



Curriculum Vitae

Personal data and Education

Work address Dipartimento di Matematica, Informatica e Geoscienze, Università di Trieste, Via Valerio, 12, Trieste.

ORCID 0000-0003-4826-1114

Scopus ID 13104048700

1998 **Ph.D in Mathematics**, *Polytechnic University of Valencia*, Spain, December.

1993 **Laurea Specialistica (M.Sc.) in Computer Science**, *Polytechnic University of Valencia*, Spain, July 1993. .

Academic positions

May 22 – **Present position: Professore Associato in Analisi Numerica (SSD MATH-05/A)**, *Dipartimento di Matematica, Informatica e Geoscienze, Università di Trieste*.

2019–22 **Ricercatore di tipo B**, *Dipartimento di Matematica e Geoscienze, Università di Trieste*.

2016–19 **Ricercatore di tipo A**, *Dipartimento di Matematica "Tullio Levi-Civita", Università di Padova*.

2014–16 **Assegnista di ricerca Senior**, *Università di Padova*.

2005–06 **Assegnista di ricerca**, *Supervisor: Prof. M. Vianello*, *Università di Padova*.

2000–02 **Postdoctoral Fellow**, *Supervisor: Prof. G. Pini*, *Università di Padova*.

1996–99 **Assistant Professor**, *Department of Applied Mathematics*, *Polytechnic University of Valencia*.

Institutional duties (recent)

2024 Member of the committee for the selection for a MATH/05-A research grant.

2021 – Member of the board of the Ph.D in *Earth Science, Fluid-Dynamics, and Mathematics. Interactions and Methods*.

2021 Member of the committee for the selection for a MAT/05 research grant.

2020 – 2021 Member of the selection committee for students willing to enroll in the BSc course: *Data Science and Scientific Computing*.

Research Contracts

I have been awarded the following contracts. Unless otherwise stated they refer to the University of Padua.

2012–2013 **Term contract**, *Supervisor: Prof. M. Putti*, Parallel preconditioners for saddle point and nonlinear systems of equations, 1 Year – Department of Mathematics.

- 2010 **Research Grant**, *Supervisor: Prof. G. Pini*, PRIN project: Parallel iterative methods for indefinite linear systems arising from the FE discretization of PDE modeling flow and geomechanical coupled models, 5 Months – Department of Mathematical Methods and Models for the Applied Sciences (DMSA).
- 2009–2010 **Research Grant**, *Supervisor: Prof. G. Pini*, PRIN project: Advanced numerical methods and models with applications to fluid mechanics and environmental geomechanics, 1 Year – DMSA.
- 2006 **Research contract**, *Supervisor: Prof. G. Pini*, Parallel preconditioners for iterative solvers of linear systems arising from the discretization of fluid dynamics models, 6 Months – DMSA.
- 2004 **Research contract**, *Supervisor: Prof. G. Pini*, Parallel implementation of iterative methods for flow and transport equations which model infiltration problems in porous media, 1 Month – DMSA.
- 2004 **Research contract**, *Supervisor: Prof. M. Vianello*, Parallel implementation of exponential integrators for ODE/PDE solvers, 2 Months – Department of Mathematics.
- 2004 **Research contract**, *Supervisor: Prof. A. Pietracaprina*, Development of BSP supports on IBM SP/3 parallel machine, 5 Months – Department of Informatics and Engineering.
- 2003 **Research contract**, *Supervisor: Prof. G. Pini*, Parallel implementation of iterative methods for flow and transport equations which model infiltration problems in porous media – 3 Months, DMSA.
- 2003 **Research contract**, *Supervisor: Prof. G. Pini*, Development of approximate inverse based parallel preconditioners for 3D flow and transport codes, 1 Month – DMSA.
- 1993 – 1996 **Research grant**, *Supervisor: Prof. R. Bru*, EC-funded project: *ESPRIT PROJECT 9072–GEPPCOM. Foundations of General Purpose Parallel Computing*, 3 Years – Polytechnic University of Valencia.

Maternity leave

I have taken two maternity leaves: the first one in 1999-2000 and the second one from July 2007 to March 2009. This long gap in my research activity was due to my decision of taking care of my daughter who had a highly preterm birth and was having health problems.

Research Interests

Scientific computing, Numerical Linear Algebra: Sparse Matrix Computations, Iterative Methods, Preconditioning Techniques, Parallel Computing, Matrix Functions. Applications to Computational Fluid Dynamics and Structural Mechanics. My main topic is iterative methods for linear systems solution as well as partial solution of eigenproblems in the hermitian case, with the main emphasis on preconditioning. I have studied, developed and implemented algorithms for solving this kind of problems both in sequential and parallel computing environments.

1. **Cost study and implementation of parallel algorithms for solving linear systems.**
2. **Error analysis of Gaussian elimination and development of new pivoting strategies.**
3. **Parallel preconditioning of large sparse linear systems.**
4. **Parallel preconditioning of CG-like methods for the symmetric eigenvalue problem.**
5. **Quasi-Newton preconditioners for Krylov solvers on the Inexact Newton method.**
6. **Parallelization of meshless methods for solving geomechanical problems.**
7. **Study and parallel implementation of exponential integrators** for the solution of discrete advection diffusion equations.

8. **Study and development of parallel preconditioners for saddle-point problems.**
9. **Preconditioners for the eigensolution of symmetric positive definite matrices of large size.**
10. **Low rank update of preconditioners for sequences of linear systems.**
11. **Preconditioner updates for sequences of linear systems in the Interior Point method for convex optimization problems.**
12. **Efficient computation of RBF and RBF based rational interpolants.**
13. **Numerical optimization in Deep Learning.**

Project involvement as PI or participant

- 2024-2025 Participation to the GNCS project: "Risoluzione efficiente di PDE basata su tecniche avanzate di algebra lineare numerica". CUP E53C23001670001.
- 2024-2025 Participation to the B-type ISCRA (Italian SuperComputing Resource Allocation) project: *ARKEVO: All-at-Once Runge Kutta methods for EVOLutionary models.*
- 2023-2025 Participation to the iNEST (Interconnected North-Est Innovation Ecosystem) project funded by the European community in the framework of Next-GenerationEU (Piano Nazionale di Ripresa e Resilienza (PNRR) – Missione 4 Componente 2, Investimento 1.5 – D.D. 1058 23/06/2022, ECS_00000043).
- 2022-2024 Participation to the BIRD project: "Linear and nonlinear algebra in physics-informed neural networks with application to real life models" of the Department of Civil, Environmental and Architectural Engineering, University of Padova.
- 2023-2024 Participation to the GNCS project: "Metodi avanzati per la risoluzione di PDEs su griglie strutturate, e non". CUP E53C22001930001.
- 2022-2023 Participation to the ISCRA project PRESTO (Parallel PREconditioners for Navier-STOKes equations).
- 2022-2023 Participation to the GNCS project: "Tecniche avanzate per problemi evolutivi: discretizzazione, algebra lineare numerica e ottimizzazione". CUP_E55F22000270001.
- 2021-2022 Participation to the ISCRA project ADAMG.
- 2020-2021 Participation to the GNCS project: "Ottimizzazione e algebra lineare avanzata per problemi governati da PDE".
- 2020-2021 Participation to the ISCRA project EXAAMG.
- 2019-2020 Participation to the GNCS project: "Tecniche innovative e parallele per sistemi lineari e non lineari di grandi dimensioni, funzioni ed equazioni matriciali ed applicazioni".
- 2018-2020 Participation to the project funded by the Spanish University: "Problemas matriciales: computación, teoría y aplicaciones". Coordinator prof. José Mas Marí.
- 2019-2020 Participation to the project *Matrix-Free Preconditioners for Large-Scale Convex Constrained Optimization Problems (PRECOOP)* granted by the CARIPARO foundation in the framework of the "Visiting Programme".
- 2019 Participation to the ISCRA project SCADAMG.
- 2018 Participation to the ISCRA project UPSCALE: Updates of scalable preconditioners in geomechanical applications.
- 2018-2019 Participation to the GNCS project: "Metodi numerici per equazioni lineari, non lineari e matriciali con applicazioni".
- 2016–2018 Participation to the BIRD project: "Approximation and Discretization Methods for PDEs on Manifolds for Environmental Modeling".

- 2017-2018 Participation to the GNCS project: Metodi numerici per problemi di ottimizzazione vincolata di grandi dimensioni e applicazioni.
- 2016-2018 Participation to the "Progetto di Ateneo": Stable and efficient discretizations of the mechanics of faults.
- 2015–2016 PI of the ISCRA project PRECISO: Parallel Preconditioners for Iterative Solvers.
- 2013 Participation to the ISCRA project PARPREC: Parallel Preconditioners for Advanced Engineering Applications.
- 2011 Participation to the ISCRA project SPREAD: Scalable PREconditioners for Advanced Discretizations of geomechanical models.
- 2010 Participation to the ISCRA project PARPSEA: PARallel Preconditioners for large Scale Engineering Applications.
- 2008-2010 Participation to the PRIN project: Metodi e modelli numerici avanzati con applicazioni di fluidodinamica e geomeccanica ambientale.
- 2004-2006 Participation to the PRIN project: Modelli numerici per flussi multifase e deformazione del suolo.
- 1998-2001 Participation to the Spanish DGES (Dirección general de educación superior) project "Problemas matriciales de sistemas de ecuaciones lineales y de sistemas de control discretos lineales".
- 1997-1998 Participation to the Spanish DGES project "Estudio e implementación de algoritmos para la resolución en paralelo de sistemas de ecuaciones".
- 1996-1997 Participation to the Spanish CICYT (Comisión Interministerial de Ciencia y Tecnología) project "Algoritmos numéricos en paralelo para problemas lineales".
- 1993-1996 Participation to the EC-funded project: ESPRIT PROJECT 9072–GEPPCOM. Foundations of General Purpose Parallel Computing.

List of Publications

As is common practice in mathematics, the author order is usually alphabetical and does not reflect a difference in contribution.

Journal papers

Papers on Refereed International Journals

- 2024 [1] L. Bergamaschi, S. Leveque, A. Martínez and J Pearson, "Parallel-in-time solver for the all-at-once Runge-Kutta discretization", *SIAM Journal on Matrix Analysis and Applications*, 45(4), 1902–1928, 2024
- [2] L. Bergamaschi, A. Martínez, J. Pearson and A. Potschka, "Spectral analysis of block preconditioners for double saddle-point linear systems with application to PDE-constrained optimization", *Computational Optimization and Applications*, published online on December 9, 2024
- [3] N. Krejić, N. Krklec Jerinkić, A. Martínez, and M. Yousefi, "A non-monotone trust-region method with noisy oracles and additional sampling". *Computational Optimization and Applications*, 2024, 89(1), pp. 247–278

- [4] F. Bakrani Balani, L. Bergamaschi, A. Martínez and M. Hajarian, "Some preconditioning techniques for a class of double saddle point problems", *Numerical Linear Algebra with Applications*, 31(4), e2551, 2024
- 2023 [5] L. Bergamaschi, M. Ferronato, G. Isotton, C. Janna and A. Martínez, "Parallel matrix-free polynomial preconditioners with application to flow simulations in discrete fracture networks", *Computer and Mathematics with Applications*, 146 (2023), pp. 60–70
- [6] M. Yousefi and A. Martínez, "Deep Neural Networks Training by Stochastic Quasi-Newton Trust-Region Methods", *Algorithms*, 16(10), 2023, 490
- 2022 [7] A. Carreño, L. Bergamaschi, D. Ginestár, A. Martínez and G. Verdú. "Strategies of preconditioner updates for sequences of linear systems associated with the neutron diffusion". *Computational and Mathematical Methods*, vol. 2022, Article ID 3884836, 13 pages, 2022. <https://doi.org/10.1155/2022/3884836>.
- 2021 [9] L. Bergamaschi and A. Martínez, "Parallel Newton–Chebyshev polynomial preconditioners for the conjugate gradient method", *Computational and Mathematical Methods*, 2021, 3(6), e1153.
- [10] L. Bergamaschi, J. Gondzio, A. Martínez, J.W. Pearson and S. Pougkakiotis, "A New Preconditioning Approach for an Interior Point-Proximal Method of Multipliers for Linear and Convex Quadratic Programming", *Numerical Linear Algebra with Applications*, 28(4), e2361, 2021
- 2020 [11] L. Bergamaschi, J. Marín and A. Martínez, "Compact Quasi-Newton preconditioners for SPD linear systems", *Numerical Linear Algebra with Applications*, 27(6), e2322, 2020
- [12] A. Martínez, F. Piazzon, A. Sommariva and M. Vianello. "Quadrature-based polynomial optimization", *Optimization Letters*, 14:1027–1036, 2020
- 2019 [13] S. De Marchi, A. Martínez and E. Perracchione. "Fast and stable rational RBF-based partition of unity interpolation". *J. Comput. Appl. Math.*, 349:331–343, 2019
- [14] A. Carreño, L. Bergamaschi, A. Martínez, A. Vidal-Ferrándiz, D. Ginestar and G. Verdú *Block preconditioning matrices for the Newton method to compute the λ -modes associated with the neutron diffusion equation. Mathematical and Computational Applications*, 24(1):1–14, 2019.
- [15] S. De Marchi, A. Martínez, E. Perracchione and M. Rossini. "RBF-based partition of unity method for elliptic PDEs: Adaptivity and stability issues via Variably Scaled Kernels". *Journal of Scientific Computing*, 79(1):321–344, 2019.
- [16] L. Bergamaschi, E. Facca, A. Martínez, and M. Putti. "Spectral preconditioners for the efficient numerical solution of a continuous branched transport model". *J. Comput. Appl. Math.*, 354:259–270, 2019.
- 2018 [17] L. Bergamaschi, V. De Simone, D. di Serafino, and A. Martínez. "BFGS-like updates of constraint preconditioners for sequences of KKT linear systems". *Numer. Lin. Alg. Appl.*, 25(5):e2144:1–19, 2018.
- 2017 [18] L. Bergamaschi and A. Martínez. "Two-stage spectral preconditioners for iterative eigensolvers". *Numer. Lin. Alg. Appl.*, 24(3):1–14, 2017.
- 2016 [19] A. Martínez. "Tuned preconditioners for the eigensolution of large SPD matrices arising in engineering problems". *Numer. Lin. Alg. Appl.*, 23(3):427–443, 2016.

- 2015 [20] L. Bergamaschi and A. Martínez. “Efficiently preconditioned inexact Newton methods for large symmetric eigenvalue problems”. *Optimization Methods & Software*, 30:301322, 2015
- 2013 [21] L. Bergamaschi and A. Martínez. “Parallel RFSAI-BFGS preconditioners for large symmetric eigenproblems”. *J. Applied Mathematics*, 2013, Article ID 767042, 10 pages.
- [22] L. Bergamaschi, R. Bru, A. Martínez, J. Mas, and M. Putti. “Low-rank update of preconditioners for the nonlinear Richard’s equation”. *Mathematical and Computer Modelling*, 57(7–8):1933–1941, 2013.
- 2012 [23] L. Bergamaschi and A. Martínez. “Banded target matrices and recursive FSAI for parallel preconditioning.” *Numerical Algorithms*, 61(2):223–241, 2012.
- [24] L. Bergamaschi and A. Martínez. “RMCP: Relaxed mixed constraint preconditioners for saddle point linear systems arising in geomechanics”. *Comp. Methods App. Mech. Engrg.*, 221–222:54–62, 2012.
- [25] L. Bergamaschi, A. Martínez, and G. Pini. “Parallel Rayleigh Quotient optimization with FSAI-based preconditioning”. *J. Applied Mathematics*, 2012, Article ID 872901, 14 pages, 2012.
- [26] L. Bergamaschi, R. Bru, A. Martínez, and M. Putti. “Quasi-Newton acceleration of ILU preconditioners for nonlinear two-phase flow equations in porous media”. *Advances in Engineering Software*, 46(1):63–68, 2012.
- 2011 [27] L. Bergamaschi and A. Martínez. “FSAI-based parallel mixed constraint preconditioners for saddle point problems arising in geomechanics”. *J. Comput. Appl. Math.*, 236(3):308–318, 2011.
- [28] L. Bergamaschi, R. Bru, and A. Martínez. “Low-rank update of preconditioners for the inexact Newton method with SPD jacobian”. *Mathematical and Computer Modelling*, 54(7–8):1863–1873, 2011.
- 2009 [29] A. Martínez, L. Bergamaschi, M. Caliarì, and M. Vianello. “A massively parallel exponential integrator for advection-diffusion models”. *J. Comput. Appl. Math.*, 231(1):82–91, 2009.
- [30] L. Bergamaschi, A. Martínez, and G. Pini. “An efficient parallel MLPG method for poroelastic models”. *CMES: Computer and Modeling in Engineering & Sciences*, 49(3):191–216, 2009.
- 2006 [31] L. Bergamaschi, R. Bru, A. Martínez, and M. Putti. “Quasi-Newton preconditioners for the inexact Newton method”. *Electronic Trans. Num. Anal.*, 23:76–87, 2006.
- [32] L. Bergamaschi, A. Martínez, and G. Pini. “Parallel preconditioned conjugate gradient optimization of the Rayleigh quotient for the solution of sparse eigenproblems”. *Appl. Math. Comput.*, 175(2):1694–1715, 2006.
- 2002 [33] J. Cerdán, J. Marín, and A. Martínez. “Polynomial preconditioners based on factorized sparse approximate inverses”. *Applied Mathematics and Computation*, 133:171–186, 2002.
- 2000 [34] P. Favati, M. Leoncini, and A. Martínez. “On the robustness of Gaussian elimination with partial pivoting”. *BIT Numerical Mathematics*, 40(1):62–73, March 2000.

1995 [35] R. Bru, C. Corral, A. Martínez, and J. Mas. “Multisplitting preconditioners based on incomplete Choleski factorizations”. *SIAM Journal on Matrix Analysis and Applications*, 16(4):1210–1222, 1995.

[Lecture Notes in Computer Science Proceedings](#)

- 2025 [36] A. Martínez, M. Viola, M. Yousefi. “Combined First- and Second-Order Directions for Deep Neural Networks Training”, *Lecture Notes in Computer Science*, 2025, ISBN 9783031812408, 9783031812415.
- 2011 [37] L. Bergamaschi and A. Martínez. “Parallel inexact constraint preconditioners for saddle point problems”. In R. N. E. Jeannot and J. Roman, editors, *Euro-Par 2011, Bordeaux (France), volume 6853, Part II of Lecture Notes in Computer Sciences*, pages 78–89, Springer, Heidelberg, 2011.
- 2006 [38] L. Bergamaschi, M. Caliari, A. Martínez, and M. Vianello. “Comparing Leja and Krylov approximations of large scale matrix exponentials”. In *Computational Sciences, ICCS 2005, Reading (UK), volume 3994 of Lecture Notes in Computer Sciences*, pages 685–692. Springer-Verlag Heidelberg, 2006.
- 2005 [39] L. Bergamaschi, M. Caliari, A. Martínez, and M. Vianello. “A parallel exponential integrator for large-scale discretizations of advection-diffusion models”. In *Recent Advances in PVM and MPI, 12th European PVM/MPI Users’ Group Meeting, Sorrento, Italy, volume 3666 of Lecture Notes in Computer Sciences*, pages 483–492. Springer-Verlag Heidelberg, 2005.
- 2005 [40] L. Bergamaschi and A. Martínez. “Parallel acceleration of Krylov solvers by factorized approximate inverse preconditioners”. In M. Daydè et al., editor, *VECPAR 2004, volume 3402 of Lecture Notes in Computer Sciences*, pages 623–636, Springer-Verlag, Heidelberg, 2005.
- 2003 [41] L. Bergamaschi, A. Martínez, G. Pini, and F. Sartoretto. “Eigenanalysis of finite element 3d flow models by parallel Jacobi Davidson”. In J. Dongarra, F. Laforenza, and S. Orlando, editors, *Euro PVM/MPI 2003, volume 2840 of Lecture Notes in Computer Sciences*, pages 565–569, Springer-Verlag, Heidelberg, 2003.

[Book chapters and Proceedings](#)

- 2022 [42] A. Martínez, M. Yousefi. “A Stochastic modified limited memory BFGS for training deep neural networks”, *Lecture Notes in Networks and Systems*, 2022, 507 LNNS, pp. 9-28.
- [43] A. Martínez, M. Yousefi. A stochastic nonmonotone trust-region training algorithm for image classification *Proceedings - 16th International Conference on Signal-Image Technology and Internet-Based Systems, SITIS 2022, 2022*, pp. 522–529
- 2019 [44] L. Bergamaschi and A. Martínez. “Generalized block tuned preconditioners for SPD eigensolvers”. *Springer INdAM Series*, 30:237–252, 2019
- 2018 [45] L. Bergamaschi and A. Martínez. “Spectral acceleration of parallel iterative eigensolvers for large scale scientific computing”. *Advances in Parallel Computing*, 32:107–116, 2018.

- 2017 [46] L. Bergamaschi, A. Martínez, and F. Zanetti. A two-stage Jacobi-Davidson method with spectral preconditioners for the eigensolution of large SPD matrices. In J. Vigo-Aguiar, editor, *Proceedings of the 17th International Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE 2017, 4–8 July, 2017*, pages 300–303, 2017.
- [47] L. Bergamaschi, E. Facca, A. Martínez, and M. Putti. Spectral preconditioners for the efficient numerical solution of sequences of linear systems. In J. Vigo-Aguiar, editor, *Proceedings of the 17th International Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE 2017, 4–8 July, 2017*, pages 1380–1391, 2017.
- 2011 [48] L. Bergamaschi, R. Bru, A. Martínez, J. Mas, and M. Putti. “Low-rank update of preconditioners for nonlinear Richards equation”. In L. Jódar, editor, *Proceedings of Modelling for Addictive Behaviour, Medicine ad Engineering 2011*, pages 211–206. *Instituto de Matemática Multidisciplinar, 2011*.
- 2010 [49] L. Bergamaschi, R. Bru, A. Martínez, and M. Putti. “Low-rank update of preconditioners for the inexact Newton method with SPD jacobian”. In L. Jódar, editor, *Proceedings of Modelling for Addictive Behaviour, Medicine ad Engineering 2010*, pages 21–25. *Instituto de Matemática Multidisciplinar, 2010*.
- [50] L. Bergamaschi, A. Martínez, and G. Pini. “Parallel mixed constraint preconditioners for the iterative solution of coupled consolidation problems”. In B. H. V. Topping, J. M. Adam, F. J. Pallares, R. Bru, and M. Romero, editors, *Proceedings of the Seventh Int. Conf. on Engineering Comput. Technology, Paper # 33. Civil-Comp Press, 2010. CD-ROM*.
- 2008 [51] L. Bergamaschi, R. Bru, A. Martínez, and M. Putti. “Quasi-Newton preconditioners for the solution of large nonlinear systems in porous media”. In M. Papadrakakis and B. H. V. Topping, editors, *Proceedings of the 6th Int. Conf. on Engineering Comput. Technology. Paper # 75. Civil-Comp Press, 2008. CD-ROM*.
- 2006 [52] L. Bergamaschi, R. Bru, A. Comerlati, A. Martínez, and M. Putti. “Quasi-Newton preconditioners for the iterative solution of nonlinear equations in porous media”. In *Proceedings of the 9th Copper Mountain Conference on Iterative Methods, 2006*.
- 2004 [53] L. Bergamaschi, M. Caliarì, A. Martínez, and M. Vianello. “Parallel implementation of an exponential integrator for advection-diffusion equations”. In *Convegno SIMAI, Venice 2004*.
- 2003 [54] L. Bergamaschi, A. Martínez, and G. Pini. “Parallel solution of sparse eigenproblems by simultaneous Rayleigh quotient optimization with FSAI preconditioning”. *Advances in Parallel Computing*, 13, 275-282. Elsevier, North-Holland, 2004. [https://doi.org/10.1016/S0927-5452\(04\)80037-6](https://doi.org/10.1016/S0927-5452(04)80037-6).
- 2000 [55] A. Martínez and J. Mas. “A parallel algorithm for matrix inversion based on the Sherman-Morrison formula”. In *Recent advances in applied and theoretical mathematics, Math. Comput. Sci. Eng., pages 45–49. World Sci. Eng. Soc. Press, Athens, 2000*.
- [56] D. Ginestar, J. Marín, A. Martínez, and G. Verdú. “A parallel Schur complement method for the neutron diffusion equation”. In *Proceedings of the 16th IMACS World Congress on Scientific Computation, Applied Mathematics and Simulation, August 2000. Switzerland*.

- 1999 [57] J. Cerdán, J. Marín, and A. Martínez. “Polynomial preconditioners based on factorized approximate inverses”. In R. Montenegro, G. Montero, and G. Winter, editors, *Proceedings of the XVI CEDYA/VI CMA, volume 2, pages 1013–1020, September 1999. Las Palmas de Gran Canaria, Spain.*
- 1997 [58] J. Marín and A. Martínez. “Testing PVM versus BSP”. *Proceedings of the VIII Jornadas de Paralelismo, September 1997. Cáceres, Spain.*
- 1996 [59] J. Cerdán, J. Marín, and A. Martínez. “Complexity issues of the solution of triangular systems on BSP computers”. *Proceedings of the II International Meeting on Vector and Parallel Processing, September 1996. Oporto, Portugal.*
- [60] A. Martínez and J. Mas. “BSP study of different pivoting strategies”. *Proceedings of the VII Jornadas de Paralelismo (In Spanish), September 1996. Santiago de Compostela, Spain.*
- 1995 [61] V. Migallón, J. Penadés, A. Martínez, and J. Mas. “Results of a non-stationary parallel multisplitting method for solving linear systems”. *Proceedings of the VI Jornadas de Paralelismo (In Spanish), July 1995. Barcelona, Spain.*

Other publications

- 2007 [62] A. Martínez, L. Bergamaschi, G. Pini, and R. Bru. “An efficient parallel meshless method for geomechanical models”. In *Science and Supercomputing in Europe – report 2007, pages 814–819. Cineca, BO, Italy, 2007.*
- 2006 [63] A. Martínez, L. Bergamaschi, G. Pini, and R. Bru. L. Bergamaschi and A. Martínez. Parallel preconditioners for large scale nonlinear systems arising in optimization. In *Science and Supercomputing in Europe – report 2006, pages 528–531. Cineca, BO, Italy, 2006.*
- [64] A. Martínez, L. Bergamaschi, G. Pini, and R. Bru. A. Martínez and L. Bergamaschi. Parallel exponential integrator for advection-diffusion models. In *Science and Supercomputing in Europe – report 2006, pages 549–553. Cineca, BO, Italy, 2006.*
- 2005 [65] L. Bergamaschi, A. Martínez, G. Pini, and F. Sartoretto. “Parallel solution of sparse linear systems and eigenvalue problems arising in diffusion equations”. In *Science and Supercomputing at CINECA, pages 403–406. Cineca, BO, Italy, 2005.*
- [66] L. Bergamaschi, M. Caliarì, A. Martínez, and M. Vianello. “Parallel solution of large-scale discretizations of advection-diffusion models”. In *Science and Supercomputing at CINECA, pages 407–410. Cineca, BO, Italy, 2005.*
- 2003 [67] L. Bergamaschi, A. Martínez, G. Pini, M. Putti, and F. Sartoretto. “Parallel eigensolution of large finite element problems”. In *Science and Supercomputing at CINECA, pages 382–385. Cineca, BO, Italy, 2003.*
- 1997 [68] M. Leoncini and A. Martínez. “Basic Linear Algebra Computations in the BSP Model”. Technical Report No. 12, Department of Applied Mathematics, Polytechnic University of Valencia.
- 1996 [69] R. Bru, A. Martínez and J. Mas. “Parallel Algorithms for Modified Gram-Schmidt and Householder QR Decompositions on a Mesh of Processors”. Technical Report No. 8, Department of Applied Mathematics, Polytechnic University of Valencia.
- [70] R. Bru, A. Martínez and J. Mas. “Parallel Algorithms for LU Decomposition on a Mesh of Processors”. Technical Report No. 9, Department of Applied Mathematics, Polytechnic University of Valencia.

Books

- 2016 [71] A. Martínez. *Calcolo Numerico con MATLAB*. 2016, Ed. Progetto, Padova
- 2015 [72] L. Bergamaschi and A. Martínez. *Calcolo Numerico, Programmazione MATLAB. Esercizi d'esame: testi e soluzioni*. 2015, Ed. Progetto, Padova
- 1998 [73] E. Ponsoda, E. Defez, A. Martínez, and R. Company. *Prácticas de Álgebra Lineal. Servicio de Publicaciones, Universitá Politécnica di Valencia, (SPUPV-98.450), 1998. ISBN 84-7721-639-8.*

Thesis

- 1998 [74] A. Martínez. *Sobre la eficiencia y la estabilidad de los algoritmos básicos del Álgebra lineal en paralelo*. PhD thesis, Polytechnic University of Valencia, December 1998.
- 1993 [75] A. Martínez. *Implementación de controladores neuroborrosos*. Master's thesis, Polytechnic University of Valencia, July 1993.

Other scientific activities

Talks and conference participation (Invited presentation are highlighted in **boldface**).

- 2025 International Workshop on Digital Twins: Mathematical Analysis, Formal Methods and Scientific Machine Learning, Padova, February 2025
Due giorni di Algebra Lineare Numerica, Pisa, January 2025.
- 2024 Workshop PINN-PAD: Physics Informed Neural Networks in PADova, Padova, February 2024
Numerical Linear Algebra (NLACIRM24) CIRM Luminy (France), Sep 16 - 20, 2024, **Spectral analysis of block preconditioners for double saddle-point linear systems arising in constrained optimization problems**
Mathematical Modelling in Engineering & Human Behaviour, Valencia, July 2024. *SVD preconditioners and Parallel-in-Time Solver for the All-at-Once Runge–Kutta Discretization*
24th SIAM Conference on Applied Linear Algebra, Paris, May 2024. **Spectral analysis of block preconditioners for double saddle-point linear systems arising in constrained optimization problems**
- 2023 Workshop HPCSIM: Frontiers of High Performance Computing in Modeling and Simulation, Padova. September 2023
Convegno SIMAI, Matera. **A non monotone extra-gradient Trust Region with oracles**. August 2023
Conference: Numerical Analysis in the 21th century, Oxford. August 2023
25th Conference of the International Linear Algebra Society, Madrid, *Parallel-in-Time Solver for the All-at-Once Runge–Kutta Discretization*, June 2023
Due giorni di Algebra Lineare Numerica, L'Aquila, May 2023.
- 2022 *16th International Conference on Signal Image Technology and Internet-Based Systems (SITIS 2022), Dijon, France*. **A stochastic nonmonotone trust-region training algorithm for image classification**. presented at the NAMDAC Workshop: Numerical Algorithms and Methods for Data Analysis and Classification, October 2022.
ALAMA 2022 – ALN2gg, International meeting on Linear Algebra, Matrix Analysis and Applications, Alcalá de Henares (Spain), June 1–3, 2022. .

- 2021 *Invited talk at the 8th European Conference of Mathematics* Portoroz, Slovenia, within the minisymposium: *Matrix Computations and Numerical (Multi)Linear Algebra with Applications*. **Parallel Newton-Chebyshev Polynomial Preconditioners**, June 2021
- 2019 *Invited talk at the 9th ICIAM Conference, Valencia*. **Optimal Transport Problem Solution: Preconditioning Strategies for the Newton Method**, July 2019.
17th EUROPT: Workshop on Advances in Continuous Optimization, Edinburgh, July 2019.
19th Int. Conference on Computational and Mathematical Methods for Science and Engineering, Rota (Cadice), July 2019.
- 2018 *Invited talk at the Polytechnic University of Valencia*. **Preconditioning strategies for SPD eigenvalue problems**, Valencia, December 2018.
16th EUROPT: Workshop on Advances in Continuous Optimization, Almeria, July 2018.
18th Int. Conference on Computational and Mathematical Methods for Science and Engineering, Rota (Cadice), July 2018. **Generalized block tuned preconditioners for sequences of shifted linear systems: application to SPD eigensolvers**.
6th IMA Conference on Numerical Linear Algebra and Optimization, Birmingham, June 2018. **Generalized block tuned preconditioners for SPD eigensolvers**.
Seminari Padovani di Analisi Numerica (SPAN), Padova, May 2018. **Generalized Block Tuned Preconditioners for SPD eigensolvers**.
Invited talk: Low-rank preconditioner updates for linear systems and eigenvalue problems. Department of Applied Mathematics, Polytechnic University of Valencia, Spain. February 2018 .
- 2017 *CEDYA-CMA Conference, Cartagena (Spagna)*, June 2017. **Spectral preconditioners for the efficient numerical solution of a continuous branched transport model**.
17th Int. Conference on Computational and Mathematical Methods for Science and Engineering, Rota (Cadice), July 2017. **Spectral preconditioners for the efficient numerical solution of sequences of linear systems**.
Due giorni di Algebra lineare numerica con applicazioni, Como, February 2017.
- 2016 *5th IMA Conference on Numerical Linear Algebra and Optimization*, Birmingham, September 2016. **Two-stage preconditioners for Newton-based iterative eigensolvers**.
- 2015 *13th EUROPT Workshop on Advances in Continuous Optimization*, Edinburgh, July 2015.
- 2014 *First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI*, Bilbao, July 2014.
- 2013 *Due giorni di Algebra lineare numerica con applicazioni*, Roma, February 2013.
- 2012 *SIAM Applied Linear Algebra 2012*, Valencia (Spain), June 2012.
- 2011 *Europar 2011*, Bordeaux (France), September 2011.
- 2010 *7th Engineering Computational Technology, Valencia, September 2010*. **Parallel Mixed Constraint Preconditioners for the iterative solution of Coupled Consolidation problems**.

- 2006 *1st Dolomites workshop on constructive approximation and applications* Alba di Canazei, Trento, September 2006.
- 2005 *Euro PVM-MPI*, Sorrento, July 2005.
Europar 05, Lisbona (Portugal), September 2005.
- 2004 *6th Int. Meeting on Vector and Parallel Computing, VecPar04*, Valencia (Spain), June 2004.
- 2000 *6th Conference on Iterative Methods*, Copper Mountain USA, April 2000.
- 1999 *XVI Conference CEDYA/VI CMA*, Las Palmas de Gran Canaria, Spain, September 1999.
Polynomial preconditioners based on factorized approximate inverses.
- 1997 *VIII Jornadas de Paralelismo*, Cáceres, (Spain), September 1997.
- 1996 *II International Meeting on Vector and Parallel Processing*, Porto (Portugal), September 1996.
VII Jornadas de Paralelismo, Santiago de Compostela, Spain, September 1996. **BSP study of different pivoting strategies**
- 1995 *VI Jornadas de Paralelismo, Barcelona, Spain, July 1995. Results of a non-stationary parallel multisplitting method for solving linear systems*
- 1994 *V Jornadas de Paralelismo*, Malaga, (Spain), September 1994.
- 1993 *IV Jornadas de Paralelismo*, Santander, (Spain), September 1993.

[Research visits](#)

- 2022 **School of Maths, University of Edinburgh, UK**, *Polynomial preconditioners for block linear systems. Research funded by the European Supercomputing Resources allocation programme HPC-Europa3*, 10 days.
- 2019 **School of Maths, University of Edinburgh, UK**, *Matrix-Free Preconditioners for Large-Scale Convex Constrained Optimization Problems*, 2 weeks.
- 2018 **Department of Applied Mathematics, UPV, Valencia, Spain**, *Block Preconditioners for the modified block Newton method to compute the λ -modes associated with the neutron diffusion equation.*, 5 days.
- 2018 **Department of Applied Mathematics, UPV, Valencia, Spain**, *Preconditioners for Inexact Newton method based on compact representations of Broyden class updates*, 10 days.
- 2007 **Department of Applied Mathematics, UPV, Valencia, Spain**, *Parallel meshless method for geomechanical problems*, in the framework of the HPC-Europa supercomputing programme, 1 Month.
- 2006 **School of Maths, University of Edinburgh, UK**, *Parallel implementation of exponential integrators for advection diffusion problems* – HPC-Europa, 5 weeks.
- 1997 **Istituto di Matematica Computazionale, CNR, Pisa**, *Non standard pivoting strategies for Gaussian elimination in parallel*, 3 Months.
- 1996 **Istituto di Matematica Computazionale, CNR, Pisa**, *Average error analysis of Gaussian Elimination*, 2 Months.
- 1995 **Istituto di Matematica Computazionale, CNR, Pisa**, *Efficient Matrix vector product on supercomputers*, 2 Months.

1994 **Istituto di Elaborazione dell'Informazione, CNR, Pisa, Communication algorithms on fat-trees based interconnection networks, 2 Months.**

[Conference organization](#)

I have taken active part in the organizing committee of the following schools/workshops:

- 2020 Workshop: Numerical Linear Algebra for PDEs and Large Scale Optimization, Padova, February 17–18
- 2019 Miniworkshop within the ICIAM Conference held in Valencia: Preconditioners for Linear Algebra Methods in Large Scale Scientific Computing.
Workshop: Advances in Linear Algebra and Huge-Scale Optimization, Edinburgh, July 1–2
- 2018 Program Chair of Topic: Parallel Numerical Methods and Applications for the *Euro-Par 2018 24th International European Conference on Parallel and Distributed Computing*, Turin, 27th–31st Aug. 2018
- 2018 Workshop Seminari Padovani di Analisi Numerica (SPAN 2018), held in Padova (Italy) on May 3–4, 2018.
- 2018 Workshop Due giorni di Algebra Lineare Numerica e Applicazioni, held in Padova (Italy) on February 8–9, 2018.
- 2017 Minisymposium: Linear Algebra for Large Scale Scientific Computing. 17th CMMSE conference, Cadiz, Spain, July 2017.
- 1995 Workshop of the ESPRIT PROJECT 9072–GEPPCOM (Foundations of General Purpose Parallel Computing), held in Peñíscola (Spain) from November 27 to December 2, 1995.
- 1994 International Summer school: *Parallel Numerical Algorithms* in the framework of the project: ESPRIT PROJECT 9072–GEPPCOM. Location: Peñíscola (Spain) from May 30 to June 3, 1994.

[Member of Editorial Boards](#)

- 2018 Guest Editor of the Special Issue of Vol.12 (2019) of the journal *Dolomites Research Notes on Approximation*: Proceedings of the Workshop SPAN 2018

[Reviewer Activity](#)

I have acted as a reviewer for the following International Journals:

SIAM Journal on Matrix Analysis and Applications
Journal of Computational and Applied Mathematics
Computational Optimization and Applications
Journal of Supercomputing
Applied Numerical Mathematics
International Journal of Computer Mathematics
IEEE on Signal processing

[Other formation courses](#)

- 2021 *Summer School on Optimization*. Organized by CIMI (International Centre for Mathematics and Computer Science in Toulouse) and ANITI (Artificial and Natural Intelligence Toulouse Institute). (2-3 September, 2021, 10 hours).

1995 *Exemplar SPP: programming enviroment*. Organized by Convex Supercomputer S. A. E. Held at the central computer center of the Polytechnic University of Valencia (30 hours).

Advances in Software Tools and Applications for Multiprocessor Systems. COMETT course held at the Barcelona Supercomputing center on 10–12 May.

Bibliometrics

Complete statistics of my publications on relevant databases: ISI Web of Knowledge (ISI WoS), MathSciNet, Scopus. Last updated on March 7, 2025.

ISI WoS	MathSciNet	Scopus	
42	33	46	publications
354	163	374	citations
8.4	4.9	8.2	average citation count per article
11	7	11	h-index

Indicators values of my scientific production versus the related thresholds required for obtaining the national scientific qualification to function as full professor in Italian Universities:

Indicator	Value (V)	Threshold (T)
Articles Last 10 Yrs.	19	13
Citations Last 15 Yrs.	289	160
H-index Last 15 Yrs.	10	7

Computer skills

Basic	HTML, OpenOffice
Intermediate	L ^A T _E X, Linux, C programming language
Advanced	Fortran 90, Matlab, MPI
	Vast experience in writing programs for parallel computing systems

Languages

Spanish	Mother tongue
Italian	Excellent
English	Good

Teaching Activities

University of Trieste (The courses of the Academic Year 2024–25 have been officially assigned but not fully delivered yet.)

- 2024-25 *Analisi Numerica*, BSc in Industrial Engineering. **(24 ore)**
Advanced Numerical Analysis, MSC in Scientific and Data-Intensive Computing. **(Titolare, 48 ore)**
Analisi Numerica, BSc in Artificial Intelligence and Data Analytics. **(Titolare, 48 ore)**
- 2023-24 *Modelli Matematici*, BSc in Mathematics. **(24 ore)**
Analisi Numerica, BSc in Industrial Engineering. **(24 ore)**
Analisi Numerica I, BSc in Mathematics. **(24 ore)**

- Analisi Numerica*, BSc in Artificial Intelligence and Data Analytics. **(Titolare, 48 ore)**
- 2022-23 *Modelli Matematici*, BSc in Mathematics. **(24 ore)**
Analisi Numerica, BSc in Industrial Engineering. **(24 ore)**
Analisi Numerica, BSc in Artificial Intelligence and Data Analytics. **(Titolare, 48 ore)**
- 2021-22 *Modelli Matematici*, BSc in Mathematics. **(24 ore)**
Analisi Numerica, BSc in Industrial Engineering. **(24 ore)**
Analisi Numerica, BSc in Artificial Intelligence and Data Analytics. **(Titolare, 48 ore)**
- 2020-21 *Advanced Numerical Analysis*, Master Degree in Data Sciences and Scientific Computing. **(Titolare, 48 ore)**
Analisi Numerica, BSc in Industrial Engineering. **(24 ore)**
- 2019-20 *Advanced Numerical Analysis*, MSC in Data Sciences and Scientific Computing. **(Titolare, 40 ore)**
Analisi Numerica, BSc in Industrial Engineering. **(24 ore)**

University of Edinburgh, School of Maths.

- Feb 2019 PhD Course: Iterative Methods and Preconditioning **(8 ore)**

University of Padua

- 2018-19 *Calcolo Numerico* in Mathematics, Faculty of Sciences. **(Titolare, 56 ore)**
Calcolo Numerico (LAB) in Computer Science, Faculty of Sciences. **(16 ore)**
Calcolo Numerico. Summer course (Bressanone, BZ) in Industrial and Civil Engineering. **(8 ore)**
- 2017-18 *Calcolo Numerico* in Mathematics, Faculty of Sciences. **(Titolare, 32 ore)**
Calcolo Numerico (LAB) in Industrial Engineering. **(24 ore)**
Calcolo Numerico. Summer course (Bressanone, BZ) in Industrial and Civil Engineering. **(8 ore)**
- 2016-17 *Calcolo Numerico (LAB)* in Mathematics, Faculty of Sciences. **(16 ore)**
Calcolo Numerico (LAB) in Industrial Engineering. **(24 ore)**
Calcolo Numerico (LAB) in Environmental Engineering. **(16 ore)**
Calcolo Numerico. Summer course (Bressanone, BZ) in Industrial and Civil Engineering. **(10 ore)**
- 2015-16 *Calcolo Numerico (LAB)* in Mathematics, Faculty of Sciences. **(16 ore)**
Calcolo Numerico (LAB) in Industrial Engineering. **(36 ore)**
Calcolo Numerico. Summer course (Bressanone, BZ) in Industrial and Civil Engineering. **(10 ore)**
- 2014-15 *Calcolo Numerico (LAB)* in Mathematics, Faculty of Sciences. **(14 ore)**
Calcolo Numerico (LAB) in Industrial Engineering. **(36 ore)**
- 2013-14 *Matematica*, in "Tecnologie Forestali e Ambientali", Faculty of Agriculture. **(Titolare, 64 ore)**
Calcolo Numerico (LAB) in Mathematics, Faculty of Sciences. **(16 ore)**
Calcolo Numerico (LAB) in Industrial Engineering. **(36 ore)**
- 2012-13 *Calcolo Numerico* in Industrial Engineering. **(32 ore)**
Calcolo Numerico (LAB) in Industrial Engineering. **(42 ore)**

- Calcolo Numerico (LAB)* in Mathematics, Faculty of Sciences. **(16 ore)**
Matematica, in “Riassetto del territorio e tutela del paesaggio”, Faculty of Agriculture. **(20 ore)**
- 2011–12 *Calcolo Numerico* in Informatics, Faculty of Sciences. **(Titolare, 64 ore)**
Calcolo Numerico in Industrial Engineering. **(32 ore)**
Calcolo Numerico (LAB) in Civil Engineering. **(36 ore)**
- 2010–11 *Calcolo Numerico (LAB)* in Civil Engineering. **(26 ore)**
- 2009–10 *Calcolo Numerico (LAB)* in Civil Engineering. **(26 ore)**
Elementi di Algebra lineare e Geometria. in Architectural Engineering. **(26 ore)**
- 2006–07 *Calcolo Numerico (LAB)* in Architectural Engineering. **(Esercitazioni, 18 ore)**
- 2003–04 *Matematica*, in “Tecnologie Forestali e Ambientali”, Faculty of Agriculture. **(Esercitazioni, 40 ore)**

Participation to examination boards

I have taken part in the examination board for all the above courses.

Polytechnic University of Valencia

- 2020-21 *Numerical Linear Algebra and Machine Learning*, inside the *Herramientas metodológicas en la investigación matemática* MSc degree, Università Politecnica di Valencia, December 2020. **(10 ore)**
- 2017–18 *Iterative Methods for Sparse Linear systems*, Master in Mathematical research, **(12 ore)**
- 1998–99 *Linear Algebra*, Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos **(Titolare, corso di durata annuale)**
- 1997–98 *Linear Algebra*, Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos. **(Titolare, corso di durata annuale)**
- 1996–97 *Linear Algebra*, Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos. **(Titolare, corso di durata annuale)**
- 1995–96 *Computer science (Laboratorio)*, for Agricultural Engineering students. (12 ore)

Participation to examination boards

I have taken part in the examination board for all the above courses.

Thesis supervision

Supervisor of the following PhD theses:

2023- *Minimization of the Gibbs Free Energy for a Poisson-Boltzmann problem*, candidate: Shahid Ali.

2019-22 *Training Deep Neural Networks by quasi-Newton methods*, candidate: Mahsa Yousefi.

Supervisor of the following MSc thesis (Data Science and Scientific Computing degree):

2021-22 *Efficient node generation over complex 3D geometries for meshless RBF-FD methods.*, candidate: Keerthana Chandrasekar

Supervisor of the following BSc thesis (Mathematical degree):

2018-19 *Low rank preconditioner updates for sequences of linear systems arising from an optimal transport problem*, candidate: Claudia Cozzolino.

Co-supervisor of the following BSc theses (Mathematical degree):

- 2024 *Dalle equazioni cinetiche della chimica alle equazioni Lotka-Volterra: risoluzione numerica tramite MATLAB* candidate: Michelle Compagnone.
- 2020-21 *Accelerazione del metodo Rayleigh Quotient inesatto per il problema parziale agli autovalori di matrici sparse di grandi dimensioni*, candidate: Alex Marcat.
- 2017-18 *Estrazione incrementale di informazioni spettrali e deflazione nella soluzione iterativa di successioni di sistemi lineari*, candidate: Stefania Colpo.
- 2016-17 *Impiego di informazioni spettrali per la soluzione iterativa di successioni di sistemi lineari*, candidate: Bryan Emmit Mack.

Trieste, March 7, 2025

Ángeles Martínez Calomardo

