

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 TBD		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 Mueller 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 TBA
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 : 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: TBA	Session 4B: buildings - Hubertus Tummescheit
14:20-14:40	23 - <i>Electromagnetic Transient Modeling 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> , Anne Senkel, Carsten Bode, Jan-Peter Heckel, Oliver Schülting, Gerhard Schmitz, Christian Becker and Alfons Kather
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
16:10-16:30	48 - <i>ScalableTestGrids - An Open-Source and Flexible Benchmark 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, Andr�s 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, J�rgen 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, Beno�t Caillaud and Mathias Malandain	35 - <i>A Modular Model of Reversible Heat Pumps and Chillers for System Applications</i> , Fabian W�llhorst, David Jansen, Philipp Mehrfeld and Dirk M�ller
11:00-11:20	69 - <i>A Reduced Index Mode-Independant Structure Model Transformation for Multimode Modelica Models</i> , Beno�t 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 Sj�lund	40 - <i>Energy-based Method to Simplify Complex Multi-Energy Modelica Models</i> , Joy El Feghali, Guillaume Sandou, Herv� Gu�g��n, 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, Beno�t 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
	Short Break (10 Min)
14.45-14.50	Status and outlook SSP Standard, Jochen Köhler
14.50-15.05	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
15.05-15.20	Model-based development of a traction control unit with SSP and FMI, Nicolas Ochoa Lleras, Hasan Esen, Pierre Mai, Klaus Mai and Hiroshi Tashiro
15.20-15.35	SSP Traceability Demonstrator, Dag Brück, Hans-Martin Heinkel, Peter Lobner and Pierre Mai
15.35-15.50	Status and Outlook DCP Standard, Martin Krammer
15.50-16.05	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-Eleuthérie 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> , Nejmi 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	