

Curriculum Vitae

(February 1, 2025)

Name: Sergio Alejandro Gómez Macías
Current position: Tenure-track Assistant Professor
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Languages:

- Spanish, native speaker.
- English, fluent.
- Italian, fluent.

Scientific IDs

Google Scholar profile: [wYdaSIQAAAAJ](https://scholar.google.com/citations?user=wYdaSIQAAAAJ)
LinkedIn profile: www.linkedin.com/in/sergio-gomez-142410163/
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Scopus Author ID: 57202658871
zbMATH ID: [gomez.sergio-alejandro](https://zbmath.org/authors/?q=external/gomez.sergio-alejandro)

Academic positions

02/2025 – present **Tenure-track Assistant Professor (RTT).** Department of Mathematics and Applications, Università di Milano-Bicocca.

10/2023 – 01/2025 **Postdoctoral researcher.** Department of Mathematics and Applications, Università di Milano-Bicocca.

Education

10/2020 – 09/2023 Università di Pavia – Università della Svizzera Italiana. **PhD in Computational Mathematics and Decision Sciences.**

- **Thesis:** [Nonconforming space–time methods for evolution PDEs.](#)
- **Advisor:** Prof. [Andrea Moiola.](#)

01/2017 – 12/2018 University of Puerto Rico at Mayagüez (UPRM). **MSc. Applied Mathematics.**

- **Thesis:** [Application of the Local Discontinuous Galerkin method to equations with fractional derivatives.](#)
- **Advisor:** Prof. [Paul Castillo.](#)

01/2012 – 05/2016 National Autonomous University of Honduras (UNAH). **Bachelor in Mathematics with emphasis in Mathematical Engineering.**

Preprints

- [1] **S. Gómez (2025).** A variational approach to the analysis of the continuous space–time FEM for the wave equation. [arXiv:2501.11494.](#)
- [2] **S. Gómez and V. Nikolić (2024).** Combined DG–CG finite element method for the Westervelt equation. [arXiv:2412.09095.](#)
- [3] **S. Gómez, C. Perinati, and P. Stocker (2024).** Inf-sup stable space-time Local Discontinuous Galerkin method for the heat equation. [arXiv.2411.14819.](#)

- [4] **S. Gómez, A. Jüngel, and I. Perugia (2024)**. Structure-preserving Local Discontinuous Galerkin method for nonlinear cross-diffusion systems. [arXiv:2406.17900](https://arxiv.org/abs/2406.17900).

Publications in international journals

- [1] **L. Beirão da Veiga, F. Dassi, and S. Gómez (2025)**. SUPG-stabilized time-DG finite and virtual elements for the time-dependent advection–diffusion equation. *Computer Methods in Applied Mechanics and Engineering*, 436, 117722.
- [2] **S. Gómez and M. Meliani (2024)**. Asymptotic-preserving hybridizable discontinuous Galerkin method for the Westervelt quasilinear wave equation. Accepted for publication in *ESAIM: Mathematical Modelling and Numerical Analysis*.
- [3] **S. Gómez and A. Moiola (2024)**. A space-time DG method for the Schrödinger equation with variable potential. *Advances in Computational Mathematics*, 50(2), 15.
- [4] **S. Gómez, L. Mascotto, and I. Perugia (2024)**. Design and performance of a space-time virtual element method for the heat equation on prismatic meshes. *Computer Methods in Applied Mechanics and Engineering*, 418(A), 116491.
- [5] **S. Gómez, L. Mascotto, A. Moiola, and I. Perugia (2024)**. Space-time virtual elements for the heat equation. *SIAM Journal of Numerical Analysis*, 62(1), 199–228.
- [6] **S. Gómez, A. Moiola, I. Perugia, and P. Stocker (2023)**. On polynomial Trefftz spaces for the linear time-dependent Schrödinger equation. *Applied Mathematics Letters*, 146(C), 108824.
- [7] **S. Gómez (2022)**. High-order interpolatory serendipity virtual element method for semilinear parabolic problems. *Calcolo*, 59(3), 25.
- [8] **S. Gómez and A. Moiola (2022)**. A space–time Trefftz Discontinuous Galerkin method for the linear Schrödinger equation. *SIAM Journal of Numerical Analysis*, 60(2), 688–714.
- [9] **P. Castillo and S. Gómez (2021)**. A unified framework of high order structure-preserving B-splines Galerkin methods for coupled nonlinear Schrödinger systems. *Computers & Mathematics with Applications*, 102(C), 45–53.
- [10] **P. Castillo and S. Gómez (2021)**. Conservative local discontinuous Galerkin methods for a generalized system of strongly coupled nonlinear Schrödinger equations. *Communications in Nonlinear Science and Numerical Simulation*, 99(C), 105836.
- [11] **A. Aguilera, P. Castillo, and S. Gómez (2021)**. Structure preserving - field directional splitting difference methods for nonlinear Schrödinger systems. *Applied Mathematics Letters*, 119(C), 107211.
- [12] **P. Castillo and S. Gómez (2021)**. An interpolatory directional splitting - Local Discontinuous Galerkin method with application to pattern formation in 2D/3D. *Applied Mathematics and Computation*, 397(C), 125984.
- [13] **P. Castillo and S. Gómez (2020)**. On the convergence of the Local Discontinuous Galerkin method applied to a stationary one dimensional fractional diffusion problem. *Journal of Scientific Computing*, 85(2), 32.
- [14] **P. Castillo and S. Gómez (2020)**. Interpolatory super-convergent discontinuous Galerkin methods for nonlinear reaction diffusion equations on three dimensional domains. *Communications in Nonlinear Science and Numerical Simulation*, 90(C), 105388.

- [15] **P. Castillo and S. Gómez (2020)**. Conservative super-convergent and hybrid discontinuous Galerkin methods applied to nonlinear Schrödinger equations. [Applied Mathematics and Computation](#), 371(C), 124950.
- [16] **P. Castillo and S. Gómez (2020)**. Conservative Local Discontinuous Galerkin method for the fractional Klein-Gordon-Schrödinger system with generalized Yukawa interaction. [Numerical Algorithms](#), 84(1), 407–425.
- [17] **P. Castillo and S. Gómez (2019)**. Optimal stabilization and time step constraints for the forward Euler-Local Discontinuous Galerkin method applied to fractional diffusion equations. [Journal of Computational Physics](#), 394(C), 503–521.
- [18] **P. Castillo, S. Gómez, and S. Manzanarez (2018)**. Improving the accuracy of LDG approximations on coarse grids. [Mathematics and Computers in Simulation](#), 156, 310–326.
- [19] **P. Castillo and S. Gómez (2018)**. On the conservation of fractional nonlinear Schrödinger equation's invariants by the LDG method. [Journal of Scientific Computing](#), 77(3), 1444–1467.

Publications in Latin-American journals

- [1] **A. Aguilera, P. Castillo, and S. Gómez (2022)**. High order conservative Finite Difference method for a class of nonlinear Schrödinger systems. [Revista Mexicana de Física E](#), 19(1), 1–14.
- [2] **P. Castillo and S. Gómez (2019)**. Von Neumann analysis for the Local Discontinuous Galerkin method in 1D. [Revista Integración, Temas de Matemáticas](#), 37(2), 199–217.
- [3] **P. Castillo and S. Gómez (2018)**. Conservation of the nonlinear Schrödinger equation's invariants by the LDG method. [Revista Mexicana de Física E](#), 64(1), 52–60.
- [4] **P. Castillo and S. Gómez (2017)**. Efficiency of the LDG method to approximate the solution of the Bratu and Troesch problems. [Revista de la escuela de Física, UNAH](#), 5(2), 39–46.

Invited seminars and talks

- (Forthcoming) TBD, 01 - 05 September 2025, [ENUMATH 2025](#), Heidelberg, Germany.
- (Forthcoming) TBD, 23 - 27 June 2025, [DD29](#), Milan, Italy.
- (Forthcoming) Local Discontinuous Galerkin method for the heterodimer model of protein interaction, 26 - 29 May 2025, [Coupled Problems 2025](#), Sardinia, Italy.
- (Forthcoming) Asymptotic-preserving HDG method for the Westervelt quasilinear wave equation, 24 - 28 February 2025, [Conference on Mathematics of Wave Phenomena 2025](#), Karlsruhe, Germany.
- Asymptotic-preserving methods for the Westervelt quasilinear wave equation, 17 - 19 December 2024, [NumAspYoung \(2024\)](#), Ferrara, Italy.
- Asymptotic-preserving HDG method for the Westervelt quasilinear wave equation, 10 - 14 June 2024, [CMAM-10 \(2024\)](#), Bonn, Germany.
- Space-time ultra-weak discontinuous Galerkin method for the Schrödinger equation, 12 - 17 May 2024, [Contemporary Challenges in Trefftz Methods, from Theory to Applications \(2024\)](#), CMO Oaxaca, Mexico (hybrid).

- Space-time ultra-weak discontinuous Galerkin method for the Schrödinger equation, 26 - 27 March 2024, [APOWA Kick-off meeting \(2024\)](#), Lille, France.
- Structure-preserving Local Discontinuous Galerkin method for nonlinear cross-diffusion system, 15 - 19 January 2024, [WONAPDE \(2024\)](#), Concepción, Chile.
- Space-time ultra-weak discontinuous Galerkin method for the Schrödinger equation, 28 August - 01 September 2023, [SIMAI \(2023\)](#), Matera, Italy.
- Space-time ultra-weak discontinuous Galerkin method for the Schrödinger equation, 14 - 18 August 2023, [ICOSAHOM \(2023\)](#), Seoul, South Korea.
- Space-time ultra-weak discontinuous Galerkin method for the Schrödinger equation, 26 - 28 July 2023, [PoWER \(2023\)](#), Turin, Italy.
- High-order interpolatory / quasi-interpolatory serendipity virtual element method for semilinear parabolic problems, 12 - 14 December 2022, [POEMS \(2022\)](#), Milan, Italy (Lightning talk).
- A space-time Trefftz discontinuous Galerkin method for the linear Schrödinger equation, 12 October 2022, [PDE afternoon \(2022\)](#), University of Vienna, Austria.
- Space-time virtual element method for the heat equation, 29 - 30 September 2022, [GIMC-SIMAI Young \(2022\)](#), Pavia, Italy.
- Space-time virtual element method for the heat equation, 29 August - 02 September 2022, [CMAM \(2022\)](#), Vienna, Austria.

Contributed talks

- Asymptotic-preserving HDG method for the Westervelt quasilinear wave equation, 30 June - 05 July 2024, [WAVES \(2024\)](#), Berlin, Germany.
- Space-time virtual elements for the heat equation, 27 - 28 April 2023, [NAD \(2023\)](#), Vienna, Austria.
- Improving the efficiency of Galerkin discretizations for nonlinear problems using interpolation techniques, 18 - 22 September 2022, [YAMC \(2022\)](#), Arenzano, Italy.
- A space-time Trefftz discontinuous Galerkin method for the linear Schrödinger equation, 25 - 29 July 2022, [WAVES \(2022\)](#), Palaiseau, France.
- High-order interpolatory/quasi-interpolatory serendipity virtual element method for semilinear parabolic problems, 04 - 06 July 2022, [PICNDEA \(2022\)](#), Évora, Portugal.
- A space-time Trefftz discontinuous Galerkin method for the linear Schrödinger equation, 16 - 17 March 2022, [CompMat \(2022\)](#), Pavia, Italy.
- Unified framework for conservative discontinuous Galerkin methods for nonlinear Schrödinger equations, 12 - 16 July 2021, [ICOSAHOM \(2021\)](#) online.
- Unified framework for conservative discontinuous Galerkin methods for nonlinear Schrödinger equations, 21 - 23 June 2021, [MexSIAM Annual Meeting \(2021\)](#) online.

Organization activity

- Organizer of the minisymposium “**Variational methods for evolutionary partial differential equations**” in [CMAM-10](#), 10-14 June 2024, Bonn, Germany, in collaboration with [Gregor Gantner](#) and [Johannes Storn](#).
- Organizer of the minisymposium “**Recent advances in polytopal methods for coupled problems**” in [SIMAI 2023](#), 28 August - 01 September 2023, Matera, Italy, in collaboration with [Michele Botti](#).

Grants and Distinctions

- 17 – 21 Feb. 2025 [Research in Residence](#) at the Centre International de Rencontres Mathematiques (CIRM), Luminy, Marseille, France.
Project: [Unconditionally stable conforming space-time methods for the Schrödinger equation](#).
Collaborator: [Matteo Ferrari](#).
- Dec. 2024 [Premio Giovani Talenti 2024](#), University of Milano-Bicocca, 3000€.
- Jan. – Dec. 2024 [GNCS project 2024](#), “Risoluzione efficiente di PDE basata su tecniche avanzate di algebra lineare numerica”, 1100€, member (PI [Massimo Frittelli](#)).
- Mar. – Sept. 2023 [Junior Research Fellowship](#) at the Erwin Schrödinger International Institute for Mathematics and Physics (ESI), Vienna, Austria, 9600€.
Project: [Structure-preserving methods for nonlinear PDEs](#).
Mentor: Prof. [Ilaria Perugia](#).

Scientific visits and periods abroad

- 03 – 09 Mar. 2024 Invited to the [University of Vienna](#) by Prof. [Ilaria Perugia](#).
- Mar. – Sept. 2023 [Junior Research Fellowship](#) at the Erwin Schrödinger International Institute for Mathematics and Physics (ESI).
- 03 – 14 Oct. 2022 Invited to the [University of Vienna](#) by Prof. [Ilaria Perugia](#).
- Feb. – Jul. 2022 Erasmus Traineeship, [Università della Svizzera italiana \(USI\)](#) under the supervision of Prof. [Kai Hormann](#).

Refereeing activity

- [Applied Mathematics and Computation](#) (Elsevier)
- [Applied Numerical Mathematics](#) (Elsevier)
- [Chaos, Solitons & Fractals](#) (Elsevier)
- [Communications in Nonlinear Science and Numerical Simulation](#) (Elsevier)
- [Computational & Applied Mathematics](#) (Springer)
- [Computers & Mathematics with Applications](#) (Elsevier)
- [Journal of Computational and Applied Mathematics](#) (Elsevier)
- [Journal of Computational Mathematics](#) (Global Science)
- [Journal of Computational Physics](#) (Elsevier)
- [Journal of King Saud University - Science](#) (Elsevier)
- [Journal of Scientific Computing](#) (Springer)
- [Mathematics and Computers in Simulation](#) (Elsevier)
- [Wave Motions](#) (Elsevier)

Other conferences and schools attended

[POLytopal Element Methods in Mathematics and Engineering \(POEMS\)](#), 03 - 05 December 2024, Paris, France.

[Kickoff meeting of the ERC Synergy grant “NEMESIS”](#), 19 - 21 June 2024, Montpellier, France.

Conference on Advanced NUMerical analysis in TORino - 2023 (CANUTO23), 02 - 04 November 2023, Turin, Italy.

2nd SFB International Workshop 2023 "Taming Complexity in Partial Differential Systems", 19 - 21 April 2023, Vienna, Austria.

Workshop on Generalized Barycentric Coordinates in Computer Graphics and Computational Mechanics, 01 - 04 June 2022, Monte Verità, Ascona, Switzerland.

Workshop on Dynamics, Control and Numerics for Fractional PDE's, 05 - 07 December 2018, Isla Verde, Carolina, Puerto Rico.

EMALCA 2015, 07 - 16 December 2015, National Autonomous University of Nicaragua. **Courses attended:** nonlinear programming, discrete dynamic systems, celestial mechanics.

Professional affiliations

- [SIMAI](#), Società Italiana di Matematica Applicata e Industriale, since 2023.
- [GNCS](#), Gruppo Nazionale di Calcolo Scientifico - Istituto Nazionale di Alta Matematica (INdAM), since 2021.
- [SIAM](#), Society for Industrial and Applied Mathematics, since 2020.

Teaching activity

A.Y. 2024-2025 (Fall semester)	Teaching assistant, Introduction to Numerical Analysis (48 hours). Department of Mathematics and Applications, UNIMIB.
A.Y. 2023-2024 (Fall semester)	Teaching assistant, Introduction to Numerical Analysis (40 hours). Department of Mathematics and Applications, UNIMIB.
A.Y. 2020 (2 nd term)	MM-650 Numerical Optimization, master course (60 hours). Department of Applied Mathematics, UNAH.
	MM-420 Discrete Mathematics, bachelor course (50 hours). Department of Applied Mathematics, UNAH.
A.Y. 2020 (1 st term)	MM-610 Numerical Linear Algebra, master course (60 hours). Department of Applied Mathematics, UNAH.
	MM-420 Discrete Mathematics, bachelor course (50 hours). Department of Applied Mathematics, UNAH.
	MM-100 Introduction to Social Statistics, bachelor course (50 hours). Department of Statistics, UNAH.
	MM-423 Numerical Linear Algebra, bachelor course (50 hours) Department of Applied Mathematics, UNAH
A.Y. 2019 (3 rd term)	MM-420 Discrete Mathematics, bachelor course (50 hours). Department of Pure Mathematics, UNAH.
A.Y. 2019 (2 nd term)	MM-420 Discrete Mathematics, bachelor course (50 hours). Department of Applied Mathematics, UNAH.
	HH806 Introduction to Computing, bachelor course (45 hours). Department of Applied Mathematics, UNAH.

MM-428 Mathematical Analysis, bachelor course (50 hours). Department of Applied Mathematics, UNAH.

A.Y. 2019
(1st term)

MM-690 Numerical Methods for Partial Differential Equations, master course (60 hours). Department of Applied Mathematics, UNAH.

MM-420 Discrete Mathematics, bachelor course (50 hours). Department of Applied Mathematics, UNAH.

MM-515 Numerical Differential Equations, bachelor course (50 hours). Department of Applied Mathematics, UNAH.

MM-423 Numerical Linear Algebra, bachelor course (50 hours). Department of Applied Mathematics, UNAH.

A.Y. 2018-2019
(1nd semester)

Teaching assistant, MATE3172 Precalculus II (3 sections, 45 hours). Department of Mathematical Sciences, UPRM.

Teaching assistant, COMP3057 Computer Basics (2 groups, 30 hours). Department of Mathematical Sciences, UPRM.

A.Y. 2017-2018
(2nd semester)

Teaching assistant, MATE3171 Precalculus I (2 groups, 30 hours). Department of Mathematical Sciences, UPRM.

Teaching assistant, COMP3057 Computer Basics (2 groups, 30 hours). Department of Mathematical Sciences, UPRM.

A.Y. 2017-2018
(1st semester)

Teaching assistant, MATE3171 Precalculus I (6 sections, 90 hours). Department of Mathematical Sciences, UPRM.

A.Y. 2016-2017
(2nd semester)

Teaching assistant, MATE3171 Precalculus I (2 groups, 30 hours). Department of Mathematical Sciences, UPRM.

Teaching assistant, MATE3172 Precalculus II (2 groups, 30 hours). Department of Mathematical Sciences, UPRM.

Computational skills

- **Programming languages:** MATLAB, C/C++, Java.
- **Software:** L^AT_EX, Microsoft Office.

Milan, February 1, 2025.

Sergio Gómez