



Stefano Riva

stefano.riva@polimi.it | steriva@outlook.it

[LinkedIn](#) | [Github](#)

EDUCATION

- Bachelor's Degree in Energy Engineering** Milan, Ita
Politecnico di Milano Oct. 2016 – Sep. 2019
- Master's Degree *cum Laude* in Nuclear Engineering** Milan, Ita
Politecnico di Milano Sep. 2019 – Dec. 2021
- Thesis Title: "Reduced basis methods for data assimilation in real thermal hydraulics systems"
 - Thesis Supervisor: Antonio Cammi
- PhD in Energy and Nuclear Science and Technology** Milan, Ita
Politecnico di Milano May 2022 - present
- Thesis title: "Advanced Data-Driven Techniques for State Estimation in Nuclear Reactors"
 - Supervisors: Antonio Cammi, Carolina Introvini
- Qualification to practice Engineering Profession** Milan, Ita
March 2024

RESEARCH AND TEACHING EXPERIENCE

- Teaching Assistant** A.Y. 2022/2023 - 2023/2024, II Semester
Fission Reactor Physics 1 course of prof. Antonio Cammi at Polimi Milan, Italy
- VISIT Intern** Oct. 2024 – March 2025
Electrical and Computer Engineering Department (University of Washington) Seattle, USA
- Supervisor: J. Nathan Kutz
 - Activities: SHallow REcurrent Decoder (SHRED) networks for State Estimation in Nuclear Reactors

LANGUAGE SKILLS

Native Italian speaker. Fluent in English (TOEIC Certification, February 2019, 930/990).

COMPUTATIONAL SKILLS

Operating system: MacOS, Linux, Windows
Languages: Python (advanced), C++ (intermediate), VisualBasic (intermediate), R (basics)
Numerical Computing Environments: MATLAB, Simulink
Finite Element Solvers: Dolfinx (Python Package), Freefem++
Computational Fluid Dynamics: OpenFOAM, Ansys FLUENT
Machine Learning packages: scikit-learn, PyTorch
Developer Tools: Git, Visual Studio Code, Jupyter
Other: Microsoft Office, iMovie

RESEARCH INTERESTS

Scientific Machine Learning techniques for Nuclear Reactors
Nuclear Reactor Modelling
Reduced Order Modelling and Data Assimilation
Computational Fluid Dynamics
Numerical Methods for Engineering

AWARDS

Best Master Thesis in Engineering <i>Cultural Association CISE2007</i>	27 September 2022
Best Paper award <i>ICAPP-2023 Conference</i>	26 April 2023
Best Student Paper award <i>NUTHOS-14 Conference</i>	28 August 2024

SELECTED GITHUB REPOSITORIES

pyISFenix <i>PYthon framework for the Incompressible Schrodinger Flow using FENICsX</i>	January 2024 Github , Documetation
pyforce <i>Python Framework for data-driven model Order Reduction of multi-physiCs problEms</i>	March 2024 Github , Documetation
NuSHRED <i>Shallow Recurrent Decoder for Nuclear Reactors applications</i>	September 2024 Github

VOLUNTEERING EXPERIENCE

Football Coach <i>Stella Azzurra '56, Oratorio San Luigi</i>	Sep. 2012 – June 2017 <i>Cinisello Balsamo, Ita</i>
Actor <i>Depramirao company</i>	Apr. 2013 – Nov. 2014 <i>Cinisello Balsamo, Ita</i>
Adolescents' Educator <i>Oratorio San Luigi</i>	Sep. 2014 – Sep. 2020, Sep. 2022 – Sep. 2024 <i>Cinisello Balsamo, Italy</i>

JOURNAL ARTICLES

- [J1] C. Introini, S. Cavalleri, S. Lorenzi, **Stefano Riva**, and A. Cammi, “Stabilization of Generalized Empirical Interpolation Method (GEIM) in presence of noise: A novel approach based on Tikhonov regularization,” *Computer Methods in Applied Mechanics and Engineering*, vol. 404, p. 115773, 2023.
- [J2] C. Introini, **Stefano Riva**, S. Lorenzi, S. Cavalleri, and A. Cammi, “Non-intrusive system state reconstruction from indirect measurements: A novel approach based on hybrid data assimilation methods,” *Annals of Nuclear Energy*, vol. 182, p. 109538, 2023.
- [J3] **Stefano Riva**, C. Introini, S. Lorenzi, and A. Cammi, “Hybrid data assimilation methods, Part I: Numerical comparison between GEIM and PBDW,” *Annals of Nuclear Energy*, vol. 190, p. 109864, 2023.
- [J4] **Stefano Riva**, C. Introini, S. Lorenzi, and A. Cammi, “Hybrid Data Assimilation methods, Part II: Application to the DYNASTY experimental facility,” *Annals of Nuclear Energy*, vol. 190, p. 109863, 2023.
- [J5] **Stefano Riva**, C. Introini, and A. Cammi, “A finite element implementation of the incompressible Schrödinger flow method,” *Physics of Fluids*, vol. 36, p. 017138, 01 2024.
- [J6] A. Cammi, **Stefano Riva**, C. Introini, L. Loi, and E. Padovani, “Data-driven model order reduction for sensor positioning and indirect reconstruction with noisy data: Application to a Circulating Fuel Reactor,” *Nuclear Engineering and Design*, vol. 421, p. 113105, 2024.
- [J7] L. Loi, **Stefano Riva**, C. Introini, F. Giacobbo, X. Wang, and A. Cammi, “OFELIA: An OpenMC-FEniCSx coupling for neutronic calculation with temperature feedback,” *Nuclear Engineering and Design*, vol. 428, p. 113480, 2024.
- [J8] **Stefano Riva**, C. Introini, and A. Cammi, “Multi-physics model bias correction with data-driven reduced order techniques: Application to nuclear case studies,” *Applied Mathematical Modelling*, vol. 135, pp. 243–268, 2024.

- [J9] M. Lo Verso, **Stefano Riva**, C. Introini, E. Cervi, F. Giacobbo, L. Savoldi, M. Di Prinzio, M. Caramello, L. Barucca, and A. Cammi, “Application of a non-intrusive reduced order modeling approach to magnetohydrodynamics,” *Physics of Fluids*, vol. 36, p. 107167, 10 2024.
- [J10] **Stefano Riva**, C. Introini, E. Zio, and A. Cammi, “Impact of malfunctioning sensors on data-driven reduced order modelling: Application to molten salt reactors,” *EPJ Web Conf.*, vol. 302, p. 17003, 2024.
- [J11] **Stefano Riva**, C. Introini, and A. Cammi, “pyforce: Python framework for data-driven model order reduction of multi-physics problems,” *under review at Journal of Open Source Software*, 2024.
- [J12] **Stefano Riva**, S. Deanesi, C. Introini, S. Lorenzi, and A. Cammi, “Real-Time State Estimation of Neutron Flux in Molten Salt Fast Reactors from Out-core Sparse Measurements,” *under review at Nuclear Science and Engineering*, 2024.
- [J13] **Stefano Riva**, C. Introini, A. Cammi, and J. N. Kutz, “Robust state estimation from partial out-core measurements with shallow recurrent decoder for nuclear reactors,” 2024. *preprint available at <https://arxiv.org/abs/2409.12550>*.
- [J14] M. A. Nasr, L. Loi, **Stefano Riva**, A. Zolfaghari, X. Wang, and A. Cammi, “Enhancing Multi-Physics Modeling in New-Generation Nuclear Reactors Using Machine Learning: Implementing Gaussian Process Regression for Updating Cross Sections,” *submitted to Annals of Nuclear Energy*, 2024.
- [J15] M. Lo Verso, **Stefano Riva**, C. Introini, E. Cervi, L. Barucca, M. Caramello, M. Di Prinzio, F. C. Giacobbo, L. Savoldi, and A. Cammi, “Enhancing Computational Efficiency in Nuclear Fusion through Reduced Order Modelling: Applications in Magnetohydrodynamics,” *submitted to Fusion Engineering and Design (SOFT24-Special Issue)*, September 2025.

CONFERENCE PAPERS

- [C1] **Stefano Riva**, A. Cammi, C. Introini, and S. Lorenzi, “Hybrid Data Assimilation Methods: Application to the DYNASTY Experimental Facility,” in *13th International Topical Meeting of Nuclear Reactor Thermal-Hydraulics, Operation and Safety (NUTHOS)*, (Taipei, Taiwan), pp. 505–518, September 2022.
- [C2] **Stefano Riva**, A. Cammi, and C. Introini, “Inviscid Fluid Simulation through *Incompressible Schrödinger Flow*: a Finite Element approach,” in *31st International Conference Nuclear Energy for New Europe (NENE2022)*, (Portoroz, Slovenia), September 2022.
- [C3] A. Cammi, **Stefano Riva**, C. Introini, L. Loi, and E. Padovani, “Indirect Field Reconstruction and Sensor Positioning in Circulating Fuel Reactors using Data-Driven Model Order Reduction,” in *2023 International Congress on Advances in Nuclear Power Plants*, (Gyeongju, Korea), April 2023.
- [C4] **Stefano Riva**, C. Introini, and A. Cammi, “Multi-Physics Model Correction with Data-Driven Reduced Order Modelling,” in *32nd International Conference Nuclear Energy for New Europe (NENE2023)*, (Portoroz, Slovenia), September 2023.
- [C5] **Stefano Riva**, L. Loi, C. Introini, A. Cammi, and X. Wang, “FEniCSx-OpenMC Coupling for Neutronic Calculation with Temperature Feedback,” in *32nd International Conference Nuclear Energy for New Europe (NENE2023)*, (Portoroz, Slovenia), September 2023.
- [C6] L. Loi, **Stefano Riva**, C. Introini, A. Cammi, and E. Padovani, “OpenMC Analysis of TRIGA Mark II Reactor Void and Temperature Reactivity Coefficients,” in *32nd International Conference Nuclear Energy for New Europe (NENE2023)*, (Portoroz, Slovenia), September 2023.
- [C7] **Stefano Riva**, S. Deanesi, C. Introini, S. Lorenzi, and A. Cammi, “Neutron flux reconstruction from out-core sparse measurements using data-driven reduced order modelling,” in *Proceedings of the International Conference on Physics of Reactors, PHYSOR 2024*, p. 1632 – 1641, 2024.

- [C8] L. Loi, **Stefano Riva**, C. Introini, E. Padovani, F. Giacobbo, and A. Cammi, “An alternative approach for group constants regression based on supervised learning techniques,” in *Proceedings of the International Conference on Physics of Reactors, PHYSOR 2024*, p. 1674 – 1683, 2024.
- [C9] **Stefano Riva**, C. Introini, L. Marocco, L. Savoldi, and A. Cammi, “Inclusion of the buoyancy forces in the Incompressible Schrödinger Flow algorithm to simulate inviscid fluids,” in *41st UIT International Heat Transfer Conference*, (Naples, Italy), June 2024.
- [C10] **Stefano Riva**, C. Introini, X. Wang, and A. Cammi, “Advection-Diffusion of Scalars with the Incompressible Schrödinger Flow,” in *The 14th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, Operation, and Safety (NUTHOS-14)*, (Vancouver, USA), August 2024.
- [C11] **Stefano Riva**, A. Missaglia, C. Introini, I. C. Bang, and A. Cammi, “A Novel Approach for Parametric Dynamic Mode Decomposition: Application to the DYNASTY Experimental Facility,” in *The 14th International Topical Meeting on Nuclear Reactor Thermal-Hydraulics, Operation, and Safety (NUTHOS-14)*, (Vancouver, USA), August 2024.
- [C12] C. G. De Lurion De L’Égouthail, L. Loi, **Stefano Riva**, C. Introini, and A. Cammi, “Shadowing Effect Correction for the Pavia TRIGA Reactor Using Monte Carlo Data and Reduced Order Modelling Techniques,” in *The 33rd International Conference Nuclear Energy for New Europe (NENE2024)*, (Portoroz, Slovenia), September 2024.
- [C13] R. Boccelli, L. Loi, **Stefano Riva**, C. Introini, S. Lorenzi, and A. Cammi, “Analysis of KRUSTY reactor behaviour with OFELIA environment,” in *The 33rd International Conference Nuclear Energy for New Europe (NENE2024)*, (Portoroz, Slovenia), September 2024.
- [C14] C. Introini, **Stefano Riva**, L. Loi, X. Wang, and A. Cammi, “Learning the dynamics of un-observable fields from out-core measurements of simple fields using Supervised Learning,” in *The 11th International Symposium on Symbiotic Nuclear Power: AI Application in Nuclear Systems (ISSNP2024)*, (Harbin, Heilongjiang, China), September 2024.
- [C15] C. Introini, **Stefano Riva**, L. Loi, X. Wang, and A. Cammi, “State estimation in the DYNASTY experimental facility using Supervised Learning,” in *The 11th International Symposium on Symbiotic Nuclear Power: AI Application in Nuclear Systems (ISSNP2024)*, (Harbin, Heilongjiang, China), September 2024.

CO-SUPERVISOR OF MASTER’S THESIS STUDENT

- [CS1] C. de Lurion de l’Égouthail, “Shadowing Effect Correction for the Pavia TRIGA Reactor Using Monte Carlo Data and Reduced Modelling Techniques,” Master’s thesis, Politecnico di Milano, October 2024. Supervisor: Prof. A. Cammi, Co-Supervisors: L. Loi, S. Riva.