ECCOMAS Thematic Conference

ECCOMAS
European Community on Computational Methods in Applied Sciences

6th International Workshop on Model Reduction Techniques

MORTech 2023

École normale supérieure Paris-Saclay
France - November 22-24, 2023

An IACM Special Interest Conference

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Co-organized by

LMPS Laboratoire de Mécanique Paris-Saclay

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SAFRAN

Day 1 – Wednesday, November 22

07:30-08:20	**Welcome coffee + Registration**		
08:20-08:30	**Opening**		
	Plenary Session - Alain Aspect Auditorium - Chair H. Matthies		
08:30-09:00	**Cueto Elias** Recent advances in thermodynamics-informed neural networks for the prediction of physical phenomena		
09:00-09:30	**Ryckelynck David** Spectral embedding of digital twins for rom-nets		
09:30-10:00	**Willcox Karen** Reduced-order models as enablers for design, control and predictive digital twins		
10:00-10:30	**COFFEE BREAK**		
	Plenary Session - Alain Aspect Auditorium - Chair A. Nouy		
10:30-11:00	**Ladevèze Pierre** PGD in nonlinear computational solid mechanics: a general weakly invasive version		
11:00-11:30	**Codina Ramon** Applications of Artificial Neural Networks in the design of Reduced Order Models: accuracy enhancement and improvement of hyper-reduction techniques		
11:30-12:00	**Maday Yvon** Some elements of analysis for nonlinear compressive reduced basis approximation for PDE's		
12:00-12:30	**Casenave Fabien** AI4Design@Safran: learning physics simulations for improving design processes		
12:30-14:00	**LUNCH**		
	Parallel Sessions		
	Alain Aspect Auditorium - Chair T. Chacon	Simondon 1 Auditorium - Chair B. Peherstorfer	Simondon 2 Auditorium - Chair D. Ryckelynck
14:00-14:30	**Falco Antonio** Can we perform Model Reduction Techniques by using a NISQ quantum computer?	**Allery Cyrille** POD-Galerkin reduced order model coupled with neural network to solve flow in porous media	**Quaini Annalisa** Reduced Order Modeling and LES filtering
14:30-15:00	**Kvamsdal Trond** Novel L2-Projection to achieve Minimally Intrusive Affine Reduced Order Models	**Shakoor Modesar** Autoencoder-accelerated computational homogenization of unsteady flows in porous media	**Chakir Rachida** Model order reduction for the identification of the thermal resistance of highly Insulated walls
15:00-15:30	**Nikolic Mijo** Fracture propagation problems enhanced by uncertainty propagation and Bayesian identification of parameters	**Bucci Michele Alessandro** Complemented Deep - Reduced Order Model	**Leturcq Bertrand** A posteriori model reduction combining creep, contact and friction in a multi-scale simulation
15:30-16:00	**COFFEE BREAK**		
	Parallel Sessions		
	Alain Aspect Auditorium - Chair A. Falco	Simondon 1 Auditorium - Chair J. Yvonnet	Simondon 2 Auditorium - Chair E. Quaini
16:00-16:30	**Chacon Tomas** On the relationship between supremizers and least-squares pressure computation in ROMs for incompressible fluids	**Veroy-Grepl Karen** Model Order Reduction in the Parametrized Multi-Scale Materials Setting	**Zhang Yancheng** Thermomechanical modeling of the Directed Energy Deposition (DED) additive manufacturing process: coupling the Inherent strain rate and POD-based model reduction
16:30-17:00	**Yuan Jie** Stochastic model updating and identification for nonlinear aeroelastic systems	**Hernandez Joaquin** The Empirical Interscale Finite Element Method: A novel approach for modeling heterogeneous structures using localized dimensional hyperreduction	**Strobl Dominic** Reduced Order Model for Temperature Field Simulation of Wire Arc Additive Manufacturing with Domain Mapping
17:00-17:30	**Ehrlacher Virginie** Model-order reduction of optimal transport problems	**Gravouil Anthony** A databased approach for micro-macro topology optimization of micro-architectured materials	**Haddad Mohamed** Interaction based deep material network model reduction technique for porous polymer structures fabricated using additive manufacturing
17:30-18:00	**Panda Nishant** Learning How RoMs Propagate Uncertainties Using Physics Informed Normalizing Flows	**Bertrand Fleurianne** Model order reduction for the finite element approximation of eigenvalue problems	**Nijhuis Bjorn** Local model order reduction to accelerate additive manufacturing simulations
18:00-18:30	**Plenary Session - Alain Aspect Auditorium - Presentation of posters: F. Chinesta**		
18:30-...	**Posters & Cocktails** **See the Book of Abstracts for the full list of posters**		

Only the speaker is indicated in the agenda. Please refer to the corresponding abstract for the list of all contributors.

Use this QR Code to download the Book of Abstracts (which also includes this agenda)

URL to download the Book of Abstracts: https://ouvaton.link/typJmy

Day 2 – Thursday, November 23

07:45-08:30	**Welcome Coffee**		
	Plenary Session - Alain Aspect Auditorium - Chair R. Ohayon		
08:30-09:00	**Benner Peter** A Posteriori Error Estimation for Model Order Reduction of Parametric Systems		
09:00-09:30	**Rozza Gianluigi** Reduced Order Modelling in Computational Fluid Dynamics: state of the art, challenges and perspectives		
09:30-10:00	**Néron David** Model reduction for multi-query simulations in nonlinear solid dynamics		
10:00-10:30	**COFFEE BREAK**		
	Parallel Sessions		
	Alain Aspect Auditorium - Chair T. Taddei	Simondon 1 Auditorium - Chair K. Veroy	Simondon 2 Auditorium - Chair P.-A. Boucard
10:30-11:00	**Iollo Angelo** Model Reduction by Convex Displacement Interpolation	**Perotto Simona** Recent progress in applying Hierarchical Model reduction techniques to applicative contexts	**Prudhomme Serge** On an Efficient PGD Solver for Structural Dynamics Applications
11:00-11:30	**Er Guo-Kang** A Model Reduction Method and Its Applications in Nonlinear Random Vibrations of Structures	**Cauvin Ludovic** Model reduction in the context of polycrystalline plasticity	**Oulghelou Mourad** Approach to Discover Redued Order Dynamics from Parametric Data
11:30-12:00	**Schwarz Henning** Comparison of LSTM and Koopman-Operator approaches for Predicting Transient Ditching Loads	**Ghnatios Chady** Generating materials yield surface by combining analytical models, model reduction techniques and data-driven approach	**Duhamel Denis** Reduced model based time domain absorbing boundary conditions for finite element modeling of infinite periodic structures
12:00-12:30	**Wick Thomas** Space-time goal-oriented a posteriori error control and adaptivity for incremental POD-based ROM	**Suliman Ridhwaan** A reduced-order modal method for non-linear structural mechanics	**Mencik Jean-Mathieu** Model reduction based on matrix interpolation and basis enrichment for dynamic analysis of nearly periodic structures including substructures with geometric changes
12:30-14:00	**LUNCH**		
	Parallel Sessions		
	Alain Aspect Auditorium - Chair M. Billaud Friess	Simondon 1 Auditorium - Chair R. Codina	Simondon 2 Auditorium - Chair F. Casenave
14:00-14:30	**Taddei Tommaso** Registration-based model reduction of parameterized PDEs with spatio-parameter adaptivity	**Manzoni Andrea** Deep learning for reduced order modeling	**Chevreuil Mathilde** Monitoring of composite structures using reduced order models
14:30-15:00	**Zheng Zhibao** Model order reduction for nonlinear stochastic problems via stochastic LATIN methods	**Nardoni Chiara** An energy-based approach to approximate the solution of PDEs using neural networks	**Atak Onur** An overview of ROM methods: An industrial point of view
15:00-15:30	**Dubreuil Sylvain** POD bases interpolation by Gaussian Process, benefits and difficulties	**Navarro-Jimenez José Manuel** Combined Data Driven Convolutional-Recurrent Neural Networks methodology for accelerating the 2-level topology optimisation process	**Bettinotti Omar** Surrogate Modeling for Multi-Physics General-Purpose Software
15:30-16:00	**COFFEE BREAK**		
	Parallel Sessions		
	Alain Aspect Auditorium - Chair A. Iollo	Simondon 1 Auditorium - Chair C. Allery	Simondon 2 Auditorium- Chair M. Chevreuil
16:00-16:30	**Billaud-Friess Marie** Probabilistic reduced basis method for solving parameter-dependent problems	**Peherstorfer Benjamin** Neural Galerkin schemes for model reduction of transport-dominated problems	**Chamoin Ludovic** Hybrid twins for the effective monitoring of real-life engineering systems: application to additive manufacturing processes and dynamics tests on shaking tables
16:30-17:00	**Ramière Isabelle** On the Hyper-Reduction of variational inequalities. Application to contact mechanics problems.	**Staber Brian** MMGP: a Mesh Morphing Gaussian Process-based machine learning method for physical problems under non-parameterized geometrical variability	**Srinivasan Shriram** Reduced order models for the problem of optimal operation of natural gas flow networks
17:00-17:30	**Touzé Cyril** Reduced order modeling of finite element structures using invariant manifold theory	**Phan Anh-Vu** Accelerated Boundary Integral Technique for Energy Eigenvalue Analysis in Confined Electron States of Quantum Wires	**Meunier Raphael** Application of Zonal Reduced-Order-Modelling to tire rolling simulation
	Plenary Session - Alain Aspect Auditorium - Chair P. Ladevèze		
17:30-18:00	**Farhat Charbel (Videoconference)** Assessment of Projection-Based Model Order Reduction for a Benchmark Parametric Hypersonic Flow Problem		
18:00-19:00	**FREE TIME**		
19:00	**Bus to the Banquet**		
	Banquet		
	Return to ENS Paris-Saclay or Massy		

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Day 3 – Friday, November 24

07:45-08:30	**Welcome Coffee**	
	Plenary Session - Alain Aspect Auditorium - Chair L. Chamoin	
08:30-09:00	**Nouy Anthony** Optimal sampling for linear and nonlinear approximation	
09:00-09:30	**Matthies Herrmann** Parameter dependent reduced order models, conditional expectation and machine learning	
09:30-10:00	**Yvonnet Julien** Reduced order models for fracture and path-dependent multiscale simulations: Macro Clustering and data-driven approaches	
10:00-10:30	**Chinesta Francisco** Recent advances on intrusive and non-intrusive separated representations	
10:30-11:00	**COFFEE BREAK**	
	Parallel Sessions	
	Simondon 1 Auditorium - Chair G. Rozza	Simondon 2 Auditorium - Chair E. Cueto
11:00-11:30	**Hoareau Christophe** Parameterized reduced order model of linearized structural vibrations around a nonlinear static prestressed state due to follower forces	**Bergmann Michel** POD-assisted computations of incompressible fluid flows: applications to marine energy
11:30-12:00	**Placzek Antoine** Nonlinear structural ROM for aeroelastic problems with large displacements	**Rohan Eduard** Two-scale modelling of fluid saturated electroactive porous media - nonlinear phenomena and computational homogenization
12:00-12:30	**Azaiez Mejdi** Certified Reduced Order Method for the Parametrized Allen-Cahn Equation	**Ferrier Renaud** POD model order reduction for transient biphasic flows in porous media based on steady-state snapshots
12:30-13:00	**Plenary Session - Alain Aspect Auditorium - Conclusion**	
13:00-14:00	**LUNCH**	

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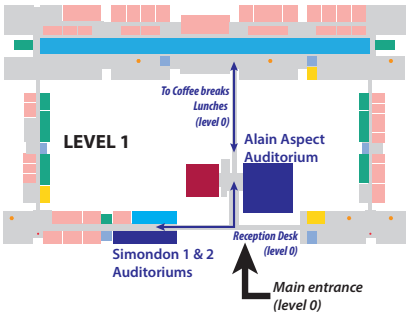
Practical information



The Alain Aspect, and Simondon 1 & 2 Auditoriums are located on level 1.
Coffee breaks will be held at level 0.
The Posters & Cocktails Session will take place on level 0.
Finally, lunches will be taken at level 0.

For your presentation, a computer is available in each Auditorium.
Please bring your presentation material with USB memory device and install it on the computer **before the beginning of the session.**
You can use your own computer **as soon as you have ensured that it is working properly on the beamer: you must have a wifi connection (see below) and Intel Unite installed (see** https://unite.ens-paris-saclay.fr/ **to download and install it: accessible only when you are connected to the local wifi network).**

Oral presentations will be **30 min long**, including **5 minutes** of discussion.

Session Chairs will strictly enforce these times and stop presentations that run over time.

Eduroam wifi access is available everywhere. If you do not have access to Eduroam, you can contact the Workshop reception desk, who will provide you with a login/password for the ENS-INVITES wifi network valid for the 3 days of the Workshop.

Posters & Cocktails Session

Don't miss the Wednesday evening session!
See the Book of Abstracts for the full list of posters.