

# FEDERICO PICHI



## PERSONAL INFORMATION

*Born in Rome, Italy 23 February 1992*

Ph.D. in **Mathematical Analysis, Modelling and Applications**

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## POSITION

### *Current Position*

PostDoc researcher at **SISSA** (International School for Advanced Studies) and **EPFL** (École Polytechnique Fédérale de Lausanne) with CRUI fellowship. Member of **mathLab** group, Mathematics Area, via Bonomea 265, Trieste, Italy.

### *Research Interests*

Numerical analysis of bifurcating phenomena held by non-linear equations. Reduced order models in computational Continuum Mechanics, Fluid Dynamics and Quantum Mechanics with applications to Artificial Neural Networks, Optimal Control Problems and Fluid-Structure Interaction.

## PUBLICATIONS

2020

- [8] [“Artificial neural network for bifurcating phenomena modelled by nonlinear parametrized PDEs”](#)  
Authors: F. PICHI, F. BALLARIN, G. ROZZA, J. S.HESTHAVEN.  
In: Preprint
- [7] [“A successive partition method for the efficient evaluation of parametrized stability factors”](#)  
Authors: F. BALLARIN, F. PICHI, G. ROZZA.  
In: Preprint
- [6] [“Driving bifurcating parametrized nonlinear PDEs by optimal control strategies: application to Navier-Stokes equations and model reduction”](#)  
Authors: F. PICHI, M. STRAZZULLO, F. BALLARIN, G. ROZZA.  
In: [arXiv](#).

2019

- [5] [“Reduced order models for the buckling of hyperelastic beams.”](#)  
Authors: F. PICHI, J. EFTANG, G. ROZZA, A. T. PATERA.  
In: Report MIT-FVG ROM2S
- [4] [“Efficient computation of bifurcation diagrams with a deflated approach to reduced basis spectral element method”](#)  
Authors: M. PINTORE, F. PICHI, M. HESS, G. ROZZA, C. CANUTO.  
In: [Advances in Computational Mathematics](#), 47:1, 2021.
- [3] [“A Reduced Order technique to study bifurcating phenomena: application to the Gross-Pitaevskii equation”](#)  
Authors: F. PICHI, A. QUAINI, G. ROZZA.  
In: [SIAM Journal on Scientific Computing](#), 42:5, B1115-B1135, 2020.

[2] [“Reduced basis approaches for parametrized bifurcation problems held by non-linear von Kármán equations”](#)

Authors: F. PICHI, G. ROZZA.

In: [Journal of Scientific Computing](#), 10.1007/s10915-019-01003-3, 2019.

2018

[1] [“Reduced Basis Approximation and A Posteriori Error Estimation: Applications to Elasticity Problems in Several Parametric Settings”](#)

Authors: D.B.P. HUYNH, F. PICHI and G. ROZZA

In: [Numerical Methods for PDEs: State of the Art Techniques](#), Springer International Publishing, Ch. 8, 203–247, 2018.

## EDUCATION

2016-2020 SISSA, Trieste (Italy)

Ph.D. degree

Mathematical Analysis, Modelling and Applications · Mathematics Area

Thesis: *Reduced order models for parametric bifurcation problems in nonlinear PDEs*

Advisors: Prof. Gianluigi ROZZA & Dr. Francesco BALLARIN

Final Grading *cum laude*

2014-2016 ‘La Sapienza’ University, Rome (Italy)

Master degree

Applied Mathematics · Department of Mathematics

Thesis: *Reduced order methods for parametric Von Kármán equations*

Advisors: Prof. Maurizio FALCONE & Prof. Gianluigi ROZZA

Final Grading *110/110 cum laude*

2011-2014 ‘La Sapienza’ University, Rome (Italy)

Bachelor degree

Mathematics · Department of Mathematics

Thesis: *Discontinuous differential equations in control theory*

Advisor: Prof. Corrado MASCIA

Final Grading *110/110 cum laude*

## OTHER INFORMATION

Teaching and  
Tasks

**Lecturer** - “Reduced order modelling in bifurcating parametrised non-linear equations”, SISSA, Trieste, 2019.

**Matlab** - Bachelor Degree in Mathematics, University of Trieste, 2019.

**Co-advisor** - Master thesis of Moreno Pintore, “Efficient Computation of Bifurcation Diagrams with Spectral Element Method and Reduced Order Models”. Master degree in Mathematical Engineering, Politecnico di Torino, Italy (Oct. 2019).

**Co-advisor** - Master thesis of Moaad Khamlich, “Reduced order models for bifurcating phenomena in Fluid-Structure Interaction problems”. Master degree in Mathematical Engineering, Politecnico di Milano, Italy, ongoing.

**President** SISSA Siam Student Chapter (2019-2020)

**Reviewer** International Journal of Bifurcation and Chaos, AMS Math. Reviews

**Organizer** SISSA SIAM Student Chapter Colloquia 2020, Virtual Event

Awards and  
Funding

**2021 CRUI project GO for IT** · Research grant between EPFL and SISSA: “Reduced order method for nonlinear PDEs enhanced by machine learning”

**2020 ECCOMAS Scholarship** · Grant for WCCM-ECCOMAS Virtual Congress

**2019 Banco Santander Financial Support Program** · Grant for 9th International Congress on Industrial and Applied Mathematics ICIAM2019

2018 MIT-Italy - FVG Project · ROM2S Reduced Order Methods at MIT and SISSA

2018 INDAM GNCS · Tecniche di riduzione di modello per le applicazioni mediche

2017 INDAM GNCS · Tecniche di riduzione computazionale e applicazioni SISSA · Master thesis fellowship for pre-graduate students

Sapienza University · Excellence course for Master degree in Applied Mathematics 2014-2016

Sapienza University · Excellence course for Bachelor degree in Mathematics 2011-2014

*Conferences  
and  
Workshops*

FEniCS 2021 (talk), SIAM CSE 2021 (talk), AJS 2021 (talk), WCCM-ECCOMAS 2020 (talk), MORSS 2020 (talk), SAMM 2020 (poster), UMI 2019 (talk), ICIAM 2019 (talk), ROM in CFD 2019 (talk, poster), CIME-EMS Summer School 2018, ICOSAHOM 2018 (talk), MoRePaS 2018 (poster), QUIET 2017, FEF 2017, EU-MORNET 2016.

March 26, 2021