

# Giovanni Stabile

## Curriculum Vitae

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### Experiences

- April 2024 - Now **Associate Professor in numerical analysis (SSD MAT/08)**, *Biorobotics Institute*, Sant'Anna School of Advanced Studies - Pisa, Italy.
- Nov 2022 - Now **Tenure Track Assistant Professor (RTD-B) in numerical analysis (SSD MAT/08)**, *Informatics and mathematics section, Department of Pure and Applied Sciences (DISPEA)*, University of Urbino, Urbino - Italy.
- Feb 2020 - Oct 2022 **Assistant Professor (RTD-A) in numerical analysis (SSD MAT/08)**, *MATHEMATICS AREA, SISSA mathLab (Applied mathematics Lab)*, SISSA - International School for Advanced Studies, Trieste - Italy.
- Jul 2016-Jan 2020 **PostDoc Researcher in numerical analysis (SSD MAT/08)**, *MATHEMATICS AREA, SISSA mathLab (Applied mathematics Lab)*, SISSA - International School for Advanced Studies, Trieste - Italy.
- Apr 2013-May 2016 **PhD Candidate**, *INSTITUTE FOR SCIENTIFIC COMPUTING*, University of Braunschweig - Germany.
- Nov 2012-May 2016 **PhD Candidate**, *DEP. OF CIVIL AND ENV. ENGINEERING*, University of Florence - Italy.
- Sep 2011-Mar 2012 **Research Stay**, *Preparation of the master thesis, RÜHR UNIVERSITY*, Bochum - Germany.

### Education

- Nov 2012-May 2016 **Joint PhD Degree in Scientific Computing/Civil and Environmental Engineering**, *Institute of Scientific Computing/DICEA*, Technical University of Braunschweig (Germany) University of Florence.
- Sep 2013-Jun 2014 **Post-Graduate course: "Workplace Safety Management"**, *Dep. of Civil and Environmental Engineering*, University of Florence.  
Certificate of "Health and safety Manager", Certificate of "Safety coordinator"
- Apr 2010-Jul 2012 **Masters Degree in Civil Engineering**, *University of Florence*, Italy, *Final Mark 110/110 with honours*.
- Sep 2006-Apr 2010 **Bachelor Degree in Civil Engineering**, *University of Florence*, Italy, *Final Mark 109/110*.

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## Research fields and scientific interests

I am a researcher working in the applied mathematics field. My research activity focuses on the numerical modeling of physical phenomena governed by *Partial Differential Equation (PDEs)*. During the preparation of my PhD dissertation, I have worked mainly on **fluid structure interaction** problems for complex industrial applications [P49, P51, P52, P53] and on **data-driven reduced-order modeling (ROM)** starting from high-fidelity *computational fluid dynamics* solvers [P50, P43].

During my postDoc I specialized in the field of *reduced-order model* for *computational fluid dynamics* using both **projection-based** techniques and **data-driven** approaches. As full order discretization technique to numerically approximate PDEs I worked both on the **finite volume method** [P27, P26, P28, P29, P30, P32, P34, P35, P36, P39, P40, P41, P42] and on the **finite element method** [P31, P37, P38, P40]. Recent and more specific interests of my research activity are devoted to **uncertainty quantification** [P22, P32, P44], **geometrical parametrization** [P28, P35, P7], **multiphysics problems** [P36, P29, P40], **air pollution modelling** [P15], **inverse problems** [C39, P25, C43], **immersed boundary methods** [P31, P38, P45] and **data-driven methods** using **Bayesian approaches** [P32] **interpolation** [P34, P36] and **Machine-Learning** techniques [P19, P23, P24]. In particular, I worked on **nonlinear approximation techniques** for the solution of parametric partial differential equations with recent contributions in the emerging field of scientific machine learning [P19, P6, P17].

Since the development of reduced order models requires extensive knowledge of scientific computing tools and high-performance computing architectures I am proficient with **C++**, **python**, **Matlab** and I have a good knowledge of **Fortran**. I am the main developer and maintainer of three computational packages for scientific computing, **ITHACA-FV** [C21] (In real Time Highly Advanced Computational Applications for Finite Volumes), which is a C++ library for model reduction of computational fluid dynamic problems, I am a maintainer and developer of **miniDNN** (mini-Deep Neural Networks) which is a header-based library for **scientific machine learning** and the developer of **EZyRB**, a python library for non-intrusive model order reduction.

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## Publications

**Total Number of citations:** 716 (Scopus), 1283 (Scholar) **H-Index:** 16 (Scopus), 20 (Scholar)

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### Books

- [B1] Gianluigi Rozza, **Giovanni Stabile**, Francesco Ballarin, *Advanced Reduced Order Methods and Applications in Computational Fluid Dynamics*, Society for Industrial and Applied Mathematics, 2022. <https://doi.org/10.1137/1.9781611977257>

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### Preprints

- [P1] Rahul Halder, Giovanni Stabile, and Gianluigi Rozza. Physics Informed Neural Network Framework for Unsteady Discretized Reduced Order System. Submitted, 2024. <https://arxiv.org/abs/2305.13613>
- [P2] Caterina Balzotti, Pierfrancesco Siena, Michele Girfoglio, **Giovanni Stabile**, Jorge Dueñas-Pamplona, José Sierra-Pallares, Ignacio Amat-Santos, and Gianluigi Rozza. A Reduced Order Model formulation for left atrium flow: an Atrial Fibrillation case. Submitted, 2023. <https://arxiv.org/abs/2309.10601>
- [P3] Sajad Salavatidezfouli, Armin Sheidani, Kabir Bakhshaei, Ali Safari, Arash Hajisharifi, **Giovanni Stabile**, and Gianluigi Rozza. Modal Analysis of the Wake Shed Behind a Horizontal Axis Wind Turbine with Flexible Blades. Submitted, 2024. <https://arxiv.org/abs/2311.08130>
- [P4] Raul Bravo, **Giovanni Stabile**, Martin Hess, Joaquin Hernandez, Riccardo Rossi, Gianluigi Rozza, *Geometrically Parametrised Reduced Order Models for the Study of Hysteresis of the Coanda Effect in Finite-elements-based Incompressible Fluid Dynamics*, Submitted, 2023. <https://arxiv.org/abs/2307.05227>
- [P5] Valentin Ngan, **Giovanni Stabile**, Andrea Mola, Gianluigi Rozza *A reduced-order model for segregated fluid-structure interaction solvers based on an ALE approach*, Submitted, 2023. <https://arxiv.org/abs/2305.13613>
- [P6] Francesco Romor, **Giovanni Stabile**, Gianluigi Rozza, *Explicable hyper-reduced order models on nonlinearly approximated solution manifolds of compressible and incompressible Navier-Stokes equations*, Submitted, 2023. <https://arxiv.org/abs/2308.03396>

- [P7] Guglielmo Padula, Francesco Romor, **Giovanni Stabile**, Gianluigi Rozza, *Generative Models for the Deformation of Industrial Shapes with Linear Geometric Constraints: model order and parameter space reductions*, Submitted, 2023. <https://arxiv.org/abs/2308.03662>
- [P8] Tobias Long, Robert Barnett, Richard Jefferson-Loveday, **Giovanni Stabile**, Matteo Icardi, *A novel reduced-order model for advection-dominated problems based on Radon-Cumulative-Distribution Transform*, Submitted, 2023. <https://arxiv.org/abs/2304.14883>
- [P9] Sajad Salavatidezfouli, Arash Hajisharifi, Michele Girfoglio, **Giovanni Stabile**, Gianluigi Rozza, *Applicable Methodologies for the Mass Transfer Phenomenon in Tumble Dryers: A Review*, Submitted, 2022. <https://arxiv.org/abs/2304.03533>
- [P10] Martina Cracco, **Giovanni Stabile**, Andrea Lario, Martin Larcher, Folco Casadei, George Valsamos, Gianluigi Rozza, *Deep learning-based reduced-order methods for fast transient dynamics*, Submitted, 2022. <https://arxiv.org/abs/2212.07737>
- [P11] Matteo Zancanaro, **Giovanni Stabile**, and Gianluigi Rozza, *A segregated reduced order model of a pressure-based solver for turbulent compressible flows*, Submitted, 2022. <https://arxiv.org/abs/2205.09396>
- [P12] Michele Girfoglio, **Giovanni Stabile**, Andrea Mola and Gianluigi Rozza, *An efficient FV-based Virtual Boundary Method for the simulation of fluid-solid interaction*, Submitted, 2023. <https://arxiv.org/abs/2110.11756>

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### Journal Papers

- [P13] Sajad Salavatidezfouli, Saeid Moradi Zadeh, Giovanni Stabile, and Gianluigi Rozza. Deep reinforcement learning for the heat transfer control of pulsating impinging jets. *Advances in Computational Science and Engineering*, 1(4):401–423, 2023. <https://doi.org/10.3934/acse.2023016>
- [P14] Armin Sheidani, Sajad Salavatidezfouli, **Giovanni Stabile**, Mostafa Barzegar Gerdroodbary, Gianluigi Rozza, *Assessment of Icing Effects on the Wake Shed Behind a Vertical Axis Wind Turbine*, *Physics of Fluids*, 35, 095135, 2023. <https://doi.org/10.1063/5.0169102>
- [P15] Moaad Khamlich, **Giovanni Stabile**, Gianluigi Rozza, László Környei, Zoltán Horváth, *A physics-based reduced order model for urban air pollution prediction*, *Computer Methods in Applied Mechanics and Engineering*, Volume 417, Part A, 2023. <https://doi.org/10.1016/j.cma.2023.116416>
- [P16] Isabella Carla Gonnella, Martin W. Hess, **Giovanni Stabile**, Gianluigi Rozza, *A two stages Deep Learning Architecture for Model Reduction of Parametric Time-Dependent Problems*, *Computers & Mathematics with Applications* Volume 149, 115-127, 2023. <https://doi.org/10.1016/j.camwa.2023.08.026>
- [P17] Dario Coscia, Laura Meneghetti, Nicola Demo, **Giovanni Stabile**, Gianluigi Rozza, *A continuous trainable filter for modelling unstructured data*, *Computational Mechanics*, 1-13, 2023. <https://doi.org/10.1007/s00466-023-02291-1>
- [P18] Anna Ivagnes, **Giovanni Stabile**, Andrea Mola, Traian Iliescu and Gianluigi Rozza. *Hybrid Data-Driven Closure Strategies for Reduced Order Modeling*, *Applied Mathematics and Computation*, 448, 2023, p. 127920. <https://doi.org/10.1016/j.amc.2023.127920>
- [P19] Francesco Romor, **Giovanni Stabile** and Gianluigi Rozza, *Nonlinear manifold ROM with Convolutional Autoencoders and Reduced Over-Collocation method*, *Journal of Scientific Computing* 94 (3), 1-39, 2023. <https://doi.org/10.1007/s10915-023-02128-2>
- [P20] Anna Ivagnes, **Giovanni Stabile**, Andrea Mola, Traian Iliescu and Gianluigi Rozza. *Pressure Data-Driven Variational Multiscale Reduced Order Models*. *Journal of Computational Physics*, 111904 (2023). <https://doi.org/10.1016/j.jcp.2022.111904>
- [P21] Umberto Morelli, Patricia Barral, Peregrina Quintela, Gianluigi Rozza, **Giovanni Stabile**, *Novel Methodologies for Solving the Inverse Unsteady Heat Transfer Problem of Estimating the Boundary Heat Flux in Continuous Casting Molds* *International Journal for Numerical Methods in Engineering* 124 (6), 1344-1380, 2023. <https://doi.org/10.1002/nme.7167>
- [P22] Xianyi Zeng, **Giovanni Stabile**, Efthymios N. Karatzas, Guglielmo Scovazzi and Gianluigi Rozza, *Embedded domain Reduced Basis Models for the shallow water hyperbolic equations with the Shifted Boundary Method*, *Computer Methods in Applied Mechanics and Engineering*, vol. 398, p. 115143, 2022. <https://doi.org/10.1016/j.cma.2022.115143>

- [P23] Davide Papapicco, Nicola Demo, Michele Girfoglio, **Giovanni Stabile** and Gianluigi Rozza. *The Neural Network shifted-Proper Orthogonal Decomposition: A Machine Learning Approach For Non-linear Reduction Of Hyperbolic Equations*, 2022, Computer Methods in Applied Mechanics and Engineering, vol. 392, 114687 <https://doi.org/10.1016/j.cma.2022.114687>
- [P24] Matteo Zancanaro, Markus Mrosek, **Giovanni Stabile**, Carsten Othmer and Gianluigi Rozza. *Hybrid neural network reduced order modelling for turbulent flows with geometric parameters*, Fluids, vol. 6, no. 8, Art. no. 8, 2021. <https://doi.org/10.3390/fluids6080296>
- [P25] Umberto Emil Morelli, Patricia Barral, Peregrina Quintela, Gianluigi Rozza and **Giovanni Stabile**. *A numerical approach for heat flux estimation in thin slabs continuous casting molds using data assimilation*. International Journal for Numerical Methods in Engineering, 1–34, 2021. <https://doi.org/10.1002/nme.6713>
- [P26] Kelbij Star, Benjamin Sanderse, **Giovanni Stabile**, Gianluigi Rozza and Joris Degroote, Reduced order models for the incompressible Navier-Stokes equations on collocated grids using a 'discretize-then-project' approach. International Journal for Numerical Methods in Fluids, 93: 2694– 2722, 2021. <https://doi.org/10.1002/flid.4994>
- [P27] Mahmoud Gadalla, Marta Cianferra, Marco Tezzele, **Giovanni Stabile**, Andrea Mola, and Gianluigi Rozza. *On the comparison of LES data-driven reduced order approaches for hydroacoustic analysis*. Computers & Fluids 104819, 2021. <https://doi.org/https://doi.org/10.1016/j.compfluid.2020.104819>.
- [P28] Marco Tezzele, Nicola Demo, **Giovanni Stabile**, Andrea Mola and Gianluigi Rozza. *Enhancing CFD predictions in shape design problems by model and parameter space reduction*. Advanced Modeling and Simulation in Engineering Sciences, 7,40, 2020. <https://doi.org/10.1186/s40323-020-00177-y>
- [P29] Kelbij Star, **Giovanni Stabile**, Gianluigi Rozza, and Joris Degroote. *A POD-Galerkin reduced order model of a turbulent convective buoyant flow of sodium over a backward-facing step*. Applied Mathematical Modelling, 89, 486-503, 2021. <https://doi.org/10.1016/j.apm.2020.07.029>
- [P30] Kelbij Star, **Giovanni Stabile**, Francesco Belloni, Gianluigi Rozza, and Joris Degroote. *A novel iterative penalty method to enforce boundary conditions in Finite Volume POD-Galerkin reduced order models for fluid dynamics problems*. Communications in Computational Physics, 30, 34-66, 2021. <https://doi.org/10.4208/cicp.0A-2020-0059>
- [P31] Efthymios N. Karatzas, **Giovanni Stabile**, Leo Nouveau, Guglielmo Scovazzi, Gianluigi Rozza, *A Reduced-Order Shifted Boundary Method for Parametrized incompressible Navier-Stokes equations*, Computer Methods in Applied Mechanics and Engineering, 370, 113273, 2020. <https://doi.org/10.1016/j.cma.2020.113273>
- [P32] **Giovanni Stabile**, Bojana Rosic. *Bayesian identification of a projection-based Reduced Order Model for Computational Fluid Dynamics*, Computers & Fluids, 370, 113273, 2020. <https://doi.org/10.1016/j.compfluid.2020.104477>
- [P33] Gianluigi Rozza, Martin Hess, **Giovanni Stabile**, Marco Tezzele, and Francesco Ballarin. Basic Ideas and Tools for Projection-Based Model Reduction of Parametric Partial Differential Equations, Handbook on Model Order Reduction, vol. 1, chapter 1. De Gruyter, 1–47, 2020. P. Benner, S. Grivet-Talocia, A. Quarteroni, G. Rozza, W. H. A. Schilders, and L. M. Silveira (eds.). <https://doi.org/10.1515/9783110671490-001>
- [P34] Saddam Hijazi, **Giovanni Stabile**, Andrea Mola, and Gianluigi Rozza. *Data-driven POD-Galerkin reduced order model for turbulent flows*, Journal of Computational Physics, 416, 109513, 2020. <https://doi.org/10.1016/j.jcp.2020.109513>
- [P35] **Giovanni Stabile**, Matteo Zancanaro and Gianluigi Rozza. *Efficient Geometrical parametrization for finite-volume based reduced order methods*, International Journal for Numerical Methods in Engineering, Volume 121/12, 2655–2682, 2020. <https://doi.org/10.1002/nme.6324>
- [P36] Sokratia Georgaka, **Giovanni Stabile**, Kelbij Star, Gianluigi Rozza, and Michael J Bluck. *A Hybrid Reduced Order Method for Modelling Turbulent Heat Transfer Problems*, Computers & Fluids, 208, 104615, 2020. <https://doi.org/10.1016/j.compfluid.2020.104615>
- [P37] **Giovanni Stabile**, Francesco Ballarin, Giacomo Zuccarino, and Gianluigi Rozza. *A reduced order variational multiscale approach for turbulent flows*, Advances in Computational Mathematics, 45, 2349–2368 2019. <https://doi.org/10.1007/s10444-019-09712-x>.

- [P38] Efthymios N Karatzas, **Giovanni Stabile**, Leo Nouveau, Guglielmo Scovazzi, and Gianluigi Rozza. *A reduced basis approach for PDEs on parametrized geometries based on the shifted boundary finite element method and application to a Stokes flow*, Computer Methods in Applied Mechanics and Engineering, 347:568–587, 2019. <https://doi.org/10.1016/j.cma.2018.12.040>.
- [P39] Sokratia Georgaka, **Giovanni Stabile**, Gianluigi Rozza, and Michael J Bluck. *Parametric POD-Galerkin Model Order Reduction for Unsteady-State Heat Transfer Problems*, Communications in Computational Physics, 27 (2020), pp. 1-32. <https://doi.org/10.4208/cicp.0A-2018-0207>.
- [P40] Saray Busto, **Giovanni Stabile**, Gianluigi Rozza, and María Elena Vázquez-Cendón. *POD-Galerkin reduced order methods for combined Navier-Stokes transport equations based on a hybrid FV-FE solver*, Computers & Mathematics with Applications, 79/2, 256–273, 2020. <https://doi.org/10.1016/j.camwa.2019.06.026>.
- [P41] **Giovanni Stabile** and Gianluigi Rozza. *Finite volume POD-Galerkin stabilised reduced order methods for the parametrised incompressible Navier-Stokes equations*, Computers & Fluids, 173, 273-284, 2018. <https://doi.org/10.1016/j.compfluid.2018.01.035>.
- [P42] **Giovanni Stabile**, Saddam Hijazi, Andrea Mola, Stefano Lorenzi, and Gianluigi Rozza. *POD-Galerkin reduced order methods for CFD using Finite Volume Discretisation: vortex shedding around a circular cylinder* Communications, Applied and Industrial Mathematics, 8, 210-236, 2017. <https://doi.org/10.1515/caim-2017-0011>.
- [P43] **Giovanni Stabile**, Hermann G. Matthies, and Claudio Borri. *A novel reduced order model for vortex induced vibrations of long flexible cylinders*, Ocean Engineering, 156:191–207, 2018. <https://doi.org/10.1016/j.oceaneng.2018.02.064>.

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### Conference Proceedings

- [P44] Saddam Hijazi, **Giovanni Stabile**, Andrea Mola, and Gianluigi Rozza. *Non-Intrusive Polynomial Chaos Method Applied to Full-Order and Reduced Problems in Computational Fluid Dynamics: a Comparison and Perspectives*, Accepted, to appear In Quantification of Uncertainty: Improving Efficiency and Technology, 2020. [https://doi.org/10.1007/978-3-030-48721-8\\_10](https://doi.org/10.1007/978-3-030-48721-8_10).
- [P45] Efthymios N. Karatzas, **Giovanni Stabile**, Nabib Atallah, Guglielmo Scovazzi, and Gianluigi Rozza. *A Reduced Order Approach for the Embedded Shifted Boundary FEM and a Heat Exchange System on Parametrized Geometries*, ISBN 978-3-030-21013-7, In IUTAM Symposium on Model Order Reduction of Coupled Systems, 2020. [https://doi.org/10.1007/978-3-030-21013-7\\_8](https://doi.org/10.1007/978-3-030-21013-7_8)
- [P46] Kelbij Star, **Giovanni Stabile**, Sokratia Georgaka, Francesco Belloni, Gianluigi Rozza, and Joris Degroote. *POD-Galerkin Reduced Order Model of the Boussinesq Approximation for Buoyancy-Driven Enclosed Flows*, In M&C 2019 meeting, 2019.
- [P47] Gianluigi Rozza, Haris Malik, Nicola Demo, Marco Tezzele, Michele Girfoglio, **Giovanni Stabile**, and Andrea Mola. *Advances in Reduced Order Methods for Parametric Industrial Problems in Computational Fluid Dynamics*, 2018. <http://hdl.handle.net/20.500.11767/88110>, <http://www.eccm-ecfd2018.org/admin/files/filePaper/p2221.pdf>.
- [P48] Saddam Hijazi, Shafqat Ali, **Giovanni Stabile**, Francesco Ballarin, and Gianluigi Rozza. *The Effort of Increasing Reynolds Number in Projection-Based Reduced Order Methods: from Laminar to Turbulent Flows*, In Numerical Methods for Flows, FEF 2017 Selected Contributions, ISBN 978-3-030-30705-9. [https://doi.org/10.1007/978-3-030-30705-9\\_22](https://doi.org/10.1007/978-3-030-30705-9_22).
- [P49] Alessandro Giusti, **Giovanni Stabile**, Enzo Marino, and Claudio Borri. *Coupling effects on the dynamic response of moored floating platforms for offshore wind energy plants*, Procedia engineering, 199:3194–3199, 2017. <https://doi.org/10.1016/j.proeng.2017.09.527>.
- [P50] **Giovanni Stabile**, Hermann G Matthies, and Claudio Borri. *A Reduced Order Model for the Simulation of Mooring Cable Dynamics*, In Computational Methods in Marine Engineering VI – MARINE2015, pages 389–400. Salvatore, Francesco; Broglia, Riccardo; Muscari, Roberto, 2015, ISBN 978-849439286-3, <http://hdl.handle.net/20.500.11767/32845>
- [P51] Enzo Marino, Claudio Lugni, **Giovanni Stabile**, Claudio Borri, and Lance Manuel. *Coupled dynamic simulations of offshore wind turbines: influence of wave modelling on the fatigue load assesment*, In XIII Conference of the Italian Association for Wind Engineering (In-Vento 2014), 2014. <https://hdl.handle.net/20.500.11767/33443>
- [P52] Enzo Marino, Claudio Lugni, **Giovanni Stabile**, and Claudio Borri. *Coupled dynamic simulations of offshore wind turbines using linear, weakly and fully nonlinear wave models: the limitations of the second-order wave theory*, In 9th International Conference on Structural Dynamics (EURODYN 2014), 2014. <http://hdl.handle.net/20.500.11767/33348>



- [P53] Enzo Marino, **Giovanni Stabile**, Claudio Borri, and Claudio Lugni. *A comparative study about the effects of linear, weakly and fully nonlinear wave models on the dynamic response of offshore wind turbines*, In Research and Applications in Structural Engineering, Mechanics and Computation, pages 389–390. CRC Press, 2013. <http://www.scopus.com/inward/record.url?eid=2-s2.0-84889016200&partnerID=MN8TOARS>

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## Theses

- [T1] **PhD Thesis - A Reduced Order Model for the Dynamic Simulation of Long Flexible Cylinders in an Offshore Environment**  
Supervisors: Prof. H. G. Matthies & Prof. C. Borri  
Description: Work conducted at DICEA of the University of Florence and at the Institute of Scientific Computing of the University of Braunschweig and focused on the development of a reduced order model for the dynamic simulation of long flexible cylinders in an offshore environment (Risers and Mooring Lines). An high fidelity fluid structure interaction solver has been developed and used to understand which are the main physical aspects of the problem and to study locally which are the hydrodynamic forces acting on the cable. The high fidelity model has been developed coupling a CFD solver (OpenFOAM) with a FEM solver (FEAP). The results of this solver are used to create a ROM suitable for design purposes and for long term simulations.
- [T2] **Master Thesis - Wind effects on circular membrane roof structures**  
Supervisors: Prof. C. Borri & Prof. G. Bartoli & Prof. Prof. H. J. Niemann  
Description: Master Thesis - Work mainly prepared under the supervision of Prof. Niemann from the Ruhr University of Bochum (Germany). The thesis is focused on the evaluation of the aerodynamic forces acting on a flexible membrane structure. During the thesis I have been involved in experimental activities inside a Boundary Layer wind tunnel and I developed a non-linear computational model with a finite element solver. .
- [T3] **Bachelor Thesis - Study of stability of a clay slope and retaining wall design**  
Supervisor: Prof. A. Ghinelli  
Description: Thesis focused on the stability analysis of a clay slope located in Tuscany and on the design of the retaining wall. The clay slope has been modelled using the general limit equilibrium method.

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## Contributions to national and international events

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### Speaker

- [C1] **Giovanni Stabile**, *Reduced Order Models and Bayesian Approaches for the Solution of Inverse Heat Conduction Problems*, Invited Speaker in contributed session, SIAM UQ, Trieste, Italy, 2024.
- [C2] **Giovanni Stabile**, Invited Speaker for a Seminar at POLIBA, Bari, Italy, 2024.
- [C3] **Giovanni Stabile**, Invited Speaker at SEMINAR++ Scientific Machine Learning (Semester Programme), Centrum Wiskunde & Informatica, Amsterdam, The Netherlands, 2023.
- [C4] **Giovanni Stabile**, *From linear to nonlinear model order reduction*, Invited Keynote Speaker, II International Workshop on Computational Science and AI in industry, Trondheim, Norway, 2023.
- [C5] **Giovanni Stabile**, *Non-Linear Manifold projection reduced order models for parametric partial differential equations with convolutional autoencoders and reduced Over-Collocation Method*, Invited Speaker in contributed session, UMI congress, Pisa, Italy, 2023.
- [C6] **Giovanni Stabile**, *ITHACA-FV a C++ library for model order reduction based on OpenFoam*, Invited Speaker in contributed session, X International Conference of Computational Methods for Coupled Problems in Science and Engineering, Chania, Greece, 2023.
- [C7] **Giovanni Stabile**, *An OpenFOAM-based tool for Real-time Data Assimilation in Continuous Casting Molds*, Invited Speaker in contributed session, Math 2 Product, Taormina, Italy, 2023.
- [C8] **Giovanni Stabile**, *Dalla modellazione matematica alla simulazione numerica: applicazione a casi di interesse industriale/biomedicale*, Invited Seminar for University Students, Biotechnology degree course, Fano, Italy, 2023.
- [C9] **Giovanni Stabile**, *Simulo Ergo Sum: il computer simula la realtà*, Invited Seminar for Computer Science Students, Computer Science degree course, Urbino, Italy, 2023.
- [C10] **Giovanni Stabile**, *A novel approach for nonlinear ROMs exploiting convolutional autoencoders and collocation*, Invited Speaker, International Workshop on Reduced Order Methods, Singapore, 2023.

- [C11] **Giovanni Stabile**, *Nonlinear manifold ROM with Convolutional Autoencoders and Reduced Over-Collocation method*, Invited Speaker, Accurate ROMs for Industrial Applications at INRIA Bordeaux, 2023.
- [C12] **Giovanni Stabile**, *Nonlinear manifold ROM with Convolutional Autoencoders and Reduced Over-Collocation method*, Invited Speaker, Accurate ROMs for Industrial Applications at Virginia Tech, 2022, Virginia Tech, USA.
- [C13] **Giovanni Stabile**, *Model order reduction for turbulent and compressible flows: hybrid approaches in physics and geometry parametrization*, Selected Contributed Talk, Model Reduction and Surrogate Modeling, 2022, Berlin, Germany.
- [C14] **Giovanni Stabile**, *Nonlinear manifold ROM with Convolutional Autoencoders and Reduced Over-Collocation method*, Contributed talk in a minisymposium (organizer), 8th European Congress on Computational Methods in Applied Sciences and Engineering, 2022, Oslo, Norway.
- [C15] **Giovanni Stabile**, *Hybrid reduced order models for coupled heat transfer problems*, Invited Talk, RAMSES conference, 2021, Trieste, Italy.
- [C16] **Giovanni Stabile**, *Shifting learning in non-linear hyperbolic equations using neural networks*, Contributed talk in a minisymposium (organizer), MMLDT-CSET, 2021, San Diego, CA, USA.
- [C17] **Giovanni Stabile**, *Hybrid reduced order models for coupled heat transfer problems*, Keynote Talk, COUPLED2021, 2021, Chia Laguna, Italy.
- [C18] **Giovanni Stabile**, *Hybrid reduced order models for turbulent flows*, Invited Speaker, YIC2021, 2021, Valencia, Spain.
- [C19] **Giovanni Stabile**, *Intrusive and Non-Intrusive Reduced Order Methods for Parametric Problems Using OpenFOAM*, Invited Seminar, University of Nottingham, 2020, UK.
- [C20] **Giovanni Stabile**, *Intrusive and Non-Intrusive Reduced Order Methods for Parametric Problems Using OpenFOAM*, Contributed talk, 15th OpenFOAM workshop, 2020, Arlington, VA, USA.
- [C21] **Giovanni Stabile**, *Geometrically parametrized reduced-order models using OpenFOAM and ITHACA-FV*, Invited talk, 4th GOFUN meeting, 2020, Braunschweig, Germany.
- [C22] **Giovanni Stabile**, Bojana Rosic, Hermann Matthies, Gianluigi Rozza, *Bayesian identification in ROM for computational fluid dynamics*, Contributed talk in a minisymposium (organizer), UNCECOMP2019 conference, 2019, Crete, Greece.
- [C23] **Giovanni Stabile**, *Reduced Order Modeling with OpenFOAM using intrusive and non-intrusive methods*, Invited talk, 3rd GOFUN meeting, 2019, Braunschweig, Germany.
- [C24] **Giovanni Stabile**, *Reduced Order Models for turbulent flows and geometrical parametrization*, Keynote speaker in a minisymposium, FEF2019 conference, 2019, Chicago, US.
- [C25] **Giovanni Stabile**, *Stabilized Reduced Order Methods for computational fluid dynamics*, Invited seminar, Institute of Scientific Computing of the TU Braunschweig, 2018, Germany.
- [C26] **Giovanni Stabile**, *Finite volume POD-Galerkin stabilized reduced order methods for the parametrized incompressible Navier-Stokes equations*, Contributed talk, MoRePaS, 2018, Nantes, France.
- [C27] **Giovanni Stabile**, *Finite volume POD-Galerkin stabilised reduced order methods for the parametrised incompressible Navier-Stokes equations*, Invited seminar, Institute of Scientific Computing of the TU Braunschweig, 2017, Germany.
- [C28] **Giovanni Stabile**, Gianluigi Rozza, *Stabilization techniques for pressure recovery applied to POD-Galerkin methods for the incompressible Navier-Stokes equations*, Poster Presenter, QUIET conference, 2017, SISSA, Trieste.
- [C29] **Giovanni Stabile**, Gianluigi Rozza, *Stabilization techniques applied to POD-Galerkin methods for finite volume approximation of the Navier-Stokes equations*, Contributed talk in a minisymposium, 19h International Conference on Finite Elements in Flow Problems, FEF, 2017, Rome, Italy.
- [C30] **Giovanni Stabile**, Saddam Hijazi, Stefano Lorenzi, Andrea Mola, Gianluigi Rozza, *POD-Galerkin Reduced Order Model for the simulation of laminar and turbulent flows around a circular cylinder*, Poster Presenter, Conference “Recent developments in numerical methods for model reduction”, Institute Henry Poincare, 2016, Paris, France.
- [C31] *Reduced order modelling of vortex-induced vibrations for long slender structures in an offshore environment*, Contributed talk in a minisymposium, 87th meeting of the international association of applied mathematics and mechanics, 2016, Braunschweig, Germany.

- [C32] **Giovanni Stabile** *A numerical approach to the dynamic analysis of mooring lines*, Contributed talk in a minisymposium, 86th meeting of the international association of applied mathematics and mechanics organized, 2015, Lecce, Italy.
- [C33] **Giovanni Stabile** *A Reduced order model for long flexible cylinders in offshore environment*, Poster Presenter, SCACR 2015 the International Short Course and Conference on Applied Coastal Research, 2015, Florence, Italy.
- [C34] **Giovanni Stabile** *A numerical approach to dynamic analysis of marine cables*, Contributed talk in a minisymposium, AIMETA 2015 the biannual meeting of the Italian Society of Theoretical and Applied Mechanics, 2015, Genoa, Italy.
- [C35] **Giovanni Stabile** *Dynamic Modelling of Mooring Lines Using a FSI Solver Based on OpenFOAM*, Contributed talk, NOFUN 2015 the 3rd Northern Germany OpenFOAM User Meeting, 2015, Braunschweig, Germany.
- [C36] **Giovanni Stabile** *Fluid Structure Interaction with OpenFOAM using the Component Template Library*, Contributed talk, NOFUN 2014 the 2nd Northern Germany OpenFOAM User Meeting, 2014, Braunschweig, Germany.

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### Co-Author

- [C37] Matteo Zancanaro, **Giovanni Stabile**, Gianluigi Rozza, Contributed talk in a minisymposium, *Segregated methods for Reduced Order Models applied to the Navier-Stokes problem in a finite volume environment*, European Numerical Mathematics and Advanced Applications Conference, Egmond aan Zee, The Netherlands
- [C38] Saray Busto Ulloa, **Giovanni Stabile**, Gianluigi Rozza, María Elena Vázquez-cendón, Contributed talk in a minisymposium, *A POD-Galerkin reduced order method for Navier-Stokes equations based on a hybrid FV-FE solver*, ICIAM 2019, International Congress on Industrial and Applied Mathematics, 2019, Valencia, Spain.
- [C39] Umberto Emil Morelli, Peregrina Quintela, Patricia Barral, **Giovanni Stabile**, Gianluigi Rozza, Contributed talk in a minisymposium, *Model order reduction for boundary condition estimation in casting machinery*, ICIAM 2019, International Congress on Industrial and Applied Mathematics, 2019, Valencia, Spain.
- [C40] Gianluigi Rozza, **Giovanni Stabile**, Contributed talk in a minisymposium, *Increasing Reynolds Number: State of the Art and Perspectives for Reduced Order Methods in Computational Fluid Dynamics*, COUPLED 2019 VIII International Conference on Coupled Problems in Science and Engineering, Sitges (Barcelona), Spain.
- [C41] Matteo Zancanaro, **Giovanni Stabile**, Gianluigi Rozza, Poster, *Finite Volume Reduced Order Methods based on SIMPLE Algorithm*, Summer School on reduced order methods in Computational Fluid Dynamics, SISSA, Trieste, Italy,
- [C42] **Stabile Giovanni**, Saddam N Y Hijazi, Andrea Mola, Gianluigi Rozza, Poster, *Hybrid ROMs for problems in computational fluid dynamics*, Summer School on reduced order methods in Computational Fluid Dynamics, SISSA, Trieste, Italy,
- [C43] Umberto Morelli, **Giovanni Stabile**, Patricia Barral, Gianluigi Rozza, Peregrina Quintela, Poster, *Reduced Order Methods for Boundary Conditions Estimation*, Summer School on reduced order methods in Computational Fluid Dynamics, SISSA, Trieste, Italy,
- [C44] Kelbij Star, Francesco Belloni, Joris Degroote, Sokratia Georgaka, Gianluigi Rozza, **Giovanni Stabile**, Poster, *Finite volume POD-Galerkin Reduced Order Model of the Boussinesq approximation for buoyancy-driven flow*, Summer School on reduced order methods in Computational Fluid Dynamics, SISSA, Trieste, Italy,

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### Organization of Conferences and Events

- 2024 Minisymposium organizer at the SIAM Conference on Uncertainty Quantification (UQ24), Trieste, Italy, 2024. <https://www.siam.org/conferences/cm/conference/uq24>
- 2024 Minisymposium organizer (2 sessions) at the 16th World Congress on Computational Mechanics and 4th Pan American Congress on Computational Mechanics, Vancouver, Canada, 2024. <https://www.wccm2024.org/>
- 2024 Minisymposium organizer (2 sessions) at the ECCOMAS CONGRESS 2024. 9th European Congress on Computational Methods in Applied Sciences and Engineering. 3-7 June 2024, Lisboa, Portugal. <https://eccomas2024.org/>



- 2023 Minisymposium organizer at the SIAM CSE, February 26-March 3, 2023, Amsterdam, The Netherlands. <https://www.siam.org/conferences/cm/conference/cse23>
- 2023 Minisymposium organizer at the M2P – Math 2 Product, May 30-June 1, 2023, Taormina, Italy. <https://m2p2023.cimne.com/>
- 2023 Minisymposium organizer at the IACM – 22nd Computational Fluids Conference CFC2023, April 25-28, 2023, Cannes, France. <https://cfc2023.iacm.info/>
- 2023 Minisymposia organizer (2 sessions) at the 10th edition of the International Conference on Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2023), June 5-7, 2023, Crete, Greece. <https://coupled2023.cimne.com/>
- 2022 Organizer and lecturer of the *Summer School on reduced order methods in Computational Fluid Dynamics*, SISSA, Trieste, Italy (Jul. 2022 11-15). <https://indico.sissa.it/event/74/>
- 2022 Minisymposia organizer (2 sessions) at 8th European Congress on Computational Methods in Applied Sciences and Engineering, June 5-9, 2022, Oslo, Norway. <http://www.eccomas2022.org>
- 2021 Minisymposium organizer at MMLDT-CSET 2021, Mechanistic Machine Learning and Digital Twins for Computational Science, Engineering & Technology, September 26-29 2021, San Diego, CA, USA. <https://mmltd.eng.ucsd.edu/>
- 2021 Minisymposium organizer Advances in Coupled Model Reduction in Heat Transfer, CFD and FSI, COUPLED2021, Chia Laguna, South Sardinia, Italy, 13-16 June 2021. <https://congress.cimne.com/Coupled2021>
- 2020 Local coordinator, RAMSES: Reduced order models; Approximation theory; Machine learning; Surrogates, Emulators and Simulators, Trieste, Italy (Jun. 2020, 30 – 2020 Jul., 3). <https://indico.sissa.it/event/43/>
- 2020 Minisymposium organizer, SIAM UQ 2020, Munich Garching, Germany (Mar. 2020, 24-27), minisymposium on Reduced order methods for uncertainty quantification in CFD parametric problems. <https://siam-uq20.ma.tum.de/>.
- 2019 Organizer and lecturer of the *Summer School on reduced order methods in Computational Fluid Dynamics*, SISSA, Trieste, Italy (Jul. 2019 8-12). <https://indico.sissa.it/event/34>.
- 2019 Organizer of the Minisymposium in honor of Prof. Matthies: *Uncertainty Computations with Reduced Order Models and Low-rank Representations*, at the Conference UNCECOMP2019, Crete, Greece (June 2019, 24-26). <https://2019.uncecomp.org>.
- 2017 Member of the local organizing committee of the conference *QUIET 2017: Quantification of Uncertainty: Improving Efficiency and Technology*, Trieste, Italy (Jul. 2017, 18-21). <https://indico.sissa.it/event/8>.

## Teaching Activities

- 2023 **Lecturer**  
PhD course on *Deep Learning and Scientific Computing* (24 hours  $\approx$  15 students)  
PhD course in Research Methods in Science and Technology at the University of Urbino.
- 2023 **Lecturer**  
Bachelor course on *Statistical Processing Of Experimental Data* (42 hours  $\approx$  60 students)  
Bachelor course in Biotechnology at the University of Urbino.
- 2023 **Lecturer**  
Master Course on *Numerical Methods for linear algebra and functional analysis* (63 hours  $\approx$  20 students)  
Master course in Applied Informatics at the University of Urbino.
- Fall 2022 **Lecturer**  
Ph.D. Course on *Model Order Reduction in Computational Fluid Dynamics: focus on stabilisation and applications* (4 hours  $\approx$  10 students)  
Ph.D. course at the university of Udine.
- Summer 2022 **Lecturer and organizer**  
Summer School on *reduced order methods in Computational Fluid Dynamics* (1 week the entire event - 10 hours my module)  
International School for Advanced Studies, Trieste, Italy;

- Spring 2022 **Lecturer**  
 Ph.D. Course on *Advanced topics on CFD* (20 hours)  
 Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy and Master in HPC, SISSA-ICTP, Italy
- 2021-2022 **Member of the evaluation committee for exams**  
 Ph.D. Course on *Topics in Continuum Mechanics*  
 Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy.
- 2021-2022 **Teaching Assistant and Member of the evaluation committee for exams**  
 1 edition of the Ph.D. and master Course on *Applied Mathematics: an Introduction to Scientific Computing by Numerical Analysis* (12 Hours of exercise sessions)  
 Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy and Master in HPC, SISSA-ICTP, Italy
- 2022 **Teaching Assistant and Member of the evaluation committee for exams**  
 1 edition of the Ph.D. on *Topics in computational fluid dynamics* (3 hours)  
 Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy
- 2016-2022 **Teaching Assistant and Member of the evaluation committee for exams**  
 6 different editions of the Ph.D. Course on *Reduced Order Methods for Computational Mechanics* (8 hours of exercise session each year)  
 Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy and Master in HPC, SISSA-ICTP, Italy
- Summer 2019 **Lecturer and organizer**  
 Summer School on *reduced order methods in Computational Fluid Dynamics*  
 International School for Advanced Studies, Trieste, Italy;
- 2014-2016 **Training Activities**  
 Master Course on *Computational Mechanics*  
 Master Degree in Civil and Environmental Engineering, Department of Civil and Environmental Engineering, University of Florence.

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## Student and PostDoc supervision and coaching activities

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### PostDoc

- 2021-2022 **Supervisor**  
 PostDoc of Martina Cracco  
 Topic: *Nonlinear Model Order Reduction*  
 PostDoc in SISSA in collaboration with the Joint Research Center  
 CoSupervisor: Gianluigi Rozza
- 2022-Now **Supervisor**  
 PostDoc of Rahul Halder  
 Topic: *Physics informed Neural Networks*  
 PostDoc in SISSA in collaboration with Electrolux Professional  
 CoSupervisor: Gianluigi Rozza
- 2021-Now **Supervisor**  
 PostDoc of Arash Hajisharifi  
 Topic: *Model reduction for home appliances*  
 PostDoc in SISSA in collaboration with Electrolux Professional  
 CoSupervisor: Gianluigi Rozza
- 2021 **Supervisor**  
 PostDoc of Mohammad Ghazizadeh  
 Topic: *Model reduction for CFD*  
 PostDoc in SISSA  
 CoSupervisor: Gianluigi Rozza
- 2021-2022 **Supervisor**  
 PostDoc of Anna Nikishova  
 Topic: *Digital Twins for Industrial Applications*  
 PostDoc in SISSA in collaboration with Wärtsilä  
 CoSupervisor: Gianluigi Rozza

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## Ph.D. theses / PreDoc

- Winter 2022 - Now **Supervisor**  
PreDoc of Kabir Bakhshaei  
Topic: *Inverse problems in a stochastic setting*  
PreDoc within a PRIN project, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Winter 2021 - Now **Supervisor**  
Ph.D. thesis of Anna Ivagnes  
Topic: *Data Driven closure models*  
Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Spring 2022 - **Supervisor**  
Summer 2022 PreDoc of Alberto della Noce  
Topic: *Simulation and computational reduction of compressible flows*  
PreDoc within a PRIN project, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Winter 2021 - Now **Supervisor**  
Ph.D. thesis of Harshith Gowrachari  
Topic: *Digital Twin for industrial processes*  
Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy in collaboration with Danieli  
CoSupervisor: Gianluigi Rozza
- Winter 2021 - Now **Supervisor**  
Ph.D. thesis of Valentin Nkana Ngan,  
Topic: *ROMs for Fluid Structure Interaction*  
Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Winter 2021 - Now **Supervisor**  
Ph.D. thesis of Sajad Salavatidezfouli  
Topic: *Numerical simulation of home appliances*  
Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy in collaboration with Electrolux  
CoSupervisor: Gianluigi Rozza
- Spring 2021 - 2022 **Supervisor**  
PreDoc of Moaad Khamlich  
Topic: *Model reduction for environmental simulations*  
PreDoc in Mathematical Analysis, Modelling, and Applications, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Fall 2023 **Supervisor**  
(expected) Ph.D. thesis of Francesco Romor  
Topic: *Non-linear model order reduction with auto-encoders*  
Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Spring 2022 **Supervisor**  
Ph.D. thesis of Umberto Emil Morelli  
Topic: *Reduced Order Modeling for inverse problems and industrial applications*  
Industrial Ph.D. within the ROMSOC project, University of Santiago de Compostela, Spain  
CoSupervisors: Peregrina Quintela, Gianluigi Rozza, Patricia Barral
- Sep. 2021 **Supervisor**  
Ph.D. thesis of Matteo Zancanaro  
Topic: *Reduced Order Modelling for compressible flows*  
Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy  
CoSupervisor: Gianluigi Rozza

- February 2021 **Supervisor**  
Ph.D. thesis of Kelbij Star  
Topic: *Reduced Order Modelling for coupled problems in Nuclear Engineering applications*  
Ph.D. in Engineering, University of Ghent - SCK-CEN, Ghent, Belgium  
CoSupervisors: Joris Degroote, Benjamin Sanderse
- Sep. 2020 **Supervisor**  
Ph.D. thesis of Saddam Hijazi  
Topic: *Reduced order methods for laminar and turbulent flows in a finite volume setting: projection-based methods and data-driven techniques*  
Ph.D. in Mathematical Analysis, Modelling, and Applications, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Jul. 2020 **Supervisor**  
3 months PreDoc of Valentin Nkana Ngan  
Topic: *Reduced Order Modelling for aeroelastic problem*  
PreDoc in Mathematical Analysis, Modelling, and Applications, SISSA, Italy  
CoSupervisor: Gianluigi Rozza
- Fall 2021 **Local Advisor during research stays at SISSA**  
Ph.D. thesis of Raul Bravo  
Topic: *Localized model order reduction*  
Ph.D. at CIMNE Barcellona  
Supervisor: Riccardo Rossi
- Fall 2020 **Local Advisor during research stays at SISSA**  
Ph.D. thesis of Markus Mrosek  
Topic: *Reduced Order Modelling for turbulent geometrically parametrized problems*  
Ph.D. at Volkswagen research center, Wolfsburg, Germany.  
Supervisor: Carsten Othmer
- Spring 2020 **Local Advisor during research stays at SISSA**  
Ph.D. thesis of Sokratia Georgaka  
Topic: *Reduced Order Modelling for coupled problems in Nuclear Engineering applications*  
Ph.D. in Mechanical Engineering, Imperial College, London, United Kindom  
Supervisor: Michael J. Bluck
- Fall 2018 **Local Advisor during research stays at SISSA**  
Ph.D. thesis of Saray Busto  
Topic: *Reduced Order Models for Hybrid FEM-FV solvers.*  
Ph.D. in Mathematics, University of Santiago de Compostela, Spain  
Supervisor: María Elena Vázquez-Cendón
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- [Master theses / Internships](#)
- 2023 **Supervisor**  
master thesis of Giorgio Abelli  
Topic: *Comparison between data-driven and physics-based numerical methods for inverse problems*  
Master in Mathematics, University of Trieste
- Winter 2022 **Supervisor**  
Master in High Performance Computing thesis of Giulio Malenza  
Topic: *Parallel implementation on GPUs of a computational fluid dynamics software*  
Master in High Performance Computing, SISSA/ICTP
- Spring 2022 **Supervisor**  
semester internship of Isabella Carla Gonnella  
Topic: *Geometric Deep Learning*  
Master degree in Data Science, University of Trieste
- Spring 2022 **Supervisor**  
semester internship of Dario Coscia  
Topic: *Development of continuous convolutional filters for unstructured data*  
Master degree in Data Science, University of Trieste
- Spring 2022 **Supervisor**  
semester internship and master thesis of Guglielmo Padula  
Topic: *Optimal transport algorithm of mesh deformation*  
Master degree in Data Science, University of Trieste

- Spring 2022 **Supervisor**  
 Master thesis of Davide Roznowicz  
 Topic: *Aerodynamics Surrogate Modelling via Graph Neural Networks*  
 Master degree in Data Science, University of Trieste, Italy in collaboration with Sauber Alfa Romeo  
 CoSupervisor: Gianluigi Rozza
- Fall 2021 **Supervisor**  
 Master thesis of Angelo Cetrangolo  
 Topic: *Inverse Problems for CFD*  
 Master degree in Mathematical Engineering, Politecnico di Torino, Italy  
 CoSupervisors: Gianluigi Rozza, Claudio Canuto
- Spring 2021 **Supervisor**  
 Master thesis of Anna Ivagnes  
 Topic: *Data Enhanced Reduced Order Methods for Turbulent Flows*  
 Master degree in Mathematical Engineering, Politecnico di Torino, Italy  
 CoSupervisors: Gianluigi Rozza, Claudio Canuto
- Spring 2021 **Supervisor**  
 Master thesis of Davide Papapicco  
 Topic: *A neural network framework for reduced order modelling of non-linear hyperbolic equations in computational fluid dynamics*  
 Master degree in Mathematical Engineering, Politecnico di Torino, Italy  
 CoSupervisors: Gianluigi Rozza, Claudio Canuto
- Fall 2019 **Supervisor**  
 Master thesis of Giulio Ortali  
 Topic: *Naval Engineering shape optimization using Reduced Order Models*  
 Master degree in Mathematical Engineering, Politecnico di Torino, Italy  
 CoSupervisors: Gianluigi Rozza, Claudio Canuto
- Fall 2017 **Supervisor**  
 Master thesis of Giacomo Zuccarino  
 Topic: *Reduced Order Models for turbulent flows using variational multiscale methods*  
 Master degree in Mathematics, University of Trieste, Italy  
 CoSupervisor: Gianluigi Rozza
- Fall 2016 **Supervisor**  
 Master thesis of Saddam Hijazi  
 Topic: *reduced order models for finite volumes*  
 Master degree in Mathematical Modelling in Engineering, University of L'Aquila, Italy  
 CoSupervisor: Gianluigi Rozza

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## National and International Collaborations

**Accademic Collaborations:** • *Zoltán Horváth* on air pollution modelling (Széchenyi István University, Győr, HU); • *S. Perotto* on mesh adaptation and stabilization techniques (PoliMI) • *S. Rubino* on stabilized ROMs techniques (University of Sevilla, ES); • *J.S. Pallares* on ROMs for cardiovascular simulations (University of Valladolid, ES); • *G. Scovazzi* on ROMs from Immersed Methods (Duke University, US); • *B. Sanderse* on structure preserving ROMs (CWI, NL); • *B. Rosic* on Bayesian calibration of ROMs (U. of Twente, NL); • *H. Matthies* on uncertainty quantification (TU Braunschweig, DE); • *E. Karatzas* on ROMs from Immersed Methods (U. of Athens, EL); • *S. Georgaka* on Machine Learning techniques (U. Manchester, UK); • *J. Degroote* on ROMs for nuclear applications (U. Ghent, BE); • *P. Quintela and P. Barral* on data assimilation and inverse problems (U. Santiago de Compostela, ES); • *C. Canuto* on nonlinear manifold approximation techniques (PoliTO, IT); • *T. Iliescu* on data-driven closure models for ROMs (Virginia Tech, US); • *S. Busto* on ROMs for CFD (U. Trento, IT); • *R. Rossi* on localized reduced order models (CIMNE-UPC, ES); • *G. Rozza* on ROMs for CFD (SISSA, IT).

**Industrial Collaborations:** • *Daiichi Sankyo Europe* on bioreactors modeling (Munich, DE) • *NVIDIA* on parallelization on GPU of a code for computational fluid dynamics (UK); • *Volkswagen Research Center* (Wolfsburg, DE) on ROMs for external aerodynamic; • *Wärtsilä* (Trieste, IT) on digital twins for naval applications; • *Electrolux research center* (Susegana, IT) on Digital Twins for home appliances; • *Danieli research center* (Buttrio, IT) on data assimilation; • *Scalian Groupe* (Rennes, FR) on ROMs for uncertainty quantification; • Sauber/Alfa Romeo (Hinwil, CH) on machine learning for aerodynamic problems; • *IBM-UK* on ROMs for CFD and UQ (Warrington, UK).



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## Editorial Duties

- Editor Topics Editor for the MDPI Fluids Mathematics journal
- Editor Editor of the book Reduction, Approximation, Machine learning, Surrogates, Emulators and Simulators: RAMSES, Lecture Notes in Computational Science and Engineering published by Springer.
- Editor Guest Editor of the Special Issue *Deep Learning for Computational Mechanics on the Advanced Modeling and Simulation in Engineering Sciences* journal
- Editor Editor of the book *Reduced Order Methods in Computational Fluid Dynamics and Applications* that has been published by SIAM.
- Editor Topics Editor for the MDPI Fluids journal and organizer of the special Issue "Reduced Order Models for Computational Fluid Dynamics", [https://www.mdpi.com/journal/fluids/special\\_issues/Reduced\\_Order\\_Models\\_for\\_Computational\\_Fluid\\_Dynamics](https://www.mdpi.com/journal/fluids/special_issues/Reduced_Order_Models_for_Computational_Fluid_Dynamics)
- Editor Editor of the Special Issue *Scientific Machine Learning: Blending of traditional mechanistic modeling with machine learning methodologies* on the *Computers & Mathematics with Applications* journal
- Reviewer **Selected Journals:** • SIAM journal on numerical analysis (2) • Computer Methods in Applied Mechanics and Engineering (12) • International Journal of Numerical Methods in Engineering (3) • Engineering Applications of Computational Fluid Mechanics (1) • American Mathematical Society, Math Reviews (3) • International Journal of Computational Fluid Dynamics (1) • Computer Physics Communications (1) • MDPI (Fluids,Mathematics,Energy,Mathematical and Computational Applications,entropy) (5) • Ocean Engineering (2) • Journal of Computational Physics (6) • Computers & Fluids (5) • Computer Modeling in Engineering & Sciences (1),• Hindawi (1) • Applied Mathematics and Computation. (1) • Journal of Turbulence (1) • Mechanics & Industry (1) • Journal of Computational Mathematics (1) • International Journal of Numerical Analysis and Modeling (1).

Reviewer Icelandic Research Fund

Funding Agencies

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## Accademic Duties

- 2022-now **Faculty board** for the school of Science, Technology and Philosophy of information, and for the school of Biology and Biotechnology. University of Urbino Carlo Bo, Urbino, Italy.
- 2020-now **Faculty board** for the PhD course in Mathematical Analysis, Modelling, and Applications. SISSA, Trieste, Italy
- 2020-now Member of **14** selection commissions for post-doc researchers (assegni di ricerca) and **13** selection commissions for postLaurea contracts (borse postLaurea), Member of 3 PhD selection committees.
- 2019-now **Member of 4 PhD committees** 2 SISSA, 1 U. of Trieste (IT); 1 U. Ghent (BE) **External reviewer** for 1 PhD thesis U. of Trieste, 2 MHPC thesis SISSA (IT). **Member of 6 Master thesis committees** 4 U. of Trieste, 1 PoliTO (IT); 1 TU Delft, (NL).

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## Grants/Awards

- 2023-Now PI of a PRIN PNRR 2022 (call under 40) grant with Università Cattolica di Brescia and IMT Lucca (240k €, 100k € for UniUrb)
- 2023-Now PI of the ERC Starting Grant DANTE - Data Aware efficient models of the urbaN microclimaTE (1450k €)
- 2023-Now GalvaSmartControl project, funded by COMET (Austrian Competence Center), in collaboration with Materials Center Leoben Forschung GmbH, voestalpine Stahl GmbH, SISSA - (10k € for UniUrb).
- 2023 GNCS Traveling Grant to attend the UMI 2023 congress.
- 2022 P34 has been listed in the most cited articles published on Journal of Computational Physics since 2020 (74 citations from scopus)
- 2022 P36 has been listed in the most cited articles published on Computers & Fluids since 2020 (25 citations from scopus)
- 2020 P39 has been listed among the featured articles of Communications in Computational Physics
- 2018 P41 has been listed in the most cited articles published on Computers & Fluids since 2018 (102 citations from scopus)

- 2019 FEF conference Traveling Grant.
- 2015 Research Grant for Doctoral Candidates and Young Academics and Scientists, DAAD German Academic Exchange Service. (10k €)
- 2015 Short Term Research Grant, DAAD German Academic Exchange Service. (6k €)

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## Computer skills

- Progr. Languages C ++, Python, FORTRAN, Matlab, L<sup>A</sup>T<sub>E</sub>X.
- Software **Comp. Packages:** OpenFOAM, Eigen, FEniCS, NumPy, SciPy, pandas, PyTorch, Nalu, Ansys (Mechanical ADPL, AQWA, Fluent, Designmodeler), FEAP, SAP 2000. **Oper. Systems:** Linux, Microsoft Windows
- CAD and Mesher:** Salome, Autocad, SolidWorks, GMSH

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## Open-source software development

- ITHACA-FV I am the creator, maintainer and main developer of **ITHACA-FV** a C++ library for model reduction based on OpenFOAM and available on GitHub <https://github.com/ITHACA-FV/ITHACA-FV>
- MiniDNN I contributed to and currently maintain **MiniDNN** an header based C++ library that implements a number of popular deep neural network (DNN) available on GitHub <https://github.com/yixuan/MiniDNN>
- EZyRB I contributed to the **EZyRB** library, a Python package for non-intrusive model order reduction <https://github.com/mathLab/ezrb>

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## Involvement in research projects and Industrial Collaborations.

- 2023 PI of the ERC Starting Grant DANTE - Data Aware efficient models of the urbaN microclimaTE (1450k €).
- 2023 Responsible of the UniUrb Research Unit for the GalvaSmartControl project, funded by COMET (Austrian Competence Center), in collaboration with Materials Center Leoben Forschung GmbH, voestalpine Stahl GmbH, SISSA - (10k € for UniUrb).
- 2023 PI of PRIN-PNRR project ROMEU in collaboration with Università Cattolica del Sacro Cuore, Brescia and IMT, Lucca. (240k €, 100k € for UniUrb - call under 40).
- 2016-2021 6 **GNCS** projects (P.I.'s G.Rozza, G.Rozza, S.Perotto, G.Rozza, S.Perotto, G. Rozza, G. Rozza).
- 2018-2022 Member of the SISSA research unit in a **PRIN** project with (Politecnico of Torino, CNR-IMATI, University of Trento, University of Pavia, University of Milano).
- 2016-2022 From 2016 to 2022 I have worked within the AROMA-CFD project, an **ERC** consolidator grant of which I was also task coordinator. (PI Prof. G. Rozza)
- 2021 I have collaborated to the writing of a **PRIN** with University of Milano, University of Brescia, University of Trento, Politecnico of Torino. - (Funded)
- 2020 I have collaborated to the writing of EuroHPC a **H2020** project financed by the European Commission.
- 2019 I have collaborated to the writing of ARIA a **H2020** project financed by the European Commission.
- 2018 I have collaborated to the writing of a **PRIN** proposal financed by the Italian Ministry of education and worked within this project. (PI prof Rozza)
- 2017 I have collaborated to the writing of the FARExAROMA-CFD proposal. Financed by the Italian Ministry of education. (PI prof Rozza)
- 2016-now I have been involved into industrial projects and technology transfer with several important industrial groups. Among them I list the cooperation with:
- Fincantieri GROUP • Danieli SPA • Wärtsilä SPA • IBM-UK • Volkswagen • Lombardi Group
  - ElectroLux • Sauber Alfa Romeo • Scalian • Daiichi Sankyo • Voestalpine • NVIDIA

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## Other Achievements

- 2022 National scientific qualification for Associate Professor - sector 01/A5 (MAT/08 Numerical Analysis)  
Validity: 25/01/2022 - 25/01/2031
- 2022 National scientific qualification for Associate Professor - sector 09/A1 (ING-IND/06 Fluid Dynamics)  
Validity: 03/02/2022 - 03/02/2031

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## Languages

- Italian Mother tongue;

English Certified by the TOEFL IBT test score 98 - C1;  
German Upper-Intermediate - B2, I lived in Germany for almost three years;

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Il sottoscritto dichiara di essere consapevole della veridicità del contenuto del presente documento e di essere a conoscenza delle sanzioni penali, di cui all'art.76 del D.P.R.28.12.2000, n. 445, in caso di false dichiarazioni. Ai sensi del Regolamento UE 679/2016 e del D.Lgs. 196/2003, dichiara di aver preso visione dell'Informativa sul trattamento dei dati personali nell'ambito delle procedure di selezione e reclutamento di personale.

Pisa, 4th April 2024

GIOVANNI STABILE

