Monica Montardini

Curriculum Vitae

Personal Information

Name	Monica
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Current position

April 2022 - now	**Researcher (RTD-a)**, Università degli studi di Pavia, Pavia, Italy. **Maternity leave** 19 July 2023 - 19 December 2023

Past positions

Jan. 2022 - March 2022	**Post-Doc**, Istituto di Matematica Applicata e Tecnologie Informatiche "E. Magenes" del CNR, Pavia, Italy, Italy. Project title: *Analisi e implementazione di algoritmi efficienti per metodi agli elementi finiti virtuali (Analysis and implementation of efficient algorithms for virtual element methods).*
March 2021 - Nov. 2021	**Software Quality Assurance Tester**, FacilityLive OpCo S.r.l., Pavia, Italy.
May 2020 - Feb. 2021	**Post-Doc**, Università degli studi di Pavia, Pavia, Italy. Project title: *Modellistica numerica di flusso idrico sotterraneo. (Numerical modeling of groundwater flow)*
Oct. 2019 - Apr. 2020	**Post-Doc**, Università degli studi di Pavia, Pavia, Italy. Project title: *Analisi Isogeometrica (Isogeometric Analysis).*

Education

Oct. 2016 - Dec. 2019	**PhD in Mathematics**, Università degli studi di Pavia, Pavia, Italy. Thesis title: *Preconditioners for Isogeometric Analysis.* Supervisor: Prof. Giancarlo Sangalli Co-advisor: Dr. Mattia Tani.
Oct. 2014 - July 2016	**M.Sc. in Mathematics**, Università degli studi di Pavia, Pavia, Italy. Thesis title: *A new isogeometric collocation method based on Galerkin superconvergent points.* Advisor: Giancarlo Sangalli; Co-advisor: Lorenzo Tamellini. Grade: 110/110 cum laude.
Oct. 2011 - July 2014	**Bc. in Mathematics**, Università degli studi di Pavia, Pavia, Italy. Thesis title: *Algoritmi genetici e problema del commesso viaggiatore.* *(Genetic algorithms and traveling salesman problem.)* Advisor: Daniele Boffi. Grade: 110/110 cum laude.

Visiting

Oct. - Dec. 2018	**Johannes Kepler University**, Linz, Austria.
15 - 25 June 2017	**NTNU**, Trondheim, Norway.

Languages

Italian	Mother tongue.
English	Very good.

- Preliminary English Test, University of Cambridge, ESOL Examination, level B1, 2009.
- Grade 7 - Graded Examinations in Spoken English, Trinity College London, level B2, 2007.

French	Very good.

Technical skills

Programming languages	**Python** (basic), **C++** (basic).
Operative systems	**Windows, Mac OS**.
Sofwtware knowledge	**JMeter** (very good), **Postman** (very good), **Matlab** (very good), **Latex** (very good).

Software development

2016 - now	**GeoPDEs**, *Matlab package*.

I collaborated in the development of the collocation method codes and in the extension of the existing codes to periodic splines.

Teaching

2023 - 2024	**Programmazione 2**, course co-owner.

Programming 2 (Math Bachelor course).
Università degli studi di Pavia.

2023 - 2024	**Complementi di matematica per scienze chimiche**, course owner.

Mathematical complements for chemical sciences (Chemistry Bachelor course).
Università degli studi di Pavia.

2022 - 2023	**Matematica**, course owner.

Mathematics (Biology Bachelor course).
Università degli studi di Pavia.

2020 - 2021, 2019 - 2020, 2017 - 2018	**Metodo agli elementi finiti e applicazioni**, teaching assistant.

Finite element method and applications (Bioengineering Master course).
Università degli studi di Pavia.

2019 - 2020, 2018 - 2019	**Elementi finiti**, teaching assistant.

Finite element method (Mathematics Master course).
Università degli studi di Pavia.

Sep. 2017	**PLS3 – PLS 2014-2016 project**, tutor.

Tutoring activity for first year Mathematics Bachelor students.
Università degli studi di Pavia.

Thesis supervision

2023	**Isogeometric solvers for the Navier-Stokes equations based on the augmented Lagrangian**, *Master thesis in mathematics*, Matteo Marullo.

Advisor: Giancarlo Sangalli; Co-advisor: Monica Montardini, Mattia Tani
Università degli studi di Pavia.

2021 **Modelli di flussi idrici sotterranei**, *Master thesis in mathematics*, Silvia Preda.
Advisor: Andrea Bressan, Prof. Giancarlo Sangalli; Co-advisor: Gabriele Loli, Monica Montardini
Università degli studi di Pavia.

Invited seminars

14 Feb. 2024 **GNCS Conference**, Rimini, Italy.
Talk: *Efficienza ed analisi di metodi numerici innovativi per la risoluzione di PDE.*

16 Feb. 2023 **Very informal seminar**, IMATI-CNR, Pavia, Italy.
Talk: *Low-rank methods for the solution of PDEs in Isogeometric Analysis*

10 May 2022 **LYNUM-IV: Lombardy Young NUmerical analysts Meeting**, Universitá degli Studi dell'Insubria, Como, Italy.
Talk: *A domain decomposition method with inexact local solvers for isogeometric multi-patch geometries.*

10 Dec. 2020 **Se mi narri di Matematica**, Università degli studi di Pavia, Pavia, Italy.
Talk: *A space-time Galerkin isogeometric method and related efficient solver for the heat equation.*

17 Feb. 2020 **BaD Seminar**, Università degli studi di Bologna, Bologna, Italy.
Talk: *Space-time Galerkin isogeometric method and efficient solver for the heat equation.*

7 Nov. 2018 **13th NFN Seminar**, Strobl, Austria.
Talk: *Efficient solution of parabolic problems in isogeometric analysis: the least-squares space-time method.*

9 Oct. 2018 **NUMA seminar**, JKU, Linz, Austria.
Talk: *Efficient preconditioning strategies in Isogeometric Analysis.*

21 June 2017 **Math Department Seminar**, NTNU, Throndheim, Norway.
Talk: *Isogeometric collocation method for free-boundary problems.*

12 May 2017 **MediolaNUM 2017. Young numerical analysts in Milan**, Università degli studi di Milano, Milano, Italy.
Talk: *Optimal-order isogeometric collocation.*

Participations at international conferences

3-7 June 2024 **ECCOMAS 2024 Conference**, Lisbon, Portugal.
Talk: *Low-rank multipatch solver for Isogeometric Analysis*

18 - 21 - June 2023 **11th International Conference on Isogeometric Analysis**, Lyon, France. .
Talk: *Low-rank methods for Isogeometric Analysis.*

28 May - 1 June 2023 **HOFEIM - High Order Finite Element and Isogeometric Methods Workshop** , Larnaca, Cyprus..
Talk: *Low-rank solver for Isogeometric Analysis.*

6 -9 Nov. 2022 **10th International Conference on Isogeometric Analysis** , Banff, Canada.
Talk: *Low-rank Isogeometric solver.*

29 - 30 Sep. 2022 **GIMC Simai Young**, Pavia, Italy.
Talk: *Virtual Element Method for image-based domain approximation*

27 - 29 June 2022 **Convegno GNCS**, Montecatini, Italy.

10 May 2022 **LYNUM-IV: Lombardy Young NUmerical analysts Meeting**, Universitá degli Studi dell'Insubria, Como, Italy .

11 - 12 Aug. 2020	**Virtual Isogeometric Analysis 2020**, Virtual conference.
10 Feb. 2020	**Structure, Regularity and Robustness in the Approximation of Partial Differential Equations**, Università degli studi di Milano, Milano, Italy.
18 - 20 Sep. 2019	**VII International Conference on Isogeometric Analysis**, Munich, Austria. Talk: *Space-time isogeometric efficient solver for parabolic problems.*
4 - 7 Sep. 2019	**XXI UMI Congress**, Pavia, Italy.
28 - 31 May 2019	**HOFEIM - High Order Finite Element and Isogeometric Methods Workshop**, Pavia, Italy. Poster: *Space-time isogeometric Galerkin method and efficient solver for parabolic problems.* Poster: *Fast domain decomposition solvers for isogeometric analysis.*
10 May 2019	**TiciNUM - Third Young Numerical Analysts Meeting in Lombardy**. Pavia, Italy.
17 - 21 Dec. 2018	**RICAM Special Semester**, *Workshop 4: Frontier Technologies for High-Dimensional Problems and Uncertainty Quantification*, JKU, Linz, Austria.
5 - 7 Nov. 2018	**13th NFN Seminar**, Stobl, Austria. Talk: *Efficient solution of parabolic problems in isogeometric analysis: the least-squares space-time method.*
10 May 2018	**MediolaNUM 2018. Young numerical analysts in Milan**, Università degli studi di Milano Bicocca, Milano, Italy.
22 - 26 Jan. 2018	**INdAM Workshop DREAMS**, Roma, Italy.
17 - 21 Sep. 2017	**Second Conference on Subdivision, Geometric and Algebraic Methods, Isogeometric Analysis and Refinability in Italy**, Gaeta, Italy. Talk: *Efficient preconditioning strategy for Stokes system in Isogeometric Analysis.*
13 - 15 Sep. 2017	**ECCOMAS Young Investigator Conference 2017**, Politecnico di Milano, Milano, Italy. Talk: *Optimal-order isogeometric collocation at Galerkin superconvergent points.*
11 - 13 Sep. 2017	**V International Conference on Isogeometric Analysis**, Pavia, Italy. Talk: *Efficient Isogeometric Preconditioners for Stokes Systems.*
3 - 7 July 2017	**CIME-EMS Summer School on Splines and PDEs**, Cetraro, Italy. Talk: *An optimal-order collocation method in Isogeometric analysis.*
26 - 27 May 2017	**The 15th European Finite Element Fair**, Università degli studi di Milano, Milano, Italy. Talk: *Isogeometric collocation method for periodic free-boundary problems.*
27 Jan. 2017	**Nonconforming and DG methods**, Università degli studi di Milano, Milano, Italy.

Participation at schools

3 - 7 July 2017	**CIME-EMS Summer School on Splines and PDEs**, Cetraro, Italy.
22 - 25 May 2017	**Frontiers in partial differential equations analysis and solvers**, Università degli studi di Pavia, Pavia, Italy.

Organization of scientific events

to be held 8 - 12 July 2024	**Isogeometric Analysis: theory, applications, and new trends**, *Lake Como school*, organizer. Como, Italy.
28 - 31 May 2019	**HOFEIM-High Order Finite Element and Isogeometric Methods Workshop**, local organizer. Pavia, Italy.
10 May 2019	**TiciNUM-Thirs Young Numerical Analysts Meeting in Lombardy**, organizer. Pavia, Italy.
13 - 15 Sep. 2017	**V International Conference on Isogeometric Analysis**, local organizer. Pavia, Italy.

Fundings

2023	**PRINN 2022-PNRR**, *Participant*. Project title:*HEXAGON: Highly–specialized EXact Algorithms for Grid Operations at the National level.*
2023	**Bando per richieste di contributo su organizzazione convegni, scuole e workshop GNCS Organizzazione Scuole, Workshops e Seminari anno 2024**. *Funding grant given by GNCS - Gruppo Nazionale per il Calcolo Scientifico (National Group for Scientific Computation) of the INdAM - Istituto Nazionale di Alta Matematica (National Institute of High Mathematics) for the organization of schools and workshops.*
2023	**Progetti di Ricerca GNCS 2023**. *Funding grant given by GNCS - Gruppo Nazionale per il Calcolo Scientifico (National Group for Scientific Computation) of the INdAM - Istituto Nazionale di Alta Matematica (National Institute of High Mathematics).*
2019	**Finanziamento Giovani Ricercatori 2019 - 2020**. *Funding grant given by GNCS - Gruppo Nazionale per il Calcolo Scientifico (National Group for Scientific Computation) of the INdAM - Istituto Nazionale di Alta Matematica (National Institute of High Mathematics) to young researchers.*

Awards

2019	**HOFEIM - Best poster award**. *Best poster award given at HOFEIM conference held in Pavia (28 - 31 May 2019).*
2010	**Brillanti Menti**. *Award for the best high school students in Lombardia.*

Fellowships

2020 - now	**SIMAI**. *Member of Società Italiana di Matematica Applicata Industriale (Italian Society for Industrial Applicated Mathematics).*
2018 - 2020	**UMI**. *Member of Unione Matematica Italiana (Italian Mathematical Union).*
2017 - now	**GNCS**. *Member of the GNCS - Gruppo Nazionale per il Calcolo Scientifico (National Group for Scientific Computation) of the INdAM - Istituto Nazionale di Alta Matematica (National Institute of High Mathematics).*
2016 - 2017	**AMS**. *Member of the American Mathematical Society.*

Publications

1. **Optimal-order isogeometric collocation at Galerkin superconvergent points**, *M. Montardini, G. Sangalli, and L. Tamellini*, Computer Methods in Applied Mechanics and Engineering, 316 : 741 - 757, 2017.

2. **Robust isogeometric preconditioners for the Stokes system based on the Fast Diagonalization method**, *M. Montardini, G. Sangalli, and M. Tani*, Computer Methods in Applied Mechanics and Engineering, 338: 162 - 185, 2018.

3. **Isogeometric Methods for Free Boundary Problems**, *M. Montardini, F. Remonato and G. Sangalli*, (2021) In: Isogeometric Analysis and Applications 2018. IGAA 2018. Lecture Notes in Computational Science and Engineering, vol 133. Springer, Cham, 2018.

4. **Space-time least-squares isogoemetric method and efficient solver for parabolic problems**, *M. Montardini, M. Negri, G. Sangalli and M. Tani*, Mathematics of Computation, 89 (323): 1193 - 1227, 2020.

5. **A domain decomposition method for Isogeometric multi-patch problems with inexact local solvers**, *M. Bosy, M. Montardini, G. Sangalli and M. Tani*, Computers and Mathematics with Applications, 80: 2604–2621, 2020 .

6. **An efficient solver for space-time isogeometric Galerkin methods for parabolic problems**, *G. Loli, M. Montardini, G. Sangalli and M. Tani*, Computers and Mathematics with Applications, 80: 2586–2603, 2020 .

7. **A IETI-DP method for discontinuous Galerkin discretizations in Isogeometric Analysis with inexact local solvers**, *M. Montardini, G. Sangalli, R. Schneckenleitner, S. Takacs and M. Tani*, Mathematical Models and Methods in Applied Sciences, 2023 .

8. **A low-rank isogeometric solver based on Tucker tensors**, *M. Montardini, G. Sangalli and M. Tani*, Computer Methods in Applied Mechanics and Engineering, 417, Part B: 116472, 2023 .

9. **A low-rank multipatch isogeometric method based on Tucker tensors**, *M. Montardini, G. Sangalli and M. Tani*, arXiv preprint, arXiv:2312.08736 .

10. **The virtual element method on image-based domain approximations**, *S. Bertoluzza, M. Montardini, M. Pennacchio and D. Prada*, arXiv preprint, arXiv:2206.03449 [math.NA].

Pavia, June 7, 2024