OpenSD2025
Open-source Scientific Computing in Structural Dynamics

Keynote speaker **Thiago Ritto**

Prof. Thiago Ritto is the author of ROSS, an open-source finite element software for rotordynamics. He actively contributes to the open-source community, sharing tools and research to advance the field of mechanical engineering. His scientific work combines physics-based modeling with modern computational techniques such as machine learning, neural networks, and Bayesian methods. He is widely published, with over 170 academic contributions. His main research areas include rotordynamics, drill string dynamics, wind turbines, and fluid-structure interactions, with a strong emphasis on uncertainty quantification and predictive modeling.

Roundtable: **Building Open-source Community in Structural Dynamics**

The roundtable will explore how open-source tools can advance the field through collaborative development, reproducible research, and community-driven innovation. The discussion will bring together experts in research infrastructure, rotordynamics software development, engineering education, experimental methods, and structural testing—each contributing unique perspectives on sustainable software practices, educational integration, and bridging computational tools with real-world validation.

Participants:

Prof. Gunnstein Thomas Frøseth,
Norwegian University of Science
and Technology, NO

Prof. Thiago Ritto,
Federal University of Rio de
Janeiro, BR

Dr. Olavo M. Silva,
Federal University of Santa
Catarina, BR

Prof. Janko Slavič,
University of Ljubljana, SI

Dr. Wout Wiejtjens,
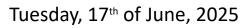Vrije Universiteit Brussel, BE

Conference programme, June 16. – 17., 2025

Monday, 16th of June, 2025

8:00 – 8:40	Coffee and registration
8:40 – 9:00	Conference opening
9:00 – 9:45	Keynote: Thiago Ritto, ROSS – Rotordynamic open-source software (chair: Janko Slavič)
9:45 – 11:05	**Session 1: Acoustics, nonlinear and multibody dynamics** (chair: Wout Weijtjens) • Quentin Mercier and Jason Armand, *pyHarm: An Open Source Harmonic Balance Method Platform for Nonlinear Mechanical Dynamics* • Daniele Fabbri, Fabio Bruzzone and Carlo Rosso, *Acoustic Field Solution in a Pipe using CAFE* • Olavo Silva, Jacson Vargas, Andre Fernandes, Rodrigo Schwartz, Vitor Slongo, Gildean Nascimento, Vinicius Ribeiro and Gustavo Martins, *OpenPulse: An Open Source Software for Acoustically Induced Vibration Analysis of Piping Systems* • Giacomo Cangi, Massimiliano Palmieri and Filippo Cianetti, *PMD - A Planar Multibody Dynamic Open Source Simulation Software*
11:05 – 11:30	Coffee break
11:30 – 12:50	**Session 2: Signal acquisition and processing** (chair: Oliver Zobel) • Gašper Krivic, Tilen Košir and Janko Slavič, *LDAQ presentation* • Oliver Zobel, Johannes Maierhofer, Andreas Köstler and Daniel Rixen, *OASIS: Bridging the Open-Source Gap Between Testing and Data Processing* • Wout Weijtjens, Domen Gorjup and Janko Slavič, *SEP 005 : an Open-Source Effort for Unified Timeseries Data in Structural Dynamics* • Giulio Curti, Massimiliano Palmieri and Filippo Cianetti, *A Python Toolbox for Advanced Time Series Analysis and Generation*
12:50 – 14:00	Lunch
14:00 – 15:40	**Session 3: Vibration fatigue** (chair: Ed Habtour) • Ahmed Mujtaba, Pietro D'Antuono and Wout Weijtjens, *Py-Fatigue: An Open-Source Tool for Fatigue Assessment using Stress-Life Methods and Crack Growth Calculations* • Josef Weber, Arvid Trapp and Peter Wolfsteiner, *Decomposition into Gaussian Portions – A Python Implementation for Dealing with non-Stationary Random Vibration in Structural Dynamics* • Jaša Šonc and Janko Slavič, *Open-Source Software for Multiaxial Fatigue Damage Calculation* • Martin Česnik, Jaša Šonc and Janko Slavič, *FatigueDS: A Python Package for Calculation of Fatigue Damage Spectrum and Extreme Response Spectrum* • Jan Výborný and Jan Papuga, *Introduction to FatPy and FABER*
15:40 – 16:00	Coffee break
16:00 – 17:00	**Session 4: Camera-based Structural Dynamics** (chair: Ivan Tomac) • Paolo Gardonio, Sofia Baldini, Domen Gorjup, Janko Slavič and Roberto Rinaldo, *Sound Power Radiation from Vibration Measurements with Optical Methods: MATLAB functions* • Ivan Tomac, Klemen Zaletelj, Domen Gorjup and Janko Slavič, *PyIDI.VideoReader: a Module for the Support of Different Multimedia Formats* • Sofia Baldini, Riccardo Bernardini, Andrea Fusiello, Paolo Gardonio and Roberto Rinaldo, *MATLAB Functions for the Reconstruction of Vibration Fields from Event Camera Acquisitions*
20:30	Social event

Tuesday, 17th of June, 2025

9:00 – 9:45	Roundtable: Building Open-source Community in Structural Dynamics (Gunnstein Thomas Frøseth, Thiago Ritto, Olavo M. Silva, Janko Slavič, Wout Weijtjens)
9:45 – 11:05	**Session 5: Structural Dynamics** (chair: Paolo Gardonio) • Klemen Zaletelj, Domen Gorjup and Janko Slavič, ***SDyPy: Following the Roadmap*** • Domen Gorjup and Janko Slavič, ***Ensuring Robustness in Open-Source Structural Dynamics Tools: Lessons from Debugging and Testing pyFRF*** • Lisa Ortis, Paolo Gardonio and Daniel Casagrande, ***A Simulink Platform for the Design of Adaptive TVA*** • Stipe Perišić, Ivan Tomac and Jani Barle, ***Python Package for Monitoring of Damping Ratio in Mechanical Systems***
11:05 – 11:30	Coffee break
11:30 – 12:50	**Session 6: Machine-learning** (chair: Tristan Gowdridge) • Daniel Brennan, Tristan Gowdridge, Josie McCulloch, Tom Windus-Smith, Tim Rogers and Keith Worden, ***A Framework for Population-Based Structural Health Monitoring*** • Miha Kodrič, ***Prediction of Cutting Edge Wear Using Machine Learningc*** • Tristan Gowdridge, Connor O'Higgins, Keith Worden and Daniel Brennan, ***On Constructing Finite Element Models from Irreducible Element Models*** • Matej Anko, ***pyMMM - Python Multi Model Manager***
12:50 – 14:00	Lunch
14:00 – 15:00	**Session 7: Camera-based Structural Dynamics** (chair: Lorenzo Capponi) • Valentina Pasquinelli, Gloria Cosoli, Milena Martarelli, Paolo Castellini and Gian Marco Revel, ***Non-Contact Beam Bridge Damage Monitoring through a Digital Image Correlation-based Methodology*** • Alessandra Cesaretti, Serena Occhipinti, Paolo Neri, Christian Maria Firrone and Daniele Botto, ***Analysis of Rotating Bladed Disk Vibrations Using Digital Image Correlation*** • Lorenzo Capponi, Klemen Zaletelj and Janko Slavič, ***Fiducial Marker-Based Motion Tracking and Correction: Implementation into pyIDI***
15:00 – 15:20	Coffee break
15:20 – 16:00	**Session 8: Substructuring** (chair: Gregor Čepon) • Domen Ocepek and Gregor Čepon, ***On the Experimental Coupling with Continuous Interfaces using Frequency Based Substructuring and pyFBS*** • Miha Pogačar, Sara Janjac and Gregor Čepon, ***Modal Parameter Estimation Framework with pyFBS: Practical Example***
20:00	Conference dinner

Map of event locations

Conference and Summer School venue

☐ University of Ljubljana, Faculty of MEchanical E...

Social events

☐ Bar Grajska Vinoteka (Monday, June 16th, 20:3...
☐ Dežela Okusov (Tuesday, June 17th, 20:00)
☐ Restaurant Na gradu (Wednesday, June 18th, 1...

Interactive map