reicherdt and Kai Werther				

Tuesday, 21/09, time zone CEST

	Session 2A: initialisation and parametrization, chair : Martin Otter	Session 2B: applications (1), chair : Dan Henriksson
08:50-09:10	3 - <i>Investigating Steady State Initialization for Modelica models</i> , Hans Olsson and Erik Henningsson	22 - <i>Aircraft Mission Simulation with the updated FlightDynamics Library</i> , Marc May, Reiko Müller and Gertjan Looye
09:10-09:30	5 - <i>New Equation-based Method for Parameter and State Estimation</i> , Luis Corona Mesa-Moles, Erik Henningsson, Daniel Bouskela, Audrey Jardin and Hans Olsson	15 - <i>Modelica-Based Modeling on LEO Satellite Constellation</i> , Chan Liu, Yikai Qian, Liping Chen, Yan Qu, Fanli Zhou
09:30-09:50	1 - <i>Efficient Parameterization of Modelica Models</i> , Thomas Beutlich and Dietmar Winkler	67 - <i>Guidance, Navigation, and Control enabling Retrograde Landing of a First Stage Rocket</i> , Christian Canham, Meaghan Podlaski and Luigi Vanfretti
09:50-10:10	47 - <i>Power Flow Record Structures to Initialize OpenIPSL Phasor Time-Domain Simulations with Python</i> , Sergio A. Dorado-Rojas, Giuseppe Laera, Marcelo de Castro Fernandes, Tetiana Bogodorova and Luigi Vanfretti	64 - <i>An Ice Storage Tank Modelica Model: Implementation and Validation</i> , Guowen Li, Yangyang Fu, Amanda Pertzborn, Jin Wen and Zheng O'Neill
Break on wonder.me		
	Session 3A: libraries, chair: Francesco Casella	Session 3B: digital twins, chair Martin Krammer
10:40-11:00	12 - <i>Status of the TransiEnt Library: Transient Simulation of Complex Integrated Energy Systems</i> , Anne Senkel, Carsten Bode, Jan-Peter Heckel, Oliver Schülting, Gerhard Schmitz, Christian Becker and Alfons Kather	50 - <i>The Potential of FMI for the Development of Digital Twins for Large Modular Multi-Domain Systems</i> , Marcus Wiens, Tobias Meyer and Philipp Thomas
11:00-11:20	30 - <i>DLR Visualization 2 Library - Real-Time Graphical Environments for Virtual Commissioning</i> , Sebastian Kümper, Matthias Hellerer and Tobias Bellmann	26 - <i>Object-Oriented Models of Parallel Manipulators</i> , Paolo Campanini and Gianni Ferretti
11:20-11:40	39 - <i>Towards a Modelica OPC UA Library for Industrial Automation</i> , Bernhard Thiele	60 - <i>A Modelica Library for Modelling of Electrified Powertrain Digital Twins</i> , Nikolaos Fotias, Ran Bao, Hui Niu, Michael Tiller, Paul McGahan and Adam Ingleby
11:40-12:00	46 - <i>A Modelica library for Thermal-Runaway Propagation in Lithium-Ion Batteries</i> , Christian Groß and Andrej W. Golubkov	77 - <i>Development of a real-time test bed for indoor climate simulation in a VR environment using a digital twin</i> , Kushagra Mathur, Christoph Nytsch-Geusen and Lucas Westermann
12:00-12:20	51 - <i>The DLR ThermoFluidStream Library</i> , Dirk Zimmer, Niels Weber and Michael Meißner	29 - <i>A first principles thermal losses model of the TCP-100 parabolic trough collector based on the Modelica Standard Library</i> , Julia Pérez, Luis J. Yebra, Francisco M. Márquez and Pedro J. Zufiria
Lunch		
13:30- 14.15	VENDOR SESSION: Wolfram System Modeler and Virtual Labs	
14:30-15.15	VENDOR SESSION : ThermoAnalytics : Using FMI for transient heat transfer simulation of 1D system models and TAITherm 3D thermal models	
15:30-16.15	VENDOR SESSION : Maplesoft: MapleSim 2021	
16:30-17.15	VENDOR SESSION : OpenModelica – Status and News on OpenModelica Development and Applications	

Wednesday, 22/09, time zone CEST

8:30-9.15	VENDOR SESSION : Toshiba Digital Solutions Corporation: Distributed Co-simulation Platform - VenetDCP	
9:30-10.15	VENDOR SESSION : Chiastek : Implementing multi-fmu simulation with a cosimulation platform	
	Break on wonder.me	
10:30-11.15	VENDOR SESSION : Dynawo: an hybrid C++/Modelica open-source suite of simulation tools for power systems	
11:30-12.15	VENDOR SESSION : Dassault Systèmes Vendor Session	
	Lunch	
13:30-14.15	VENDOR SESSION : Modelon Impact - System Simulation for Everyone	
	Session 4A: applications (2), chair: Michael Tiller	Session 4B: buildings, chair: Hubertus Tummescheit
14:20-14:40	23 - <i>Electromagnetic Transient Simulation of Large Power Networks with Modelica</i> , Alireza Masoom, Jean Mahseredjian, Tarek Ould-Bachir and Adrien Guironnet	13 - <i>Detailed White-Box Non-Linear Model Predictive Control for Scalable Building HVAC Control</i> , Filip Jorissen, Damien Picard, Kristoff Six and Lieve Helsen
14:40-15:00	7 - <i>Seismic Hybrid Testing using FMI-based Co-Simulation</i> , Cláudio Gomes, Giuseppe Abbiati and Peter Gorm Larsen	31 - <i>Software Architecture and Implementation of Modelica Buildings Library Coupling for Spawn of EnergyPlus</i> , Michael Wetter, Kyle Benne and Baptiste Ravache
15:00-15:20	24 - <i>NeuralFMU: Towards Structural Integration of FMUs into Neural Networks</i> , Tobias Thummerer, Josef Kircher and Lars Mikelsons	62 - <i>Coupling physical and machine learning models: case study of a single-family house</i> , Basak Falay, Sandra Wilfling, Qamar Alfalouji, Johannes Exenberger, Thomas Schranz, Christian Møldrup Legaard, Ingo Leusbrock and Gerald Schweiger
15:20-15:40	58 - <i>Sensitivity Analysis of a Car Shock Absorber Through a Functional Mock-up Units-Based Modelling Strategy</i> , Bruno Vuillod, Ludovic Hallo, Enrico Panettieri and Marco Montemurro	66 - <i>Underfloor heating system model for building performance simulations</i> , Stephan Göbel, Elaine Schmitt, Philipp Mehrfeld and Dirk Müller
	Break on wonder.me	
	Session 5A: testing, chair: Anton Haumer	Session 5B: open standards (2) FMI/DCP, chair: Robert Braun
16:10-16:30	48 - <i>ScalableTestGrids - An Open-Source and Flexible Benchmark Suite to Assess Modelica Tool Performance on Large-Scale Power System Test Cases</i> , Francesco Casella and Adrien Guironnet	44 - <i>A Cloud-native Implementation of the Simulation as a Service-Concept Based on FMI</i> , Moritz Stüber and Georg Frey
16:30-16:50	56 - <i>Continuous Development and Management of Credible Modelica Models</i> , Leo Gall, Martin Otter, Matthias Reiner, Matthias Schäfer and Jakub Tobolar	59 - <i>Python Framework for Wind Turbines Enabling Test Automation of MoWiT</i> , Johannes Fricke, Marcus Wiens, Niklas Requate and Mareike Leimeister
16:50-17:10	2- <i>Modeling of A Bearing Test Bench and Analysis of Defect Bearing Dynamics in Modelica</i> , Diwang Ruan, Zhirou Li and Clemens Gühmann	61 - <i>A GraphBased Meta-Data Model for DevOps in Simulation Driven Development and Generation of DCP Configurations</i> , Stefan H. Reiterer and Clemens Schiffer
17:10-17:30	25 - <i>Modelica Models as Integral Part of the Building Design Process</i> , Torsten Schwan, Monika Wicke, Alexander Hentschel and René Unger	41 - <i>Portable runtime environments for Python-based FMUs: Adding Docker support to UniFMU</i> , Thomas Schranz, Christian Møldrup Legaard, Daniella Tola and Gerald Schweiger

Thursday, 23/09, morning, time zone CEST

	Session 6A: interoperability, chair: Dirk Zimmer	Session 6B : applications (3), chair: Bernhard Thiele
08:50-09:10	36 - <i>General Purpose Lua Interpreter for Modelica</i> , Fabian Buse and Tobias Bellmann	11 - <i>Use of Modelica to predict risk of Covid-19 infection in indoor environments</i> , Arnav Pathak, Kilian Schneider and Victor Norrefeldt
09:10-09:30	8 - <i>Object Manipulation and Assembly in Modelica</i> , Robert Reiser	63 - <i>Model-Based Development of the RespiraWorks Ventilator with Modelon Impact</i> , John Batteh, Lixiang Li, Edwin Chiu and Ethan Chaleff
09:30-09:50	9 - <i>A Portable and Secure Package Format for Executable Simulation Modules based on WebAssembly</i> , Moritz Allmaras, Andrés Botero Halblaub, Harald Held and Tim Schenk	81 - <i>In-silico virtual prototyping multilevel modeling system for Cyborgs (CybSim) as a novel approach for current challenges in biosciences</i> , Manuel Prado-Velasco
09:50-10:10	6 - <i>New Method to Perform Data Reconciliation with OpenModelica and ThermoSysPro</i> , Daniel Bouskela, Audrey Jardin, Arunkumar Palanisamy, Lennart Ochel and Adrian Pop	52 - <i>Decarbonization of Industrial Energy Systems: A Case Study of Printed Circuit Board manufacturing</i> , Carles Ribas Tugores, Gerald Birngruber, Jürgen Fluch, Angelika Swatek and Gerald Schweiger
	Break on wonder.me	
	Session 7A : Modelica Language - Hilding Elmqvist	Session 7B : energy (1) - Dietmar Winkler
10:40-11:00	17 - <i>Handling Multimode Models and Mode Changes in Modelica</i> , Albert Benveniste, Benoît Caillaud and Mathias Malandain	35 - <i>A Modular Model of Reversible Heat Pumps and Chillers for System Applications</i> , Fabian Wüllhorst, David Jansen, Philipp Mehrfeld and Dirk Müller
11:00-11:20	69 - <i>A Reduced Index Mode-Independant Structure Model Transformation for Multimode Modelica Models</i> , Benoît Caillaud, Mathias Malandain and Albert Benveniste	37 - <i>Modelica Modeling and Simulation for a Micro Gas-Cooled Reactor</i> , Huimin Zhang, Erhui Chen, Yangyang Liang, Li Wang, Jun Wang, Shuhong Du, Liping Chen, Fanli Zhou, Ji Ding and Haiming Zhang
11:20-11:40	14 - <i>Evaluating a Tree Diff Algorithm for Use in Modelica Tools</i> , Martin Sjölund	40 - <i>Energy-based Method to Simplify Complex Multi-Energy Modelica Models</i> , Joy El Feghali, Guillaume Sandou, Hervé Guéguen, Pierre Haessig and Damien Faille
11:40-12:00	28 - <i>Numerically Robust Six-Equation Two-Phase Flow Model for Stationary and Moving Systems in Modelica</i> , Johannes Brunnemann, Ales Vojacek and Thomas Koch	33 - <i>A Case Study on Condenser Water Supply Temperature Optimization with a District Cooling Plant</i> , Kathryn Hinkelman, Jing Wang, Chengliang Fan, Wangda Zuo, Antoine Gautier, Michael Wetter and Nicholas Long
12:00-12:20	16 - <i>Compile Time Impulse Analysis in Modelica</i> , Albert Benveniste, Benoît Caillaud and Mathias Malandain	27 - <i>Long Term Technical and Economic Evaluation of Hydrogen Storage Technologies for Energy Autarkic Residential Complexes</i> , Lucas Schindhelm, Ales Vojacek and Johannes Brunnemann
	Lunch	

Thursday, 23/09, afternoon, time zone CEST

	"FMI Industrial User Meeting – Industrial Usage of FMI and Companion Standards SSP / DCP/ eFMI"
13.30-13.35	Welcome, Overview on FMI / SSP / DCP / eFMI Standards
13.35-13.50	Initial Steps in Deploying and Calibrating Power System Models on a Synchrophasor Data Cloud Platform using FMI, Luigi Vanfretti, Giuseppe Laera, Marcelo de C. Fernandes, Chen Wang, Chetan Mishra and Kevin D. Jones
13.50-14.05	FMI-based simulation workflows based on open source and commercial tools, Christian Bertsch, Fabian Jansen, Andreas Babucke and Torsten Sommer
14.05-14.20	Open Simulation Platform - Towards a maritime ecosystem for efficient co-simulation , Lars Tandle Kyllingstad
14.20-14.35	FMI3 development (Status, roadmap, layered standards), Andreas Junghanns
14.35-15.35	Demo of FMI3 support in tool prototypes Andreas Junghanns (Synopsys), Matthias Blesken (dSpace), Masoud Najafi (Altair), Klaus Schuch (AVL), Torte Blochwitz (ESI Group), Torsten Sommer (Dassault)
	Short Break (10 Min)
15.45-15.50	Status and outlook SSP Standard, Jochen Köhler
15.50-16.05	Use of SSP, FMI and OSI for Simulation-based Testing of an Automated Vehicle, Jochen Koehler, Heinz Sachsenweger, Arun Das, Markus Deppe and Hans-Martin Heinkel
16.05-16.20	Model-based development of a traction control unit with SSP and FMI, Nicolas Ochoa Lleras, Hasan Esen, Pierre Mai, Klaus Mai and Hiroshi Tashiro
16.20-16.35	SSP Traceability Demonstrator, Dag Brück, Hans-Martin Heinkel, Peter Lobner and Pierre Mai
16.35-16.50	Status and Outlook DCP Standard, Martin Krammer
16.50-17.05	Status and Outlook eFMI Standard, Christoff Bürger
	General Q&A + End

Friday, 24/09, time zone CEST

09.10-09.15	Modelica Industrial User Session, Introduction, Martin Otter	
09.15-09.40	<i>Engineering Simulation Digital Twin of Hybrid Renewable Energy System by Modelica</i> , Walid Adra	
09.40-10.05	<i>Excavator Simulation Conducted by MWorks with Real Controller Network Communication</i> , Tianjun Zhang, Hao Yang, Fanli Zhou, Liping Chen, Qi Liu and Lu Chen	
10.05-10.30	<i>Building digital twins for AI based root cause analysis</i> , Valentin Drouet and Laurent Muszynski	
	Break on wonder.me	
11.00-11.25	<i>A resume of the ways to improve connection between FEM and OpenModelica</i> , Marco Mastroeni	
11.25-11.50	<i>Optimize a multisubstance goal throughout a complex value chain</i> , Anas Lahlou, Jean Michel Ghidaglia and John Redford	
11.50-12.15	<i>Analysis and reduction of models using Persalys</i> , Claire-Eleuthèriane Gerrer, Hubert Blervaque, Julien Schueller, Daniel Bouskela and Sylvain Girard	
12.15-12.25	Session closing and discussion	
	Lunch	
	Session 8A: energy (2) - Luigi Vanfretti	Session 8B : applications (4) FMI - Christian Bertsch
13:30-13:50	54 - <i>Modelling the Synchronisation Control for a Hydro Power Controller</i> , Jonatan Hellborg, Tonje Tollefsen, Khemraj Bhusal and Dietmar Winkler	74 - <i>Parallel Fast: An Efficient Coupling Approach for Co-Simulation with Different Coupling Step Sizes</i> , Franz Holzinger, Klaus Schuch, Martin Benedikt and Daniel Watzenig
13:50-14:10	55 - <i>Developing Protective Limiters for a Hydro Power Controller in Modelica</i> , Luxshan Manoranjan and Dietmar Winkler	71 - <i>Towards an automated generator of urban building energy loads from 3D building models</i> , Alessandro Maccarini, Michael Mans, Christian Grau Sørensen and Alireza Afshari
14:10-14:30	53 - <i>An Approach for Reducing Gas Turbines Usage by Wind Power and Energy Storage</i> , Nejm Saadallah and Yngve Heggelund	73 - <i>Examination of Reduced Order Building Models with Different Zoning Strategies to Simulate Larger Non-Residential Buildings Based on BIM as Single Source of Truth</i> , David Jansen, Veronika Richter, Diego Cordoba Lopez, Philipp Mehrfeld, Jérôme Frisch, Dirk Müller and Christoph van Treeck
14:30-14:50	57 - <i>Implementation and Validation of the Generic WECC Photovoltaics and Wind Turbine Generator Models in Modelica</i> , Maria Nuschke, Sören Lohr, Adrien Guironnet and Marianne Saugier	38 - <i>Accurate Robot Simulation for Industrial Manufacturing Processes using FMI and DCP Standards</i> , Nihar Hasmukhbhai Shah, Perig Le Henaff, Clemens Schiffer, Martin Krammer and Martin Benedikt
14:50-15:10	80 - <i>Modeling of Recompression Brayton Cycle And CSP Plant Architectures for Estimation of Performance & Efficiency</i> , Ashok Kumar Ravi, Stéphane Velut and Raja Vignesh Srinivasan	19 - <i>Optimizing life-cycle costs for pumps and powertrains using FMI co-simulation</i> , Miro Eklund, Jouni Savolainen, Antti Lukkari and Tommi Karhela
	Break on wonder.me	
15:40-16:25	Keynote: How can the Modelica community support the transition to decarbonized, grid-flexible buildings?, Michael Wetter	
16:25-16:35	Library award, Conference closing	