

# GABRIELE LOLI

PhD in Mathematics

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## CURRENT POSITION

07/2023 – Today **Non-tenure track Assistant Professor (RTDa)** Università degli Studi di Pavia  
Department of Mathematics

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## EDUCATION

2017–2020 **Ph.D. in Mathematics** Università degli Studi di Pavia  
Thesis: Efficient solvers for Isogeometric Analysis. Supervisors: Giancarlo Sangalli (Università degli Studi di Pavia) and Annalisa Buffa (EPFL).

2015–2018 **Diploma IUSS di licenza (Eccellente)** Scuola Universitaria Superiore IUSS (Pavia)  
Thesis: Round-off error analysis of the isogeometric method. Supervisor: Giancarlo Sangalli (Università degli Studi di Pavia).

2015–2017 **Master in Mathematics (110/110 cum laude)** Università degli studi di Pavia  
Thesis: A Sylvester equation based preconditioner for the isogeometric advection-diffusion problem. Supervisor: Giancarlo Sangalli and Mattia Tani (Università degli Studi di Pavia).

2012–2016 **Diploma IUSS di primo livello (Eccellente)** Scuola Universitaria Superiore IUSS (Pavia)  
Thesis: The isoperimetric inequality for the entropy and its consequences. Supervisor: Giuseppe Toscani (Università degli Studi di Pavia).

2012–2015 **Bachelor Mathematics (110/110)** Università degli studi di Pavia  
Thesis: Classical interpolation inequalities. Supervisor: Pierluigi Colli (Università degli Studi di Pavia).

Since 2012 **Fellow of Collegio Ghislieri**  
Pavia

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## WORK EXPERIENCES

12/2020 – 06/2023 **Research Assistant** Università degli Studi di Pavia  
Department of Mathematics

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## VISITING POSITIONS

01/2020–03/2020 **École Polytechnique Fédérale de Lausanne, Institute of Mathematics (EDMA)**  
Invited as a visiting PhD Student by Annalisa Buffa.

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## PUBLICATIONS

**An unconditionally stable space–time isogeometric method for the acoustic wave equation**  
S. Frascini, G. Loli, A. Moiola, G. Sangalli. Computer & Mathematics with Applications. Volume 169, Pages 205–222 (2024).

**An Isogeometric Shape Optimization method for groundwater flow in porous media**  
A. Bressan, G. Loli, S. Manenti, A. Reali, G. Sangalli. Computer & Mathematics with Applications. Volume 162, Pages 104–119 (2024).

**High-Order Spline Upwind for Space-Time Isogeometric Analysis**  
G. Loli, G. Sangalli, P. Tesini. Computer Methods in Applied Mechanics and Engineering. Volume 417, 116408 (2023).

**Easy and Efficient preconditioning of the Isogeometric Mass Matrix**  
G. Loli, G. Sangalli, M. Tani. Computer & Mathematics with Applications. Volume 116, Pages 245–264 (2022).

**Explicit high-order generalized- $\alpha$  methods for isogeometric analysis of structural dynamics**  
P. Behnoudfar, G. Loli, A. Reali, G. Sangalli, V. M. Calo. Computer Methods in Applied Mechanics and Engineering. Volume 389, 114344 (2022).

**A projected super-penalty method for the  $C^1$ -coupling of multi-patch isogeometric Kirchhoff plates**  
L. Coradello, G. Loli, A. Buffa. Computational Mechanics. Volume 67, 4, Pages 1133–1153 (2021).

**An efficient solver for space-time isogeometric Galerkin methods for parabolic problems**  
G. Loli, M. Montardini, G. Sangalli, M. Tani. Computer & Mathematics with Applications. Volume 80, Issue 11, Pages 2586-2603 (2020).

**Quadrature Rules in the Isogeometric Galerkin Method: State of the Art and an Introduction to Weighted Quadrature**  
F. Calabrò, G. Loli, G. Sangalli, M. Tani. Giannelli C. and Speleers H. (eds.) Advanced Methods for Geometric Modeling and Numerical Simulation. Springer International Publishing, pp. 43-55 (2019).

## PREPRINTS

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**Parallelization in time by diagonalization**  
A. Bressan, A. Kushova, G. Loli, M. Montardini, G. Sangalli, M. Tani. arXiv Preprint. arXiv:2403.07875 (2023).

**Spline Upwind for space-time Isogeometric Analysis of cardiac electrophysiology**  
P. F. Antonietti, L. Dedè, G. Loli, G. Sangalli, P. Tesini. arXiv Preprint. arXiv:2311.17500 (2023).

**Isogeometric multi-patch  $C^1$ -mortar coupling for the biharmonic equation**  
A. Benvenuti, G. Loli, G. Sangalli, T. Takacs. arXiv Preprint. arXiv:2303.07255 (2023).

## SCIENTIFIC PRESENTATIONS

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- 25/06/2024 **An isogeometric shape optimization method for the dam problem**  
Invited talk at "XXVIII Congress of Differential Equations and Applications / XVIII Congress of Applied Mathematics (CEDYA/CMA)", University of the Basque Country, Bilbao, Spain.
- 23/02/2024 **Isogeometric Shape Optimization method for groundwater flow**  
Invited talk at "Workshop Spoke 6 - Multiscale modelling & Engineering Applications - Centro Nazionale di Ricerca in HPC, Big Data and Quantum Computing", Sapienza Università di Roma, Rome, Italy.
- 25/01/2024 **Efficient PDEs solver with Isogeometric Analysis**  
Invited talk at "Incontro Annuale dei Ricercatori in Matematica UNIPV", Università degli Studi di Pavia, Pavia, Italy.
- 23/08/2023 **An efficient solver for space-time isogeometric Galerkin methods for parabolic problems**  
Invited talk at "10th International Congress on Industrial and Applied Mathematics – ICIAM 2023 Tokyo" in Tokyo, Japan.
- 29/09/2022 **Isogeometric multi-patch  $C^1$ -mortar coupling for the bilaplace equation**  
Invited talk at "GIMC SIMAI YOUNG 2022" in Pavia, Italy.
- 10/10/2020 **An efficient solver for space-time isogeometric Galerkin methods for parabolic problems**  
Informal seminar at Institute of Mathematics (EDMA) of the École Polytechnique Fédérale de Lausanne (EPFL) in Lausanne, Switzerland.
- 20/01/2020 **Preconditioning of the isogeometric mass matrix**  
Informal seminar at Institute of Mathematics (EDMA) of the École Polytechnique Fédérale de Lausanne (EPFL) in Lausanne, Switzerland.
- 20/09/2019 **Isogeometric Mass Matrix preconditioner**  
Invited talk at "International Conference on Isogeometric Analysis (IGA 2019)" in Munich, Germany.
- 10/05/2019 **Space-time isogeometric preconditioners for parabolic problems**  
Invited talk at "Third Young Numerical Analysts Meeting in Lombardy - TiciNUM 2019" in Pavia, Italy.

## TEACHING EXPERIENCE

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- 10.2023–01.2024 **Numerical Methods in Engineering Sciences, 6 ECTS** Università degli Studi di Pavia  
Professor for Master Degree course in Environmental Engineering, Computer Engineering and Industrial Automation Engineering.
- 03.2020–06.2020 **Numerical Analysis, 6 ECTS.** Università degli Studi di Pavia  
Teaching assistant for Bachelor Degree course in Mathematics.
- 10.2019–01.2020 **Mathematical Analysis 1, 6 ECTS** Università degli Studi di Pavia  
Teaching assistant for Bachelor Degree course in Industrial Engineering.
- 03.2019–06.2019 **Numerical Methods with Computer Laboratory, 6 ECTS** Università degli Studi di Pavia  
Teaching assistant for Bachelor Degree course in Chemistry.

10.2018–01.2019	<b>Finite Element Method and Applications, 6 ECTS</b> Teaching assistant for Master Degree course in Bioengineering.	Università degli Studi di Pavia
10.2018–01.2019	<b>Linear Algebra and Geometry, 6 ECTS</b> Tutor for Bachelor Degree course in Civil Engineering.	Università degli Studi di Pavia

## GRANTS

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2024	<b>Winner of the grant "Cassini Senior 2024" (1000,00€)</b> Organization of "Fourth Conference of Young Applied Mathematicians in Rome (YAMC-2024)".
2024	<b>Principal investigator of the GNCS-INdAM Project 2024 (4700,00€)</b> Sviluppo di metodi numerici innovativi ed efficienti per la risoluzione di PDE.

## AWARDS

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2021–2022	<b>Finanziamento Giovani Ricercatori GNCS 2021-2022</b> Funding grant given by GNCS - Gruppo Nazionale per il Calcolo Scientifico (National Group for Scientific Computation) of INdAM - Istituto Nazionale di Alta Matematica (National Institute of High Mathematics) to young researchers.
2019	<b>HOFEIM - Best poster award</b> Award for the best poster given at international workshop "The 8th International Workshop on High-Order Finite Element and Isogeometric Methods (HOFEIM-2019)".

## ORGANIZATION OF WORKSHOPS OR CONFERENCES

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16–20/09/2024	<b>Fourth Conference of Young Applied Mathematicians in Rome (YAMC-2024)</b> Rome (Ro), Italy	Organizer
18–22/09/2023	<b>Third Conference of Young Applied Mathematicians in Siena (YAMC-2023)</b> Siena (SI), Italy	Organizer
18–22/09/2022	<b>Second Conference of Young Applied Mathematicians in Arenzano (YAMC-2022)</b> Arenzano (GE), Italy	Organizer
28–31/05/2019	<b>The 8th International Workshop on High-Order Finite Element and Isogeometric Methods (HOFEIM-2019)</b> Pavia (PV), Italy	Local Organizer

## COMPUTER SKILLS

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### Programming Languages

Python, Matlab, C.

### Markup languages

LaTeX.

### Operative systems

macOS, Unix, Windows.

### Cad softwares

AutoCAD, Catia.

### Database management systems

SQL.

### Revision-tracking systems

Git.

### Other software packages

MS Office Suite.

## LANGUAGES

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**English** - Advanced, **French** - Basic, **Italian** - Native