

Preface to the International Workshop on Sustainability and Modeling (SusMod) 2026

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Overview

The perception of the value of modern engineered systems is changing. In addition to their functional and extra-functional properties, nowadays' systems are also evaluated by their sustainability properties [3]. It is fully expected that, in the decade ahead of us, users and organizations will reward and demand efforts toward sustainability. While this expectation is relatively straightforward, it is less clear how these sustainability ambitions should be supported. The multi-systemic and stratified nature of sustainability [6] poses challenges in designing sustainable systems and analyzing sustainability properties [5]. Finding trade-offs between economic, environmental, societal, and technological aspects of sustainability is a wicked problem and calls for advanced modeling methods [1].

Model-driven engineering (MDE) excels in taming the complexity of convoluted problems—of which sustainability is a prime example. Through the mechanism of abstraction, modeling methods aid stakeholders in articulating their sustainability-related goals efficiently [4]. Explicit models of sustainability [2] support formal reasoning to uncover trade-offs among often contradicting sustainability goals. Advanced MDE techniques, such as collaborative and blended modeling, foster participatory modeling methods to externalize sustainability ambitions. It is urgent to investigate how MDE can be used in engineering more sustainable systems and how MDE itself can become sustainable.

This workshop aimed to bring together researchers with MDE and sustainability backgrounds and researchers and practitioners from other domains with concerns, challenges, or contributions about sustainability that a model-driven approach might address. The workshop was intended for a broad spectrum of professionals working on various aspects of sustainability by MDE or sustainability of MDE.

Submissions and Accepted papers

This was SusMod's third edition. After two initial years with a low number of submissions, this year, we accepted eight papers to be presented at the workshop.

Accepted papers

- *Engineering for Planetary Impact: A Model-Driven Framework for Integrating Sustainability and Development Indicators in Socio-Technical Systems*. Van-Ho Nguyen and Yves Wautelet.
- *Formalizing of modeling of the operational phase of a Digital Service System with regards to Life Cycle Assessment*. Floris Thiant, Olivia Penas, Yann Leroy, and Anne-Laure Ligozat.

- *OptiGob 2.0: A Model-Driven Approach for Exploring Agri-Sustainability Projections*. Michael Mittermaier, David Styles, and Judith Michael.
- *Quantifying the Relationship Between Clinical Safety and Environmental Impact in Therapeutic LLMs*. Alireza A. Safaei, Laura M. Vowels, Matthew J. Vowels, Apoorv Jha, and Shekoufeh Rahimi.
- *Towards a Model-Driven Framework for Energy Community Digital Twins*. Alexandra Jäger, Leandra Brauchle, Johannes Karrer, Marcel Böhm, and Philipp Zech.
- *Towards an Intelligent Model-based Approach to Automated Sustainability Reporting*. Juan de Lara, Esther Guerra, Jacinto Corral, and Cristóbal Mora.
- *Towards Meta-Learning-Based Performance Prediction for Machine Learning Surrogates in Digital Twins*. Stijn Bellis and Joachim Denil.
- *Using LLMs for software energy-use analysis and improvement*. Hanan Siala, Kevin Lano, and Zishan Rahman.

Organization

Organizing Committee

- Istvan David, McMaster University, Canada
- Arianna Fedeli, Gran Sasso Science Institute (GSSI), Italy
- Vincenzo Stoico, Vrije Universiteit Amsterdam, The Netherlands

Program Committee

- Stijn Bellis, University of Antwerp, Belgium
- Coral Calerop, University of Castilla-La Mancha, Spain
- Ruzanna Chitchyan, University of Bristol, UK
- Robert Clarisó, Universitat Oberta de Catalunya, Spain
- Benoit Combemale, University of Rennes 1 & Inria, France
- Miguel Goulão, Universidade Nova de Lisboa, Portugal
- Kevin Lano, King's College London, UK
- Xiaoran Liu, McMaster University, Canada
- Luciano Marchezan, University of Montreal, Canada
- Michael Mittermaier, University of Regensburg, Germany
- Elisa Yumi Nakagawa, University of Sao Paulo, Brazil
- Adel Noureddine, University Paris Nanterre, France
- Quentin Perez, INSA Rennes, France
- Yves Wautelet, KU Leuven, Belgium
- Philipp Zech, University of Innsbruck, Austria

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