

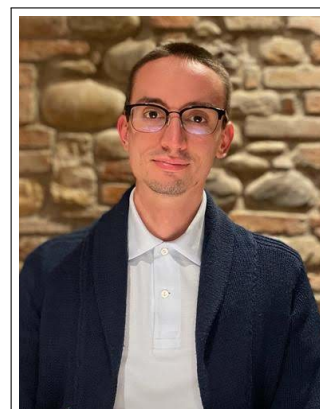
# Davide Pradovera

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Born on October 9, 1993 in Piacenza, Italy.  
Nationality: Italian.

## Current position

*Post-doctoral researcher*, KTH.

## Areas of specialization

Numerical mathematics for partial differential equations, approximation theory, model order reduction, frequency-domain applications, scattering problems.

## Appointments held

- 2014–2017 [ *Special courses teacher*, Piacenza (IT).
- 2016 [ *Developer intern*, Iren SpA, Piacenza (IT).
- 2017–2021 [ *Doctoral assistant*, EPFL, Lausanne (CH).
- 2022 [ *Post-doctoral researcher*, EPFL, Lausanne (CH).
- 2022–2024 [ *University assistant and post-doctoral researcher*, University of Vienna, Vienna (AT).
- 2024–now [ *Post-doctoral researcher*, KTH, Stockholm (SE).

## Education

- 2012–2015 [ BSc in Applied Mathematics (*cum laude*), Politecnico di Milano, Milan (IT).  
Thesis: “A mathematical justification of the momentum operator in quantum mechanics”.  
Advisor: Prof. M. Verri.
- 2015–2017 [ MSc in Computational Science and Engineering, EPFL, Lausanne (CH).  
Project: “Implementation of smooth contact mechanics with the mortar method”.  
Advisor: Prof. G. Anciaux.  
Project: “Finite elements-based Padé approximants for Helmholtz frequency response problems”.  
Advisor: Prof. F. Nobile.  
Thesis: “Randomized low-rank approximation of matrices and tensors”.  
Advisor: Prof. D. Kressner.

- 2017–2021 [ PhD in Mathematics, EPFL, Lausanne (CH).  
Thesis: “Model order reduction based on functional rational approximants for parametric PDEs with meromorphic structure”.  
Advisor: Prof. F. Nobile.

## Grants, honors, and awards

- 2011 [ 3<sup>rd</sup> place at the “Hong Kong International Science Fair”.  
2013 [ 4<sup>th</sup> place in the “Championnat International des Jeux Mathématiques et Logiques”.  
2014 [ 5<sup>th</sup> place in the “Championnat International des Jeux Mathématiques et Logiques”.  
2017 [ Douchet prize for best GPA, MATH-EPFL.  
2020 [ Prize for exceptional teaching service, Section of Mathematics, EPFL.  
2021 [ Junior Research Fellowship at ESI Vienna.

## Publications

### Journal articles

- 2019 [ F. Bonizzoni and DP, “Distributed sampling for rational approximation of the acoustic scattering of an airfoil”, PAMM 19.  
2020 [ F. Bonizzoni, F. Nobile, I. Perugia, and DP, “Fast Least-Squares Padé approximation of problems with normal operators and meromorphic structure”, Math. Comput. 89.  
F. Bonizzoni, F. Nobile, I. Perugia, and DP, “Least-Squares Padé approximation of parametric and stochastic Helmholtz maps”, Adv. Comput. Math. 46.  
[ DP, “Interpolatory minimal rational model order reduction of parametric problems lacking uniform inf-sup stability”, SIAM J. Numer. Anal. 58.  
2021 [ F. Bonizzoni and DP, “Shape optimization for a noise reduction problem by non-intrusive parametric reduced modeling”, Proc. WCCM-ECCOMAS2020.  
DP and F. Nobile, “Frequency-domain non-intrusive greedy Model Order Reduction based on minimal rational approximation”, Sci. Comput. Electr. Eng. 36.  
[ F. Nobile and DP, “Non-intrusive double-greedy parametric model reduction by interpolation of frequency-domain rational surrogates”, ESAIM:M2AN 55.  
2022 [ DP and F. Nobile, “A technique for non-intrusive greedy piecewise-rational model reduction of frequency response problems over wide frequency bands”, J. Math. Ind. 12.  
2023 [ F. Bonizzoni, DP, and M. Ruggeri, “Rational-approximation-based model order reduction of Helmholtz frequency response problems with adaptive finite element snapshots”, Math. Eng. 5.  
DP, “Adaptive approximation of nonlinear eigenproblems by minimal rational interpolation”, PAMM 22.  
[ DP, “Toward a certified greedy Loewner framework with minimal sampling”, Adv. Comput. Math. 49.  
2024 [ P. Huwiler, DP, and J. Schiffmann, “Plug-and-play adaptive surrogate modeling of parametric nonlinear dynamics in frequency domain”, Int. J. Num. Meth. Eng. 125.  
[ DP and A. Borghi, “Match-based solution of general parametric eigenvalue problems”, J. Comp. Phys. 519.

## Pending articles

- 2023 [ DP, M. Nonino, and I. Perugia, “Geometry-based approximation of waves in complex domains”, to appear.
- 2024 [ DP, I. V. Gosea, and J. Heiland, “Barycentric rational approximation for learning the index of a dynamical system from limited data”, under review.

## Talks and attendance at events

### Presentations at conferences

- 2019 [ DP, F. Nobile, F. Bonizzoni, and I. Perugia, “A technique for rational model order reduction of parametric problems lacking uniform inf-sup stability”, GAMM Annual Meeting 2019, Vienna (AT).
- DP, F. Nobile, F. Bonizzoni, and I. Perugia, “A technique for rational model order reduction of parametric problems lacking uniform inf-sup stability”, ICIAM 2019, Valencia (ES).
- [ DP and F. Nobile, “Interpolatory rational model order reduction of parametric problems lacking uniform inf-sup stability”, ENUMATH 2019, Egmond aan Zee (NL).
- 2021 [ DP, F. Nobile, and F. Bonizzoni, “Non-intrusive model reduction of parametric frequency response problems via minimal rational interpolation”, ICOSAHOM 2020/2021 (virtual), Vienna (AT).
- [ DP and F. Nobile, “Non-intrusive model reduction of parametric frequency-response problems – with applications to UQ”, SIMAI 2020+2021, Parma (IT).
- 2022 [ DP and F. Nobile, “Non-intrusive surrogate modeling of parametric frequency response problems – With applications in forward UQ”, SIAM UQ22 (virtual), Atlanta (Georgia, US).
- DP and F. Nobile, “Inexpensive surrogate modeling of frequency response problems by greedy minimal rational interpolation”, GAMM Annual Meeting 2022, Aachen (DE).
- [ DP and F. Nobile, “Non-intrusive surrogate modeling of frequency response surfaces via locally adaptive sparse grids”, GIMC SIMAI Young 2022, Pavia (IT).
- 2023 [ DP, M. Nonino, and I. Perugia, “Geometry-based approximation of waves propagating through complex domains”, 17<sup>th</sup> Austrian Numerical Analysis Day, Vienna (AT).
- DP, F. Nobile, and A. Borghi, “Non-intrusive surrogate modeling of parametric frequency-response problems”, Math2Product 2023, Taormina (IT).
- DP, “Rational approximation with minimal sampling for Helmholtz-like problems”, ILAS 2023, Madrid (ES).
- [ DP, F. Nobile, and A. Borghi, “Data-driven adaptive approximation of parametric dynamical systems with pole bifurcations”, ENUMATH 2023, Lisbon (PT).
- 2024 [ DP, F. Nobile, and A. Borghi, “Adaptive collocation-based approximation of parametric nonlinear eigenproblems”, SIAM UQ24, Trieste (IT).
- [ DP and A. Borghi, “Adaptive collocation-based approximation of parametric nonlinear eigenproblems”, ECM 2024, Seville (ES).

### Posters

- 2018 [ F. Bonizzoni, I. Perugia, F. Nobile, and DP, “An efficient algorithm for Padé-type approximation of the frequency response for the Helmholtz problem”, MoRePaS IV, Nantes (FR).

- [ F. Bonizzoni, I. Perugia, F. Nobile, and DP, “An efficient algorithm for Padé-type approximation of the frequency response for the Helmholtz problem”, Swiss Numerics Day 2018, Zurich (CH).
- 2020 [ DP and F. Nobile, “Frequency-domain non-intrusive greedy Model Order Reduction based on minimal rational approximation”, SCEE 2020, Eindhoven (NL).
- [ DP and F. Nobile, “Frequency-domain non-intrusive greedy Model Order Reduction based on minimal rational approximation”, MORSS 2020 (virtual), Lausanne (CH).
- 2022 [ DP and F. Nobile, “Non-intrusive adaptive surrogate modeling of parametric frequency-response problems”, MORE 2022, Berlin (DE).

### Other talks and seminars

- 2018 [ DP, F. Nobile, F. Bonizzoni, and I. Perugia, “Fast Least-Squares Padé approximation of self-adjoint problems with meromorphic structure”, seminar, MATHICSE retreat, Sainte-Croix (CH).
- [ DP, F. Nobile, F. Bonizzoni, and I. Perugia, “Fast Least-Squares Padé approximation of self-adjoint problems with meromorphic structure”, workshop talk, DRWA, Alba di Canazei (IT).
- 2019 [ DP and F. Nobile, “Polynomial approximation of resonance manifolds”, short seminar, MATH-ICSE retreat, Champéry (CH).
- 2020 [ DP, “Padé approximation: a quick overview”, seminar (virtual), CSQI talks, Lausanne (CH).
- [ DP, “From Padé approximation to rational interpolation”, seminar (virtual), CSQI talks, Lausanne (CH).
- [ DP, “Minimal rational approximation”, seminar (virtual), CSQI talks, Lausanne (CH).
- [ DP, “Minimal rational approximation: a model reduction tool for parametrized PDEs with resonances”, seminar (virtual), PDE afternoons, Vienna (AT).
- 2021 [ DP, “Matching-based pMOR for dynamical systems”, seminar (virtual), CSQI talks, Lausanne (CH).
- 2022 [ DP, “Surrogate modeling of parametric frequency response problems via locally adaptive sparse grids”, workshop talk, “Approximation of high-dimensional parametric PDEs in forward UQ” ESI workshop, Vienna (AT).
- [ DP, “Can reliable surrogate models for frequency-domain problems be both non-intrusive and cheap to build?”, workshop talk, “UQ in kinetic and transport equations and in high-frequency wave propagation” ESI workshop, Vienna (AT).
- 2023 [ DP, “Efficient and adaptive rational approximation for parametric dynamical systems”, seminar, CSC seminar, Magdeburg (DE).
- 2024 [ DP, “Adaptive data-driven surrogate modeling of parametric nonlinear eigenproblems”, seminar, NA seminar, KTH, Stockholm (SE).

### Attended events

- 2018 [ “Numerical Analysis of Complex PDE Models in the Sciences” ESI workshop, Vienna (AT).
- 2021 [ Swiss Numerics Day 2021, Lausanne (CH).
- 2022 [ “Adaptivity, High Dimensionality and Randomness” ESI workshop, Vienna (AT).
- [ Austrian Numerical Analysis Day 2022, Linz (AT).
- [ MCQMC 2022, Linz (AT).
- 2023 [ “Canonical scattering problems” INI workshop, Cambridge (GB).
- [ 2<sup>nd</sup> SFB International Workshop 2023, Vienna (AT).

- 2024 [ “Celebrating Zhaojun Bai’s honorary doctorate” workshop, Stockholm (SE).
- 5<sup>th</sup> Workshop on Scientific Computing in Sweden, Stockholm (SE).

## **Teaching experience**

- 2017–2021 [ As teaching assistant at EPFL (preparation of course and exercise material, preparation and grading of assignments and exams):
  - 2017 ( Analyse avancée I, BSc in Mathematics.
  - 2018 ( Analyse numérique, BSc in Mechanical Engineering.
  - 2018 ( Analyse fonctionnelle, BSc in Mathematics.
  - 2019 ( Introduction to partial differential equations, BSc in Mathematics.
  - 2021 ( Numerical analysis and computational mathematics, MSc in Computational Sciences and Engineering.
- 2019–2021 ( Parallel and high-performance computing, MSc in Computational Sciences and Engineering.
- 2022 [ Invited lecturer for: Numerical methods for random PDEs and uncertainty, PhD course, EPFL.
- 2022–2023 [ As university assistant at U Vienna (charged with the organization of the whole course):
  - 2022–2023 ( Exercises of Analysis and Linear Algebra I, BSc in Mathematics.
  - 2023 ( Topics in Finite Elements, MSc in Mathematics.
  - 2023 ( Exercises of Applied Mathematics, BSc Teacher Training Program in Mathematics.
  - 2023 ( Exercises of Numerical Mathematics, BSc in Mathematics.

## **Teaching education**

- 2023 [ “When to Teach What? - Sequencing Course Content and Assignments”, Center for Teaching and Learning, University of Vienna.
- “(Unconscious) Bias at the University”, Center for Training and Development, University of Vienna.
- [ “Introduction to Active Learning”, Center for Teaching and Learning, University of Vienna.

## **Other service**

- 2019 [ Supervision of BSc thesis: “Approximation numérique du spectre des opérateurs elliptiques d’ordre deux” by T. Chanay, EPFL.
- 2020 [ Organizer of the Model Order Reduction Summer School 2020 (virtual event).
- [ Referee for scientific journals: “Advances in Computational Mathematics”.
- 2022 [ Supervision of MSc project: “Minimal rational approximation for time-harmonic Maxwell’s equations” by F. Matti, EPFL.
- [ Referee for scientific journals: “Journal of Computational Physics”.
- 2023 [ Chairperson for “Data-driven reduced order modelling and surrogates with applications in complex multi-physics systems” mini-symposium at M2P 2023.
- Organizer of the “Reducing the irreducible: model reduction for transport-dominated problems” mini-symposium at ENUMATH 2023.
- [ Referee for scientific journals: “Advances in Computational Mathematics”, “Computational Methods in Applied Mathematics”, “Journal of Computational Physics”, “Inverse Problems”, and “SIAM Journal of Scientific Computing”.

2024	[	Organizer of the “Methods for stochastic/parametric frequency-domain and spectral problems” mini-symposium at SIAM UQ <sub>24</sub> .
	[	Referee for scientific journals: “Advances in Computational Mathematics”, “Applied Mathematics Letters”, “Computational Methods in Applied Mathematics”, “IEEE Transactions on Microwave Theory and Techniques”, and “Mathematics and Computers in Simulation”.
2025	[	Referee for scientific journals: “23rd European Control Conference”.
2024–now	[	Editorial board member of “Examples and Counterexamples”.
	[	Chair of the Numerical Analysis seminar series at KTH

## Computer skills

Advanced	[	MATLAB, C/C++, OpenMP, MPI, Python, L <sup>A</sup> T <sub>E</sub> X.
Intermediate	[	CUDA, C#, FreeFem++, HTML, CSS.
Basic	[	R, OpenFOAM, Fluent, Fortran, Java.

## Languages

Italian:	Native	English:	Fluent
French:	Intermediate	Spanish:	Intermediate
Swedish:	Basic	German:	Basic

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