

| DAY 2               |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
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| 08:00-08:45         | Coffee and Refreshments                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| Keynote 08:45-09:30 | Chair: Oliver Schmidt, UC San Diego, USA                                                                                                                                                                                                                              | Bernrd R. Noack, Shenzhen University, China                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
|                     |                                                                                                                                                                                                                                                                       | Aerodynamic technologies and machine learning for the aerial society —Making drones and air taxis energy efficient and gust-safe                                                                                                                                               |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| Keynote 09:30-10:15 |                                                                                                                                                                                                                                                                       | Jiaqing Kou, Northwestern Polytechnical University, China                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
|                     |                                                                                                                                                                                                                                                                       | Explainable Generative Machine Learning for Aircraft Aerodynamic Configuration Design                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| 10:15-11:00         | Coffee Break, Refreshments                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| Parallel Sessions   | 4. Physics-informed models                                                                                                                                                                                                                                            | 5. Reinforcement learning, Dimensionality Reduction and Reduced Order Models                                                                                                                                                                                                   | 11. Industrial & Applied ML in Fluid Systems                                                                                                                                                                                                                                                          | 13. Multi-phase                                                                                                                                                                                                                                                                                                           | 6. Combustion, Flames, Sprays                                                                                                                                                                                                                                                                                                                               |
| Chair               | Dr Jenna Poonoosamy, Forschungszentrum Jülich, Germany                                                                                                                                                                                                                | Prof George Papadakis, Imperial College London, UK                                                                                                                                                                                                                             | Prof Min Xu, Shanghai Jiao Tong University, China                                                                                                                                                                                                                                                     | Prof David Hung, Shanghai Jiao Tong University, China                                                                                                                                                                                                                                                                     | Prof Arne Scholtissek, Technical University of Darmstadt, Germany                                                                                                                                                                                                                                                                                           |
| ROOM                | ROOM A                                                                                                                                                                                                                                                                | ROOM B                                                                                                                                                                                                                                                                         | ROOM C                                                                                                                                                                                                                                                                                                | ROOM D                                                                                                                                                                                                                                                                                                                    | ROOM E                                                                                                                                                                                                                                                                                                                                                      |
| 11:00 - 11:15       | <b>S.4-A.7 Simon Wassing</b><br>Simon Wassing, Tobias Leicht, Philipp Bekemeyer<br>CFD-informed Neural Networks (CHNNs) – Integrating an industrial-grade CFD solver into Physics-informed Neural Networks<br>German Aerospace Center (DLR), Germany                  | <b>S.5-A.8 Oliver Schmidt</b><br>Oliver Schmidt, Aaron Towne<br>The AJAA Data-Driven Modeling of Fluid Flows Community Challenge<br>UC San Diego, USA                                                                                                                          | <b>S.11-P.1 Ron Barron</b><br>Love Fadil, Vatsal Shah, Ronald Barron, Mohammad Hassanzadeh<br>Improving PINN Stability for Convection-Dominated Boundary Value Problems via Artificial Damping Regularization<br>University of Windsor, Canada                                                        | <b>S.13-A.4 Hendrik Hessenkemper</b><br>Hendrik Hessenkemper, Guangxuan Huang, Lantian Wang, Tian Ma<br>Deep Learning Models for 3D Lagrangian tracking in disperse 3-phase flows<br>Helmholtz-Center Dresden-Rossendorf, Germany                                                                                         | <b>S.6-P.1 Baptiste Romain</b><br>Baptiste Romain, Adrien Langenais, Joël Dupays, Laurent Catoire<br>Chemistry reduction and acceleration based on neural network surrogate<br>ONERA, France                                                                                                                                                                |
| 11:15 - 11:30       | <b>S.4-P.8 Ian Hubbard</b><br>Ian Hubbard, Siert-Jan Foth<br>Fidelity-Scaling via Physics-Informed Graph Learning on Marine Propeller Blades<br>Warsila Propulsion Netherlands                                                                                        | <b>S.5-A.10 Miguel Pérez Cuadrado</b><br>Miguel Pérez Cuadrado, Giorgio Maria Cavallazzi, Alfredo Pinati<br>Latent-Space SINDY-Discovered ODEs for Reconstructed Turbulent Dynamics with Causal Analysis of Attractor Transitions<br>City St Georges, University of London, UK | <b>S.11-A.2 Jialei Yan</b><br>Jialei Yan, Ruizong Wu, Chenyu Lu<br>Deep learning for the dynamic characteristics and stability of floating structures under complex marine environments<br>Harbin Institute of Technology, China                                                                      | <b>S.13-A.5 Jiayang Xu</b><br>Jiayang Xu, Josef Winter, Steffen Schmidt, Nikolaus A. Adams<br>Multi-Fidelity Heteroscedastic Gaussian Processes for Cavitation Wall Load Prediction<br>Chair of Aerodynamics and Fluid Mechanics, Technical University of Munich, Germany                                                 | <b>S.6-A.2 Cédric Mehli</b><br>C. Mehli<br>Acceleration of chemical kinetics integration in combustion CFD using artificial neural networks<br>IFPEN, France                                                                                                                                                                                                |
| 11:30 - 11:45       | <b>S.4-A.9 Gulliver Van Essche</b><br>Gulliver Van Essche, Gongga Granja Cruz, Tim De Troyer, Mark Runnoes, Jan Decuyper<br>Physics-informed learning of unsteady fluid systems via dynamical invariants<br>VUB, Belgium                                              | <b>S.5-P.11 Gianluigi Rozza</b><br>Gianluigi Rozza<br>Accelerating Numerical Simulation in CFD by Reduced Order Surrogate Modelling and Scientific Machine Learning<br>SISSA Trieste, Italy                                                                                    | <b>S.11-A.3 Xiao Xue</b><br>Xiao Xue, Tianyue Yang, Mingyang Gao, Maide Wang, Kewei Zhu, Peter V. Coveney<br>Uni-Flow: A Unified Autoregressive-Diffusion Framework for Stable Long-Horizon and High-Resolution Multiscale Flow Modeling<br>University College London, UK                             | <b>S.13-P.6 Connor Nolan</b><br>Connor Nolan, Lee Mortimer, Peter Jimack, Michael Fairweather<br>Machine Learning-Based Prediction of Non-Spherical Particle Agglomeration<br>University of Leeds, UK                                                                                                                     | <b>S.6-A.3 Hongchao Chu</b><br>Hongchao Chu, Honggang Bai, Mingren Gao, Alberto Procacci, Shihang Bao, Hesheng Bao, Alessandro Parente, Heinz Pitsch<br>Uncertainty-guided active Co-Kriging for cost-efficient determination of hot-spot surface ignition of hydrogen-air mixtures<br>Institute for Combustion Technology, RWTH Aachen University, Germany |
| 11:45 - 12:00       | <b>S.4-P.10 Amélie Lam</b><br>Amélie Lam, Héloïse Mahuet, André Ferrari, Sara El Bouch<br>Solver-In-The-Loop Training with Multistep Inputs for Capturing Fine-Scale Turbulence<br>Laboratoire Lagrange, France                                                       | <b>S.5-A.12 João Victor Neves Neiva</b><br>João V. N. Neiva, Luc Pastur, Igor B. de Paula, Omar E. H. Pinedo<br>Experimentally-based least-order model of the transient growth of a laminar separation bubble<br>ENSTA-Paris, France                                           | <b>S.11-P.4 Jing Li</b><br>Jing Li, Changtong Luo<br>Sparse Rational Learning for Aerodynamic Prediction<br>Institute of Mechanics, Chinese Academy of Sciences, China                                                                                                                                | <b>S.13-P.7 Zikai Zhang</b><br>Zikai Zhang, David L. S. Hung<br>Full-Field Reconstruction of Droplet Impact via Multi-Fidelity Physics-Informed Neural Networks<br>Shanghai Jiao Tong University, China                                                                                                                   | <b>S.6-A.10 Xiaowei Jin</b><br>Xiaowei Jin, Shengkai Xu, Hui Li<br>Operator learning method with adaptive activation function for high-speed shock tube problems and airfoil flows<br>Harbin Institute of Technology, China                                                                                                                                 |
| 12:00 - 12:15       | <b>S.4-A.11 Matthias Möller</b><br>Matthias Möller<br>iGANets: Blending isogeometric analysis with operator learning<br>Delft University of Technology, The Netherlands                                                                                               | <b>S.5-A.13 Haitao Lin</b><br>Haitao Lin, Xu Wang, Weiwei Zhang<br>Transferable Scaling Function Learning Method for Cross Shape Aerodynamic Database Construction<br>Northwestern Polytechnical University, China                                                             | <b>S.14-A.5 Donghyuk Kang</b><br>Donghyuk Kang<br>Data-Driven Sparse Reconstruction of Three-Dimensional Steady and Unsteady Flow Fields in a Centrifugal Impeller under Nominal and Disturbed Operating Conditions<br>Department of Mechanical Engineering, Saitama University, Japan                | <b>S.13-A.8 Bruno Delhom</b><br>Bruno Delhom, Chaouki Habchi, Olivier Colin, Julien Bobbot<br>Development of a multi-species real fluid modeling approach using an innovative machine learning method, application to MASCOF<br>IFPEN, France                                                                             | <b>S.6-A.5 Nicolas Eckel</b><br>N. Eckel, T.J.P. Karpowski, D. Misa, F. Ferraro, C. Hesse, A. Scholtissek<br>ANN-based Chemistry Surrogate Modeling for Premixed Hydrogen Surrogate Modeling for<br>Technical University Darmstadt, Simulation of reactive Thermo-Fluid Systems, Germany                                                                    |
| 12:15 - 12:30       | <b>S.4-P.12 Roberto Dal Monte</b><br>Roberto Dal Monte, Michele Cogo, Francesco Picano<br>Probabilistic Near-Wall Turbulence Modeling via Physics-Guided Diffusion Model<br>Università degli Studi di Padova, Italy                                                   | <b>S.5-A.14 Guillermo Suarez</b><br>Guillermo Suarez, Emre Özçaya, Nico R. Gauger<br>Active Flow Control via Model-Based Reinforcement Learning<br>RPTU University Kaiserslautern-Landau, Germany                                                                              | <b>S.14-A.6 Mohammadnabhi Nouri</b><br>Manolis Gavaises, Gaber Janja<br>End-to-End Trainable Hybrid Model for PT-Phase-Split-Neural -Value Correction with an Implicit Rachford-Rice Layer<br>Otto-von-Guericke-University Magdeburg, Germany                                                         | <b>S.13-A.9 Roque Martins Duarte Junior</b><br>Roque Martins Duarte Junior, Vinicius Gustavo Poletto, Cesar Otaviano Ribeiro Negriolo<br>Modeling and simulation of hydrogen bubble transport in alkaline electrolyser<br>Research Center for Rheology and Non-Newtonian Fluids, Federal University of Technology, Brazil | <b>S.6-A.6 Cyril Freyling</b><br>Freyling Cyril, Coussennet Axel<br>Symbolic Regression-Based Prediction of Mass Fraction Burned in Hydrogen-Fueled Internal Combustion Engines<br>Université Libre de Bruxelles, Belgium                                                                                                                                   |
| 12:30 - 12:45       | <b>S.1-P.13 Michael Vipin</b><br>Bharath Ravikumar, Ioannis Karathanassis, Mehdi Seddiq, Manolis Gavaises<br>Learning viscoelastic constitutive models from mesoscopic simulations using scientific machine learning<br>City St George's University London, UK        | <b>S.5-A.20 George Papadakis</b><br>G. Papadakis, S. Lu<br>Learning from the past to predict the future: a general, data-driven and physically interpretable algorithm, applied to turbulent flow forecasting<br>Dept. of Aeronautics, Imperial College London, UK             |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| 12:30-14:00         | Lunch (Maich restaurant)                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| Keynote 14:00-14:45 | Chair: Steffen Schmidt, TUM, Germany                                                                                                                                                                                                                                  | Nils Thuerey, TU Munich, Germany                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
|                     |                                                                                                                                                                                                                                                                       | AI techniques for differentiable and non-differentiable solvers                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| Keynote 14:45-15:30 |                                                                                                                                                                                                                                                                       | Adrian Lozano Duran, MIT, California Institute of Technology, USA                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| 15:30-16:15         |                                                                                                                                                                                                                                                                       | General-Purpose ML-Based Closure Models for Computational Fluid Dynamics                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
|                     | Coffee Break and Refreshments                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |
| Parallel Sessions   | 4. Physics-informed models                                                                                                                                                                                                                                            | 5. Dimensionality Reduction and Reduced Order Models                                                                                                                                                                                                                           | 1. Machine Learning                                                                                                                                                                                                                                                                                   | 3. Optimisation and Design                                                                                                                                                                                                                                                                                                | 14. Turbomachinery and Airfoils                                                                                                                                                                                                                                                                                                                             |
| Chair               | Dr Nikolaos Prasianakis, Paul Scherrer Institute, Switzerland                                                                                                                                                                                                         | Prof Nils Thuerey, Technical University of Munich, Germany                                                                                                                                                                                                                     | Prof Miguel-Alfonso Mendez, von Karman Institute for Fluid Dynamics, Belgium                                                                                                                                                                                                                          | Prof Kyriakos Giannakoglou, National Technical University of Athens, Greece                                                                                                                                                                                                                                               | Prof Weiwei Zhang, Northwestern Polytechnical University, China                                                                                                                                                                                                                                                                                             |
| ROOM                | ROOM A                                                                                                                                                                                                                                                                | ROOM B                                                                                                                                                                                                                                                                         | ROOM C                                                                                                                                                                                                                                                                                                | ROOM D                                                                                                                                                                                                                                                                                                                    | ROOM E                                                                                                                                                                                                                                                                                                                                                      |
| 16:15 - 16:30       | <b>S.4-P.13 Yuling Han</b><br>Yuling Han, Zhihui L., Zhibin Yu<br>Physics-informed latent neural operator for three-dimensional compressor cascade flow prediction<br>University of Liverpool, UK                                                                     | <b>S.5-A.15 Antonio Colanera</b><br>Antonio Colanera, Luca Magri<br>Fuzzy quantized local reduced models for chaotic flows.<br>SISSA mathLab, Italy                                                                                                                            | <b>S.1-A.14 Wilfried Genest / Savin Eric</b><br>Wilfried Genest, Eric Savin, Filippo Gatti, Didier Cloutaud<br>Predictive modeling of incompressible fluid flows using conditional score-based diffusion models<br>ONERA and CentraleSupélec, France                                                  | <b>S.3-A.3 Francesco Di Fiore</b><br>Francesco Di Fiore, Hayrye Pehlivan Solak, Andrea Serati, Matteo Diez, Laura Mainini<br>Active Learning for Fluid Dynamics Driven Design<br>Imperial College London, UK                                                                                                              | <b>S.14-P.7 Alessandro Pala (Michele Marconcini)</b><br>Alessandro Pala, Michele Marconcini, Andrea Amone<br>RMA: Impeller Representation Model for Aerodynamics<br>University of Florence, Italy                                                                                                                                                           |
| 16:30 - 16:45       | <b>S.4-A.14 Qiang Liu (Giacomo Baldan)</b><br>Giacomo Baldan, Qiang Liu, Nils Thuerey<br>Pareto-Optimal Generative Modeling with Physical Constraints via Physics-Based Flow Matching<br>Technical University of Munich, Germany                                      | <b>S.5-A.16 Alec Linot</b><br>Alec J. Linot, El Runner<br>Data-driven Manifold Charing using Persistent Homology for Chaotic Dynamics<br>University of Massachusetts Amherst, USA                                                                                              | <b>S.1-P.15 Chris R. Jung</b><br>Chris R. Jung, Markus Dör, Adam T. Müller, Natalie Jüngling, Jennifer Niesner, Nicola C. Stache<br>Generative Indoor Flow Prediction: Drifting Models for Surrogate Flow Modeling<br>Heilbronn University of Applied Sciences, Germany                               | <b>S.3-A.4 Izuru Kambayashi</b><br>Izuru Kambayashi, Masaki Ikara, Szu Yung Chen, Byungjin An<br>LBM-based Deep Learning Surrogate Modeling for Shape Optimization of Fans<br>Ebara Corporation, Japan                                                                                                                    | <b>S.14-A.8 Szu Yung Chen</b><br>Szu Yung Chen, Izuru Kambayashi, Ning Yang, Motochiko Nohmi, Ryoa Yoshihara<br>Data-Driven Analysis of Cavitation Erosion Geometry<br>Ebara Corporation, Japan                                                                                                                                                             |
| 16:45 - 17:00       | <b>S.4-A.15 Tamara Gammaidoni</b><br>Tamara Gammaidoni, Jacopo Zenbi, Michele Bettistoni<br>Physics-Informed ML for CFD Applications: Forward Modeling of Microchannel Heat Transfer and Inverse Identification in Hydrogen Injection<br>University of Perugia, Italy | <b>S.5-A.18 Lucas Schneeberger</b><br>Lucas Schneeberger, Guy Y. Cornejo Medada, Zhiyuan Wang, Jacopo Trelli, Stefano Disceati, Andrea Ianni<br>Manifold learning of pitching airfoil dynamics from pressure measurements<br>Universidad Carlos III de Madrid, Spain           | <b>S.1-A.16 Dev Hathi</b><br>Dev S. Hathi, Josef M. Winter, Steffen J. Schmidt, Nikolaus A. Adams<br>Learning Lattice Boltzmann collision operator using Graph Neural Networks<br>Technical University of Munich, Germany                                                                             | <b>S.11-A.6 Louis Fliesebach</b><br>Louis Fliesebach, Marian Fuchs, Hendrik Helmann, Charles Modest, Nikanthra Sahoo<br>An automated CFD workflow for the generation of high-fidelity AI training data<br>Upstream CFD GmbH, Germany                                                                                      | <b>S.14-P.9 Florian Sobieczky</b><br>Florian Sobieczky<br>AI Driven Prediction of Pressure Loss assisting Draft Tube Design in Hydraulic Turbines<br>Andritz Hydro GmbH, Austria                                                                                                                                                                            |
| 17:00 - 17:15       | <b>S.4-PO.1 Tommaso Baffetti</b><br>Tommaso Baffetti, Carlo Fabrizio, Gianluca Bortempi, Alberto Procacci, Alessandro<br>A Transformer-Based Reduced-Order Model for Reactive Flows Dynamics<br>Université Libre de Bruxelles                                         |                                                                                                                                                                                                                                                                                | <b>S.1-A.17 Bharath Ravikumar</b><br>Bharath Ravikumar, Ioannis K. Karathanassis, Manolis Gavaises, Timothy Smith, Gareth Brown<br>Scope of machine learning in the development of many-body dissipative particle dynamics simulations of complex fluids<br>City St Georges, University of London, UK | <b>S.3-A.5 Long Ma</b><br>Long Ma, Xiaojing Wu, Weiwei Zhang<br>A Consistency-Identifiable Conditional Variational Autoencoder for Reliable Generative Shape Design<br>School of Aeronautics, Northwestern Polytechnical University, China                                                                                | <b>S.14-A.10 Xiaojing Wu</b><br>Xiaojing Wu, Zhen Zuo, Weiwei Zhang<br>Multi-fidelity Aerodynamic Transfer Modeling Considering Heterogeneous Shapes Based on Point Cloud Variational Autoencoder for Efficient Propeller Shape Design<br>Institute of AI for Industries, Chinese Academy of Sciences, China                                                |
|                     |                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                | End of Day 2                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                             |