Marco Tezzele, Ph.D.

Oden Institute for Computational Engineering and Sciences
The University of Texas at Austin
Austin, TX 78712
Updated on March 19, 2024

marco.tezzele@austin.utexas.edu
marcotezzele Scopus profile
https://mtezzele.github.io

Research and Education

2021 – pres. **Postdoctoral Fellow, The University of Texas at Austin**
Oden Institute for Computational Engineering and Sciences
NASA ULI Project: *Autonomous Cargo Operations at Scale*. Advisor: Karen E. Willcox

2018 – 2021 **Ph.D.in Mathematical Analysis, Modelling, and Applications, SISSA**
Industrial Ph.D. grant financed by Fincantieri SpA
Thesis title: *Data-driven parameter and model order reduction for industrial optimisation problems with applications in naval engineering.* Advisor: Gianluigi Rozza

2015 – 2018 **Assistant Researcher, SISSA**
International School for Advanced Studies, Mathematics Area, mathLab Group
Project: *Reduced order modeling for shape optimization*. Advisor: Gianluigi Rozza

2014 – 2015 **Master in High Performance Computing, SISSA & ICTP**
Advisor: Luca Heltai

2010 – 2014 **M.Sc. Mathematics, Università degli studi di Milano**
6 months ERASMUS LLP exchange program at Technische Universität Kaiserslautern
Advisor: Lourenço Beirão da Veiga; co-advisor: Luca Heltai

2006 – 2010 **B.Sc. Mathematics, Università degli studi di Pavia**
Advisor: Daniele Boffi; co-advisor: Luca Heltai

Awards and Funding

2023 **Minitutorial speaker invitation**
SIAM UQ24, Trieste, Italy, 2024 ($ 500 award + conference fees)

Anile-ECMI Prize for Mathematics in Industry
Ceremony held in Wrocław, Poland, during ECMI 2023 (€ 2,500 award)

2022 **Early Career Travel Award**
SIAM CSE23, Amsterdam, The Netherlands, 2023 ($ 950 award)

2021 **ECCOMAS best PhD Thesis Award in the field of Computational Methods in Applied Sciences and Engineering**
Ceremony held in Oslo, Norway, during ECCOMAS Congress 2022 (€ 2,000 award)

2019 **DSWeb 2019 Software Contest** - Tutorials on Dynamical Systems Software
Junior Faculty Category - PyDMD Package, in collaboration with N. Demo
Announced at SIAM DS19, Snowbird, Utah, U.S. (€ 500 award)

2018 **MISTI MIT-Italy FVG** - MIT & SISSA collaboration
Project: *Multi-disciplinary Ship Design by Reduced Order Models and Machine Learning*
SISSA PI: Gianluigi Rozza. Shared travel grant ($ 10,000 award)

Ph.D. scholarship at SISSA
Financed by Fincantieri SpA

Awards and Funding (continued)

2014 **Master in HPC scholarship at SISSA & ICTP**
Financed by Nvidia Corporation (€ 7,000 award)

SISSA Master thesis fellowship for pre-graduate students

Awards won by mentored students

2023 **Best poster award at MORTech 2023 - Matteo Torzoni**
A computational framework for predictive digital twins of civil engineering structures,
Matteo Torzoni, Marco Tezzele, Stefano Mariani, Andrea Manzoni, and Karen E. Willcox.
6th International Workshop on Model Order Reduction Techniques, Paris-Saclay, France, 2023.

List of Publications

Preprints

1. S. M. Ichinaga, F. Andreuzzi, N. Demo, *et al.*, "PyDMD: A Python package for robust dynamic mode decomposition," arXiv:2402.07463, 2024.
2. **M. Tezzele**, S. Carr, U. Topcu, and K. E. Willcox, "Adaptive planning for risk-aware predictive digital twins," . Submitted, 2024.
3. F. Romor, **M. Tezzele**, and G. Rozza, "A local approach to parameter space reduction for regression and classification tasks," . Preprint: arXiv:2107.10867, 2021.

International Journals

1. M. Torzoni, **M. Tezzele**, S. Mariani, A. Manzoni, and K. E. Willcox, "A digital twin framework for civil engineering structures," *Computer Methods in Applied Mechanics and Engineering*, vol. 418, p. 116 584, Jan. 2024. DOI: 10.1016/j.cma.2023.116584.
2. N. Demo, **M. Tezzele**, and G. Rozza, "A DeepONet multi-fidelity approach for residual learning in reduced order modeling," *Advanced Modeling and Simulation in Engineering Sciences*, vol. 10, no. 1, p. 12, 2023. DOI: 10.1186/s40323-023-00249-9.
3. F. Romor, **M. Tezzele**, M. Mrosek, C. Othmer, and G. Rozza, "Multi-fidelity data fusion through parameter space reduction with applications to automotive engineering," *International Journal for Numerical Methods in Engineering*, vol. 124, no. 23, pp. 5293–5311, Dec. 2023. DOI: 10.1002/nme.7349.
4. **M. Tezzele**, L. Fabris, M. Sidari, M. Sicchiero, and G. Rozza, "A multi-fidelity approach coupling parameter space reduction and non-intrusive POD with application to structural optimization of passenger ship hulls," *International Journal for Numerical Methods in Engineering*, vol. 124, no. 5, pp. 1193–1210, Mar. 2023. DOI: 10.1002/nme.7159.
5. F. Romor, **M. Tezzele**, A. Lario, and G. Rozza, "Kernel-based active subspaces with application to computational fluid dynamics parametric problems using discontinuous Galerkin method," *International Journal for Numerical Methods in Engineering*, vol. 123, no. 23, pp. 6000–6027, Dec. 2022. DOI: 10.1002/nme.7099.
6. N. Demo, **M. Tezzele**, A. Mola, and G. Rozza, "Hull Shape Design Optimization with Parameter Space and Model Reductions, and Self-Learning Mesh Morphing," *Journal of Marine Science and Engineering*, vol. 9, no. 2, p. 185, 2021. DOI: 10.3390/jmse9020185.
7. N. Demo, **M. Tezzele**, and G. Rozza, "A Supervised Learning Approach Involving Active Subspaces for an Efficient Genetic Algorithm in High-Dimensional Optimization Problems," *SIAM Journal on Scientific Computing*, vol. 43, no. 3, B831–B853, 2021. DOI: 10.1137/20M1345219.

8. M. Gadalla, M. Cianferra, **M. Tezzele**, G. Stabile, A. Mola, and G. Rozza, "On the comparison of LES data-driven reduced order approaches for hydroacoustic analysis," *Computers & Fluids*, vol. 216, p. 104 819, 2021, ISSN: 0045-7930. DOI: 10.1016/j.compfluid.2020.104819.

9. **M. Tezzele**, N. Demo, G. Stabile, A. Mola, and G. Rozza, "Enhancing CFD predictions in shape design problems by model and parameter space reduction," *Advanced Modeling and Simulation in Engineering Sciences*, vol. 7, no. 40, 2020. DOI: 10.1186/s40323-020-00177-y.

10. N. Demo, **M. Tezzele**, and G. Rozza, "A non-intrusive approach for reconstruction of POD modal coefficients through active subspaces," *Comptes Rendus Mécanique de l'Académie des Sciences*, vol. 347, no. 11, pp. 873–881, Nov. 2019. DOI: 10.1016/j.crme.2019.11.012.

11. **M. Tezzele**, F. Salmoiraghi, A. Mola, and G. Rozza, "Dimension reduction in heterogeneous parametric spaces with application to naval engineering shape design problems," *Advanced Modeling and Simulation in Engineering Sciences*, vol. 5, no. 1, p. 25, Sep. 2018, ISSN: 2213-7467. DOI: 10.1186/s40323-018-0118-3.

Conference Proceedings

1. F. Romor, **M. Tezzele**, and G. Rozza, "Multi-fidelity data fusion for the approximation of scalar functions with low intrinsic dimensionality through active subspaces," in *Proceedings in Applied Mathematics & Mechanics*, Wiley Online Library, vol. 20, 2021. DOI: 10.1002/pamm.202000349.

2. G. Rozza, M. H. Malik, N. Demo, *et al.*, "Proceedings of the 6th European Conference on Computational Mechanics: Solids, Structures and Coupled Problems, ECCM 2018 and 7th European Conference on Computational Fluid Dynamics, ECFD 2018," in *ECCOMAS ECFD 7 - Proceedings of 6th European Conference on Computational Mechanics (ECCM 6) and 7th European Conference on Computational Fluid Dynamics (ECFD 7)*, R. Owen, R. de Borst, J. Reese, and P. Chris, Eds., Glasgow, UK, 2020, pp. 59–76.

3. N. Demo, **M. Tezzele**, A. Mola, and G. Rozza, "A complete data-driven framework for the efficient solution of parametric shape design and optimisation in naval engineering problems," in *Proceedings of MARINE 2019: VIII International Conference on Computational Methods in Marine Engineering*, R. Bensow and J. Ringsberg, Eds., 2019, pp. 111–121.

4. A. Mola, **M. Tezzele**, M. Gadalla, *et al.*, "Efficient reduction in shape parameter space dimension for ship propeller blade design," in *Proceedings of MARINE 2019: VIII International Conference on Computational Methods in Marine Engineering*, R. Bensow and J. Ringsberg, Eds., 2019, pp. 201–212.

5. **M. Tezzele**, N. Demo, and G. Rozza, "Shape optimization through proper orthogonal decomposition with interpolation and dynamic mode decomposition enhanced by active subspaces," in *Proceedings of MARINE 2019: VIII International Conference on Computational Methods in Marine Engineering*, R. Bensow and J. Ringsberg, Eds., 2019, pp. 122–133.

6. D. Cangelosi, A. Bonvicini, M. Nardo, *et al.*, "SRtP 2.0 — The Evolution of the Safe Return to Port Concept," in *Technology and Science for the Ships of the Future: Proceedings of NAV 2018: 19th International Conference on Ship & Maritime Research*, IOS Press, 2018, pp. 665–672. DOI: 10.3233/978-1-61499-870-9-665.

7. N. Demo, **M. Tezzele**, G. Gustin, G. Lavini, and G. Rozza, "Shape optimization by means of proper orthogonal decomposition and dynamic mode decomposition," in *Technology and Science for the Ships of the Future: Proceedings of NAV 2018: 19th International Conference on Ship & Maritime Research*, IOS Press, 2018, pp. 212–219. DOI: 10.3233/978-1-61499-870-9-212.

8. N. Demo, **M. Tezzele**, A. Mola, and G. Rozza, "An efficient shape parametrisation by free-form deformation enhanced by active subspace for hull hydrodynamic ship design problems in open source environment," in *Proceedings of ISOPE 2018: The 28th International Ocean and Polar Engineering Conference*, vol. 3, 2018, pp. 565–572.

9. **M. Tezzele**, N. Demo, M. Gadalla, A. Mola, and G. Rozza, "Model order reduction by means of active subspaces and dynamic mode decomposition for parametric hull shape design hydrodynamics," in

Technology and Science for the Ships of the Future: Proceedings of NAV 2018: 19th International Conference on Ship & Maritime Research, IOS Press, 2018, pp. 569–576. DOI: 10.3233/978-1-61499-870-9-569.

10. F. Salmoiraghi, F. Ballarin, G. Corsi, A. Mola, **M. Tezzele**, and G. Rozza, "Advances in geometrical parametrization and reduced order models and methods for computational fluid dynamics problems in applied sciences and engineering: Overview and perspectives," in *ECCOMAS Congress 2016 - Proceedings of the 7th European Congress on Computational Methods in Applied Sciences and Engineering*, vol. 1, Crete, Greece, 2016, pp. 1013–1031. DOI: 10.7712/100016.1867.8680.

Proceedings in Invited Books as Chapters and Chapters in Books

1. E. Donadini, M. Strazzullo, **M. Tezzele**, and G. Rozza, "A Data-Driven Partitioned Approach for the Resolution of Time-Dependent Optimal Control Problems with Dynamic Mode Decomposition," in *Spectral and High Order Methods for Partial Differential Equations ICOSAHOM 2020+1*, J. M. Melenk, I. Perugia, J. Schöberl, and C. Schwab, Eds., Cham: Springer International Publishing, 2023, pp. 225–238. DOI: 10.1007/978-3-031-20432-6_13.

2. N. Demo, **M. Tezzele**, G. Stabile, and G. Rozza, "Scientific Software Development and Packages for Reduced Order Models in Computational Fluid Dynamics," in *Advanced Reduced Order Methods and Applications in Computational Fluid Dynamics*, ser. CS&E Series, G. Rozza, G. Stabile, and F. Ballarin, Eds., SIAM Press, 2022, ch. 19. DOI: 10.1137/1.9781611977257.ch19.

3. M. W. Hess, **M. Tezzele**, and G. Rozza, "Overview and Motivation," in *Advanced Reduced Order Methods and Applications in Computational Fluid Dynamics*, ser. CS&E Series, G. Rozza, G. Stabile, and F. Ballarin, Eds., SIAM Press, 2022, ch. 1. DOI: 10.1137/1.9781611977257.ch1.

4. L. Meneghetti, N. Shah, M. Girfoglio, *et al.*, "A Deep Learning Approach to Improving Reduced Order Models," in *Advanced Reduced Order Methods and Applications in Computational Fluid Dynamics*, ser. CS&E Series, G. Rozza, G. Stabile, and F. Ballarin, Eds., SIAM Press, 2022, ch. 20. DOI: 10.1137/1.9781611977257.ch20.

5. A. Mola, N. Demo, **M. Tezzele**, and G. Rozza, "Geometrical Parameterization and Morphing Techniques with Applications," in *Advanced Reduced Order Methods and Applications in Computational Fluid Dynamics*, ser. CS&E Series, G. Rozza, G. Stabile, and F. Ballarin, Eds., SIAM Press, 2022, ch. 17. DOI: 10.1137/1.9781611977257.ch17.

6. **M. Tezzele**, N. Demo, A. Mola, and G. Rozza, "An integrated data-driven computational pipeline with model order reduction for industrial and applied mathematics," in *Novel Mathematics Inspired by Industrial Challenges*, ser. Mathematics in Industry 38, M. Günther and W. Schilders, Eds., Springer International Publishing, 2022. DOI: 10.1007/978-3-030-96173-2_7.

7. **M. Tezzele**, N. Demo, G. Stabile, and G. Rozza, "Nonintrusive Data-Driven Reduced Order Models in Computational Fluid Dynamics," in *Advanced Reduced Order Methods and Applications in Computational Fluid Dynamics*, ser. CS&E Series, G. Rozza, G. Stabile, and F. Ballarin, Eds., SIAM Press, 2022, ch. 9, ISBN: 978-1-611977-24-0. DOI: 10.1137/1.9781611977257.ch9.

8. **M. Tezzele**, F. Romor, and G. Rozza, "Reduction in Parameter Space," in *Advanced Reduced Order Methods and Applications in Computational Fluid Dynamics*, ser. CS&E Series, G. Rozza, G. Stabile, and F. Ballarin, Eds., SIAM Press, 2022, ch. 16. DOI: 10.1137/1.9781611977257.ch16.

9. F. Garotta, N. Demo, **M. Tezzele**, M. Carraturo, A. Reali, and G. Rozza, "Reduced Order Isogeometric Analysis Approach for PDEs in Parametrized Domains," in *Quantification of Uncertainty: Improving Efficiency and Technology: QUIET selected contributions*, ser. Lecture Notes in Computational Science and Engineering, M. D'Elia, M. Gunzburger, and G. Rozza, Eds., vol. 137, Cham: Springer International Publishing, 2020, pp. 153–170, ISBN: 978-3-030-48721-8. DOI: 10.1007/978-3-030-48721-8_7.

10. G. Rozza, M. Hess, G. Stabile, **M. Tezzele**, and F. Ballarin, "Basic Ideas and Tools for Projection-Based Model Reduction of Parametric Partial Differential Equations," in *Model Order Reduction*, P. Benner,

S. Grivet-Talocia, A. Quarteroni, G. Rozza, W. H. A. Schilders, and L. M. Silveira, Eds., vol. 2, Berlin, Boston: De Gruyter, 2020, ch. 1, pp. 1–47, ISBN: 9783110671490. DOI: 10.1515/9783110671490-001.

11. **M. Tezzele**, F. Ballarin, and G. Rozza, "Combined parameter and model reduction of cardiovascular problems by means of active subspaces and POD-Galerkin methods," in *Mathematical and Numerical Modeling of the Cardiovascular System and Applications*, ser. SEMA-SIMAI Series, D. Boffi, L. F. Pavarino, G. Rozza, S. Scacchi, and C. Vergara, Eds., vol. 16, Springer International Publishing, 2018, pp. 185–207. DOI: 10.1007/978-3-319-96649-6_8.

Software Papers

1. F. Romor, **M. Tezzele**, and G. Rozza, "ATHENA: Advanced Techniques for High dimensional parameter spaces to Enhance Numerical Analysis," *Software Impacts*, vol. 10, p. 100 133, 2021. DOI: 10.1016/j.simpa.2021.100133.
2. **M. Tezzele**, N. Demo, A. Mola, and G. Rozza, "PyGeM: Python Geometrical Morphing," *Software Impacts*, vol. 7, p. 100 047, 2021, ISSN: 2665-9638. DOI: 10.1016/j.simpa.2020.100047.
3. M. Gadalla, **M. Tezzele**, A. Mola, and G. Rozza, "BladeX: Python Blade Morphing," *The Journal of Open Source Software*, vol. 4, no. 34, p. 1203, 2019. DOI: 10.21105/joss.01203.
4. N. Demo, **M. Tezzele**, and G. Rozza, "EZyRB: Easy Reduced Basis method," *The Journal of Open Source Software*, vol. 3, no. 24, p. 661, 2018. DOI: 10.21105/joss.00661.
5. N. Demo, **M. Tezzele**, and G. Rozza, "PyDMD: Python Dynamic Mode Decomposition," *The Journal of Open Source Software*, vol. 3, no. 22, p. 530, 2018. DOI: 10.21105/joss.00530.

Software Libraries

PyDMD		Python Dynamic Mode Decomposition (webpage | docs | DOI)
PyGeM		Python Geometrical Morphing (webpage | docs | DOI)
ATHENA		Advanced Techniques for High dimensional parameter spaces to Enhance Numerical Analysis (webpage | docs | DOI)
EZyRB		Easy Reduced Basis method (webpage | docs | DOI)
BladeX		Python Blade Morphing (webpage | docs | DOI)

Presentations

Invited Talks

2024
- **Predictive digital twins for the structural health monitoring of physical assets**. Invited seminar, Mathematics Area, SISSA, Trieste, Italy, February 13, 2024. Host: Gianluigi Rozza.

2023
- **Recent advances in parameter space reduction with applications to naval engineering**. 22nd ECMI Conference on Industrial and Applied Mathematics, Anile Prize winner, June 26–30, 2023, Wrocław, Poland.
- **Recent advances in parameter space reduction**. International Workshop on Reduced Order Methods, Institute for Mathematical Sciences, National University of Singapore, Singapore, May 22–26, 2023. Video available here.
- **Predictive digital twins: from structural monitoring to a robust policy update**. MIT Aerospace Computational Design Laboratory Seminar Series, MIT AeroAstro, Cambridge, MA, June 9, 2023. Host: Youssef Marzouk.
- **Reduced order modelling as enabler for optimization and digital twins**. Scientific Computing Seminar, Department of Mathematics, University of Houston, Houston, TX, March 23, 2023. Host: Annalisa Quaini.

Presentations (continued)

2022
- **Reduced order modelling as enabler for optimization and digital twins**. Emory Mathematics Seminar, Mathematics Department, Emory University, Atlanta, GE, September 8, 2022. Host: Alessandro Veneziani.
- **Data-driven parameter and model order reduction for industrial optimisation problems**. ECCOMAS Congress 2022, Ph.D. Olympiads, June 5–9, 2022, Oslo, Norway.

Oral Presentations

2024
- **SIAM UQ**. SIAM Conference on Uncertainty Quantification, February 27 - March 1, 2024, Trieste, Italy.

2023
- **SIAM TX-LA Section**. 6th Annual Meeting of the SIAM Texas-Louisiana Section, November 3–5, 2023, Lafayette, LA.
- **MMLDE-CSET**. 2nd IACM Mechanistic Machine Learning and Digital Engineering for Computational Science Engineering and Technology, September 24–27, 2023, El Paso, TX.
- **SIAM CSE**. SIAM Conference on Computational Science and Engineering, February 26 - March 3, 2023, Amsterdam, The Netherlands.

2022
- **SIAM TX-LA Section**. 5th Annual Meeting of the SIAM Texas-Louisiana Section, November 4–6, 2022, Houston, TX.
- **SIAM MDS**. SIAM Conference on Mathematics of Data Science, September 26–30, 2022, San Diego, CA.

2021
- **SIMAI**. Bi-annual Congress of the Italian Society of Industrial and Applied Mathematics (SIMAI 2020+2021), August 30 – September 3, 2021, Parma, Italy.
- **COUPLED**. 9th edition of the ECCOMAS International Conference on Computational Methods for Coupled Problems in Science and Engineering, June 14–16, 2021, Virtual Conference (originally scheduled in Chia Laguna, Cagliari, Italy).
- **MARINE**. 9th edition of the ECCOMAS International Conference on Computational Methods in Marine Engineering, June 2–4, 2021, Virtual Conference (originally scheduled in Edinburgh, Scotland).
- **SIAM CSE**. SIAM Conference on Computational Science and Engineering, March 1–5, 2021, Virtual Conference (originally scheduled in Fort Worth, TX).
- **WCCM ECCOMAS**. 14th WCCM & ECCOMAS Congress 2020, January 11–15, 2021, Virtual Congress (originally scheduled in Paris, France).

2019
- **MARINE**. 8th edition of the ECCOMAS International Conference on Computational Methods in Marine Engineering, May 13–15, 2019, Gothenburg, Sweden.

2018
- **NAV**. 19th edition of the International Conference on Ship & Maritime Research, June 20–22, 2018, Trieste, Italy.

2017
- **ADMOS**. ECCOMAS International Conference on Adaptive Modeling and Simulations, June 26–28, 2017, Verbania, Italy.

2016
- **COST EU-MORNET**. Workshop on Reduced Order Methods in Computational Fluid Dynamics: State of the Art and Perspectives in COST EU-MORNET, February 22–23, 2016, Trieste, Italy.

Poster Presentations

2020
- **CAE**. 36th International CAE Conference and Exhibition, 30 November–4 December, 2020, Virtual Conference (originally scheduled in Vicenza, Italy).

2018
- **MoRePaS**. 4th edition of Model Reduction of Parametrized Systems, April 10–13, 2018, Nantes, France.

Presentations (continued)

2017 **QUIET**. Quantification of Uncertainty: Improving Efficiency and Technology, July 18–21, 2017, Trieste, Italy.

2016 **ME3**. Conference at Institut Henri-Poincaré: Recent developments in numerical methods for model reduction, November 7–10, 2016, Paris, France.

Teaching Experience

2023 **Guest Lecturer**, University of Colorado Boulder
Course: *Data-Driven Modeling*, Host: David Bortz
Invited to teach one lecture on dynamic mode decomposition and the use of the PyDMD software package (15 students).
Developed two-hour lecture with interactive components, tutorials, and open questions.

2022 **Guest Lecturer**, SISSA
Event: *2nd Summer School on Reduced Order Methods in Computational Fluid Dynamics*
Invited to teach two lectures on parameter space reduction and non-intrusive reduced order modeling (25 students).

2019 **Instructor**, ARPA FVG (Regional Environmental Protection Agency)
Course: *Python for scientific applications and artificial neural networks with PyTorch*
Developed a 12-hour course on Python with a focus on scientific packages, with tutorials, hands-on sessions, and final assessment (15 students).

2019 **Teaching Assistant**, SISSA
Event: *1st Summer School on Reduced Order Methods in Computational Fluid Dynamics*
Asked to teach two lectures on parameter space reduction and non-intrusive reduced order modeling (25 students).

Mentoring Experience

2023-pres. **Sebastian Henao-Garcia**, Ph.D. student, The University of Texas at Austin
Project: *Digital twins for spacecraft systems*

Leonidas Gkimisis, Visiting Ph.D. student, Max Planck Institute Magdeburg
Project: *Reduced order modeling for fluid-structure interaction*

Pierfrancesco Siena, Ph.D. student, SISSA
Project: *Reduced order modeling for cardiovascular applications*

2022-pres. **Valentyn Visyn**, Ph.D. student, The University of Texas at Austin
Project: *Digital twins for autonomous drones*

Lorenzo Fabris, Ph.D. student, SISSA
Project: *Structural optimization of cruise ships*

2022-2023 **Matteo Torzoni**, Visiting Ph.D. student, Politecnico di Milano
Project: *Digital twins for structural health monitoring of civil structures*

2021 **Eleonora Donadini**, Master student, University of Trieste
Project: *A data-driven approach for time-dependent optimal control problems with DMD*

2020 **Martina Teruzzi**, Master student in HPC, SISSA & ICTP
Project: *Parallel implementations for complex graph analysis with application in modern passenger ship safety management*

2019 **Francesco Romor**, Master student, University of Trieste
Project: *Reduction in parameter space for problems approximated by discontinuous-Galerkin method in computational fluid dynamics*

Mentoring Experience (continued)

2018 — **Aurora Maurizio**, Master student in HPC, SISSA & ICTP
Project: *Representation of distribution networks of ships using graph-theory*

Fabrizio Garotta, Master student, University of Pavia
Project: *Reduced order isogeometric analysis approach for PDEs in parametrized domains*

2017-2019 — **Mahmoud Gadalla**, Assistant researcher, SISSA
Project: *Advanced methods for hydro-acoustic design of naval propulsion*

2017-2018 — **Nicola Demo**, Assistant researcher, SISSA
Project: *Bulbous bow shape optimization through reduced order modelling*

Academic Service

2019-pres. — **Reviewer** for the following international journals: Journal of Computational Physics, Advances in Computational Mathematics, Computers and Mathematics with Applications, Expert Systems with Applications, Information and Inference IMA, Mathematical Methods in the Applied Sciences, International Journal of Computational Fluid Dynamics, IEEE Microwave and Wireless Components Letters, IEEE Transactions on Artificial Intelligence, IEEE Transactions on Big Data, Ocean Engineering, Journal of Ocean Engineering and Marine Energy, Journal of Open Source Software.

2023 — **Scientific Committee** of ECCOMAS MARINE 2023

Co-chair of the University of Texas at Austin Postdoctoral Association

2022 — **Mentor** within the SIAM TX-LA Graduate Mentoring Program, Houston

Mentor within the Applied Math Mentorship Program, Austin SIAM Chapter

2019-2021 — **Secretary** of the SISSA SIAM Student Chapter

2018-pres. — **Member** of the Society for Industrial and Applied Mathematics (SIAM)

Minisymposia Organizer

2024 — **Physical models and reduced order models augmentation with data for physics-informed machine learning in real-world applications**,
Chady Ghnatios, Beatriz Moya Garcia, Annika Robens-Radermacher, Marco Tezzele.
16th World Congress on Computational Mechanics and 4th Pan American Congress on Computational Mechanics (WCCM-PANACM), July 21–26, 2024, Vancouver, Canada.

Digital twins for predictive decision-making of engineering systems,
Matteo Torzoni, Marco Tezzele, Stefano Mariani, Andrea Manzoni.
9th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS), June 3–7, 2024, Lisbon, Portugal.

Data-enhanced reduced order modeling,
Marco Tezzele, Nicole Aretz, Romit Maulik.
9th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS), June 3–7, 2024, Lisbon, Portugal.

Advances in data-enhanced modeling and applications,
Marco Tezzele, Giovanni Stabile.
SIAM Conference on Uncertainty Quantification (SIAM UQ), February 27 – March 1, 2024, Trieste, Italy.

2023 — **Data-driven learning and model reduction**,
Marco Tezzele, Nicole Aretz.
6th Annual Meeting of SIAM Texas-Louisiana Section, November 3–5, 2023, Lafayette, LA.

Academic Service (continued)

- **Advances in data-driven reduced order modeling**,
  Marco Tezzele, Ionut-Gabriel Farcas, Gianluigi Rozza.
  2nd IACM Mechanistic Machine Learning and Digital Engineering for Computational Science Engineering and Technology (MMLDE-CSET), September 24–27, 2023, El Paso, TX.
- **Scientific machine learning and reduced order modeling in naval engineering**,
  Marco Tezzele, Nicola Demo, Andrea Mola, Gianluigi Rozza.
  10th edition of the ECCOMAS International Conference on Computational Methods in Marine Engineering (MARINE), June 27–29, 2023, Madrid, Spain.
- **Accelerating computational science and engineering via data-driven learning and nonlinear model reduction**, Ionut-Gabriel Farcas, Marco Tezzele, Diane Guignard.
  SIAM Conference on Computational Science and Engineering (SIAM CSE), February 26 – March 3, 2023, Amsterdam, The Netherlands.

2022

- **Challenges and opportunities in computational science and engineering: perspectives from data-driven learning and model reduction**,
  Ionut-Gabriel Farcas, Marco Tezzele, Aniketh Kalur.
  5th Annual Meeting of SIAM Texas-Louisiana Section, November 4–6, 2022, Houston, TX.
- **Scientific Machine Learning for Reduced Order Modelling and Uncertainty Quantification**, Marco Tezzele, Gianluigi Rozza.
  SIAM Conference on Mathematics of Data Science (SIAM MDS), September 26–30, 2022, San Diego, CA.

2021

- **Advanced Computational Fluid Dynamics and Applications**,
  Marco Tezzele, Nicola Demo, Gianluigi Rozza.
  Bi-annual Congress of the Italian Society of Industrial and Applied Mathematics (SIMAI), August 30 – September 3, 2021, Parma, Italy.
- **Model order reduction methods in marine engineering**,
  Marco Tezzele, Nicola Demo, Andrea Mola, Gianluigi Rozza.
  9th edition of the ECCOMAS International Conference on Computational Methods in Marine Engineering (MARINE), June 2–4, 2021, Edinburgh, Scotland.

Outreach and Science Communication

2023

- **Contribution** to SIAM News with a piece on adaptive planning for digital twins. To be published in the next months.
- **Interview** about scientific computing and large scale optimization for the general public, published in Italian on the regional newspapers Il Piccolo and Messaggero Veneto.
  News article available here.
- **Roundtable** on "Autonomous Aerial Cargo Operations at Scale CONOPS", Marshall University Bill Noe Flight School, February 6–7, 2023, Charleston, WV. A US senator was present, together with policy makers, business owners and facilitators.

2022

- **Participation** in the training course "Stronger Together: Connections and Responsibilities Between Mentors and Mentees" (1 CEU), October 5, 2022, organized by The University of Texas at Austin.
- **Contribution** to the ECCOMAS Newsletter with a piece about "Parameter space and model order reduction for industrial optimization". The pdf is available here.

2021-pres.

- **Contributor** on Medium.com with several pieces about scientific software and research findings. Check out my profile.

2021

- **Roundtable** on "Applied mathematics for environmental sustainability", Trieste NEXT Science Fair, September 24–26, 2021, Trieste, Italy.

Outreach and Science Communication (continued)

2020-pres. **Editor** of the SISSA mathLab publication "Interdisciplinary Computational Sciences for Innovation" on Medium.com.

2020 **Organizer** of the Hackoberfest 2020, SISSA mathLab edition (webpage). Event to disseminate best practices in scientific programming and open source software.

Speaker at the event "Applied mathematics to advance science and industry", Science in the City Festival - ESOF2020, September 4, 2020, Trieste, Italy. Video available here.

Pitch presenter at PHD4INNOVATING: "How can high-level training, policy makers and economic players work together towards a new structured Innovation paradigm?" ESOF2020, September 2, 2020, Trieste, Italy. Media coverage.

2019 **Organizer** of the Hackoberfest 2019, SISSA mathLab edition. Event to disseminate best practices in scientific programming and open source software.

2017 **Participation** in the SISSA4SCHOOLS program, consisting in educational presentations for middle and high school classes visiting SISSA.

Participation in the training course "Creative Science Communication", November–December, 2017, organized by SISSA medialab.

2016 **Presenter** of the talk for the general public titled "Waves, hulls, and simulations", Trieste NEXT Science Fair, September 23–25, 2016, Trieste, Italy.

References

Karen E. Willcox, Ph.D.
Professor, Director
Oden Institute for Computational Engineering and Sciences
The University of Texas at Austin
Austin, TX 78712
kwillcox@oden.utexas.edu
(Postdoctoral research advisor)

Gianluigi Rozza, Ph.D.
Professor
Mathematics Area, mathLab Group
SISSA, International School for Advanced Studies
Trieste, Italy 34136
gianluigi.rozza@sissa.it
(Ph.D. advisor)

Other references available on request