Curriculum Vitae of Luca Gemignani

Personal Data

place of birth	Lucca (LU), Italy
date of birth	March 13, 1963
nationality	Italian
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Education

1978-1982	High School Qualification: Diploma Liceo Scientifico (Scientific Education), Liceo Scientifico Barsanti e Matteucci Viareggio (LU).
1983-1987	Master Degree in Mathematics, University of Pisa. Title of Master Thesis " Numerical Methods for Simultaneously Computing All the Zeros of a Polynomial", supervisor Prof. D.A. Bini.

Career Summary

1988-1989	Military service as artillery officer of Italian Army;
1989-1991	Data processing center official at Italian National Institute of Social Security (I.N.P.S.) in Florence;
1991-1994	Assistant Professor at Mathematics Department of University of Parma, Parma, Italy;
1994-1998	Assistant Professor at Computer Science Department of University of Pisa, Pisa, Italy;
1998-2012	Associate Professor of Numerical Analysis at Mathematics Department of University of Pisa, Pisa, Italy;
2012-	Full Professor of Numerical Analysis at Computer Science Department of University of Pisa, Pisa, Italy.

Teaching

From 1991 to today he served as teacher and/or instructor in more than 80 courses of numerical computing, numerical anal-

ysis, scientific computing, approximation theory and computational mathematics at the University of Pisa and Parma. Among the courses taught during the three most recent terms:

Numerical Computing with Laboratory for the Bachelor Degree in Biomedical Engineering at University of Pisa

High Performance Scientific Computing for the Master Degree in Computer Science and Networking at University of Pisa

Numerical Computing for the Bachelor Degree in Computer Science at University of Pisa

Research

Research activity falls into the field of computational mathematics. More specific areas are: structured numerical linear algebra, polynomial computations and the exploitation of the symbolic-numeric interface in these fields. The primary focus is concerned with the numerous and varied problems associated with solving (systems of) linear and nonlinear equations, including issues like the complexity analysis and the design of efficient algorithms based on structural properties. The main scientific contributions of Luca Gemignani include:

(a) The design of computationally efficient adaptations of the QR eigenvalue algorithm for computing all the eigenvalues of matrices with recursive and rank structures.

(b) The development of fast and numerically reliable algorithms for structured matrices (e.g., Toeplitz, Hankel, Hurwitz, Vandermonde, Bezout and related matrices).

(c) Analysis of the complexity and design of efficient algorithms for the numerical approximation of zeros of polynomials and analytic functions, with applications to spectral factorization problems in control theory and signal processing.

(d) Algebraic algorithms for symbolic and numeric-symbolic computations with polynomials and structured matrices.

(e) Applications of the structured matrix technology for the analysis and design of solution algorithms for computational problems arising in the field of approximation theory and CAGD.

The results of this research activity have been presented at many international conferences of computational mathematics. Luca Gemignani is the author of more than 90 referred publications in international journals; acts as a referee for several prestigious journals in the field of computational mathematics and he has been Editor for a special issue of Linear Algebra and its Applications, 2010. At July 2025 the values of "H-index" are 16 (Scopus), 22 (Google Scholar) and 17 (Web of Science). The most relevant publications are reported below.

Selected Publications

2025 Lidia Aceto and Luca Gemignani. "Computing the action of the matrix generating function of Bernoulli polynomials on a vector with an application to non-local boundary value problems". In: *Adv. Comput. Math.* 51.2 (2025), Paper No. 19, 23. ISSN: 1019-

7168,1572-9044. DOI: 10.1007/s10444-025-10231-1. URL: https://doi.org/10.1007/s10444-025-10231-1

2023 Luca Gemignani and Beatrice Meini. "Relaxed fixed point iterations for matrix equations arising in Markov chain modeling". In: *Numer. Algorithms* 94.1 (2023), pp. 149–173. ISSN: 1017-1398,1572-9265. DOI: 10.1007/s11075-023-01496-y. URL: https://doi.org/10.1007/s11075-023-01496-y

2022 Paola Boito, Yuli Eidelman, and Luca Gemignani. "Computing the reciprocal of a ϕ-function by rational approximation". In: *Adv. Comput. Math.* 48.1 (2022), Paper No. 1, 28. ISSN: 1019-7168,1572-9044. DOI: 10.1007/s10444-021-09917-z. URL: https://doi.org/10.1007/s10444-021-09917-z

2022 R. Bevilacqua, G. M. Del Corso, and L. Gemignani. "Orthogonal iterations on companion-like pencils". In: *J. Sci. Comput.* 91.1 (2022), Paper No. 6, 22. ISSN: 0885-7474,1573-7691. DOI: 10.1007/s10915-022-01777-z. URL: https://doi.org/10.1007/s10915-022-01777-z

2022 Luca Gemignani and Federico Poloni. "Comparison theorems for splittings of M-matrices in (block) Hessenberg form". In: *BIT* 62.3 (2022), pp. 849–867. ISSN: 0006-3835,1572-9125. DOI: 10.1007/s10543-021-00899-4. URL: https://doi.org/10.1007/s10543-021-00899-4

2020 A. Aristodemo and L. Gemignani. "Accelerating the Sinkhorn–Knopp iteration by Arnoldi-type methods". In: *Calcolo* 57.1 (2020), Paper No. 10. ISSN: 0008-0624. DOI: 10.1007/s10092-020-0359-7. URL: https://doi.org/10.1007/s10092-020-0359-7

2020 Roberto Bevilacqua, Gianna M. Del Corso, and Luca Gemignani. "Fast QR iterations for unitary plus low rank matrices". In: *Numer. Math.* 144.1 (2020), pp. 23–53. ISSN: 0029-599X. DOI: 10.1007/s00211-019-01080-4. URL: https://doi.org/10.1007/s00211-019-01080-4

2018 P. Boito, Y. Eidelman, and L. Gemignani. "Efficient solution of parameter-dependent quasiseparable systems and computation of meromorphic matrix functions". In: *Numer. Linear Algebra Appl.* 25.6 (2018), e2141, 13. ISSN: 1070-5325. DOI: 10.1002/nla.2141. URL: https://doi.org/10.1002/nla.2141

2017 L. Gemignani and L. Robol. "Fast Hessenberg reduction of some rank structured matrices". In: *SIAM J. Matrix Anal. Appl.* 38.2 (2017), pp. 574–598. ISSN: 0895-4798,1095-7162. DOI: 10.1137/16M1107851. URL: https://doi.org/10.1137/16M1107851

2016 C. Conti, L. Gemignani, and L. Romani. "Exponential pseudo-splines: looking beyond exponential B-splines". In: *J. Math. Anal. Appl.* 439.1 (2016), pp. 32–56. ISSN: 0022-247X. DOI: 10.1016/j.jmaa.2016.02.019. URL: https://doi.org/10.1016/j.jmaa.2016.02.019

2016 P. Boito, Y. Eidelman, and L. Gemignani. "Implicit QR for companion-like pencils". In: *Math. Comp.* 85.300 (2016), pp. 1753–1774. ISSN: 0025-5718. DOI: 10.1090/mcom/3020. URL: https://doi.org/10.1090/mcom/3020

2015 R. Bevilacqua, G. M. Del Corso, and L. Gemignani. "A CMV-based eigensolver for companion matrices". In: *SIAM J. Matrix Anal. Appl.* 36.3 (2015), pp. 1046–1068. ISSN: 0895-4798. DOI: 10.1137/140978065. URL: https://doi.org/10.1137/140978065

2013 Luca Gemignani and Vanni Noferini. "The Ehrlich-Aberth method for palindromic matrix polynomials represented in the Dickson basis". In: *Linear Algebra Appl.* 438.4 (2013), pp. 1645–1666. ISSN: 0024-3795. DOI: 10.1016/j.laa.2011.10.035. URL: https://doi.org/10.1016/j.laa.2011.10.035

2011 C. Conti, L. Gemignani, and L. Romani. "From approximating to interpolatory non-stationary subdivision schemes with the same generation properties". In: *Advances in Computational Mathematics* 35.2 (2011), pp. 217–241. DOI: 10.1007/s10444-011-9175-6

2010 D.A. Bini, P. Boito, Y. Eidelman, L. Gemignani, and I. Gohberg. "A fast implicit QR eigenvalue algorithm for companion matrices". In: *Linear Algebra and Its Applications* 432.8 (2010), pp. 2006–2031. DOI: 10.1016/j.laa.2009.08.003

2007 D.A. Bini, Y. Eidelman, L. Gemignanl, and I. Gohberg. "Fast Qr eigenvalue algorithms for hessenberg matrices which are rank-one perturbations of unitary matrices". In: *SIAM Journal on Matrix Analysis and Applications* 29.2 (2007), pp. 566–585. DOI: 10.1137/050627563

2007 Y. Eidelman, I. Gohberg, and L. Gemignani. "On the fast reduction of a quasiseparable matrix to Hessenberg and tridiagonal forms". In: *Linear Algebra and Its Applications* 420.1 (2007), pp. 86–101. DOI: 10.1016/j.laa.2006.06.028

2006 D.A. Bini, L. Gemignani, and F. Tisseur. "The Ehrlich-aberth method for the nonsymmetric tridiagonal eigenvalue problem".

In: *SIAM Journal on Matrix Analysis and Applications* 27.1 (2006), pp. 153–175. DOI: 10.1137/S0895479803429788

2005 M. Van Barel, D. Fasino, L. Gemignani, and N. Mastronardi. "Orthogonal rational functions and structured matrices". In: *SIAM Journal on Matrix Analysis and Applications* 26.3 (2005), pp. 810–829. DOI: 10.1137/S0895479803444454

2005 D.A. Bini, L. Gemignani, and V.Y. Pan. "Fast and stable QR eigenvalue algorithms for generalized companion matrices and secular equations". In: *Numerische Mathematik* 100.3 (2005), pp. 373–408. DOI: 10.1007/s00211-005-0595-4

2005 Dario A. Bini, Luca Gemignani, and Joab R. Winkler. "Structured matrix methods for CAGD: an application to computing the resultant of polynomials in the Bernstein basis". In: *Numer. Linear Algebra Appl.* 12.8 (2005), pp. 685–698. ISSN: 1070-5325. DOI: 10.1002/nla.444. URL: https://doi.org/10.1002/nla.444

2004 D.A. Bini, F. Daddi, and L. Gemignani. "On the shifted QR iteration applied to companion matrices". In: *Electronic Transactions on Numerical Analysis* 18 (2004), pp. 137–152

2004 D.A. Bini, L. Gemignani, and V.Y. Pan. "Inverse Power and Durand-Kerner Iterations for Univariate Polynomial Root-Finding". In: *Computers and Mathematics with Applications* 47.2-3 (2004), pp. 447–459

2004 D.A. Bini and L. Gemignani. "Bernstein-Bezoutian matrices". In: *Theoretical Computer Science* 315.2-3 (2004), pp. 319–333. DOI: 10.1016/j.tcs.2004.01.016

2002 D.A. Bini, L. Gemignani, and B. Meini. "Computations with infinite Toeplitz matrices and polynomials". In: *Linear Algebra and Its Applications* 343 (2002), pp. 21–61. DOI: 10.1016/S0024-3795(01)00341-X

1995 Dario Bini and Luca Gemignani. "Fast parallel computation of the polynomial remainder sequence via Bezout and Hankel matrices". In: *SIAM Journal on Computing* 24.1 (1995), pp. 63–77. DOI: 10.1137/S0097539791201903

1994 Dario Bini and Luca Gemignani. "Iteration schemes for the divide-and-conquer eigenvalue solver". In: *Numer. Math.* 67.4 (1994), pp. 403–425. ISSN: 0029-599X. DOI: 10.1007/s002110050035. URL: https://doi.org/10.1007/s002110050035

Administrative Experience

2003-2005	Director of a center of computer services for teaching at the University of Pisa.
2005-2006	Member of the mathematics subject area group within the Tuning Project supported by the European Commission for the harmonization of mathematics degree profiles in Europe under the the Bologna process.
2012-2014	Member of the board of the PhD program in Computer Science and the Mathematics of Computation at the University of Insubria, Como, Italy.
2022-	Member of the board of the PhD program in Computer Science and the University of Pisa, Pisa, Italy.
2022-2025	Member of the scientific committee of the Italian Scientific Computing Group (GNCS) of INDAM.

Fundings and Projects

200-2002	Italian national research project PRIN n.MM01151559_004 coordinated by Prof. Verdi Claudio, University of Milan, Italy, entitled " Analysis and Design of Efficient Algorithms for Computational Problems with Structured Matrices"
2003-2004	Research project supported by Italian national group on Scientific Computing entitled "Innovative Numerical Methods for Large and Structured Matrices"
2017-2019	Research project supported by the University of Pisa entitled "Innovative models and algorithms for large and structured computational problems"

Editorial Activity

Member of the Editorial Board of Mathematics, MDPI, Basel, Switzerland.

Guest Editor of Linear Algebra and its Applications, Elsevier, Amsterdam, The Netherlands.

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