Curriculum Vitæ of ALESSANDRO RUSSO

Alessandro Russo
Full Professor of Numerical Analysis
Department of Mathematics and Applications
University of Milano-Bicocca
Settore Concorsuale: 01/A5 ANALISI NUMERICA
Settore Scientifico Disciplinare: MAT/08 ANALISI NUMERICA

Bibliometric data on SCOPUS (December 12, 2024)

Papers on International Journals: 69
Total citations: 5652 by 2430 documents
H-index: 34

Education

- 1983: Degree in Mathematics at the University of Torino with the thesis "On the buckling of cylindrical shells" (advisor: Prof. G. Geymonat).
- 1983-1986: Graduate student at the International School for Advanced Studies (Trieste)

Employment

- October 2002 - present: Full Professor of Numerical Analysis at the University of Milano-Bicocca
- November 1995 - September 2002: Senior Researcher at the Istituto di Analisi Numerica of CNR - Pavia (now IMATI-CNR)
- May 1986 - October 1995: Researcher at the Istituto di Analisi Numerica of CNR - Pavia (now IMATI-CNR)

Service Activities

- 2018-2021: President of the School of Science of the University of Milano-Bicocca
- 2013-2018: member of the Academic Senate of the University of Milano-Bicocca
- 2013-2015: deputy director of the Department of Mathematics and Applications
- 2002-2008: Director of the School for Applications of Mathematics in Industry (SAMI)

Teaching

- 2002-present: I have taught several courses at the University of Milano-Bicocca on Numerical Analysis, including Finite Elements, Fourier Analysis, Elementary Numerical Analysis both for students of Mathematics and students of Computer Science. I have also taught several PhD courses for the PhD Program in Mathematics of the University of Milano-Bicocca.

- 1990-2001: course "Numerical Analysis" at the Politecnico di Torino

Scientific interests

My scientific activity has been mainly focused on the numerical approximation of partial differential equations with the Finite Element Method. In particular, I have studied the following topics:

- Euler-Navier-Stokes coupling
- Advection-Diffusion equations with dominant advection
- Connection between SUPG and bubble stabilization for advection-diffusion equations
- Hourglass control in Finite Elements
- Virtual Element Method

Organization of Workshops and Schools

- 2024: Co-orgnizer with B. Meini, C. Nitsch, B. Paternoster, G. Toraldo of the Workshop "Calcolo Scientifico e Modelli Matematici: alla ricerca delle cose nascoste attraverso le cose manifeste", 29-31 January 2024, Centro Congressi Federico II, Napoli, Italy
- 2017: Co-organizer with P. Antonietti, L. Beirao da Veiga, M. Verani of the POEMS Workshop 2017 (Workshop on Polygonal and Polyhedral Methods), 3-7 July 2017, University of Milano-Bicocca, Milano, Italy
- 2017: Co-organizer with L. Beirao da Veiga, F. Brezzi, L.D. Marini of the minisymposium "Virtual Element Methods" for the International Conference on Finite Elements in Flow Problems (FEF 2017), 5-7 April 2017, Rome, Italy
- 2016: Co-organizer with L. Beirao da Veiga, F. Brezzi, L.D. Marini of the minisymposium "High-order methods for polygonal and polyhedral meshes" for the ECCOMAS 2016 Conference, 5-10 June 2016, Crete Island, Greece
- 2015: Organizer of the Workshop "Discretization Methods for Polygonal and Polyhedral Meshes. 2015 Edition", University of Milano-Bicocca, 11-13 February 2015
- 2012: Co-organizer with L. Beirao da Veiga, A. Cangiani, G. Manzini of the Workshop "Discretization Methods for Polygonal and Polyhedral Meshes: FEM, MFD, DG, VEM, XFEM and friends", University of Milano-Bicocca, 17-19 September 2012
- 2002-2008: Director of the School for Applications of Mathematics in Industry (SAMI)
- 2006-2008: National Coordinator of the "Progetto Lauree Scientifiche - Stage e post Lauream" funded by the Italian ministry of education, university and research (MIUR)

Grants

- 2023-2025 Local PI of the research project "PRIN PNRR 2022: Polyhedral Galerkin methods for engineering applications to improve disaster risk forecast and management: stabilization-free operator-preserving methods and optimal stabilization methods", Programma Nazionale, Italy; national coordinator: Prof. S. Berrone (Politecnico di Torino)
- 2022-2025 Local PI of the research project "PRIN2020: Advanced polyhedral discretisations of heterogeneous PDEs for multiphysics problems", Programma Nazionale, Italy; national coordinator: Prof. P. Antonietti (Politecnico di Milano)
- 2011-2013 Co-Investigator of the research project "PRIN2009: Modelli, Metodi e Calcolo Scientifico per Problemi di Elettrocardiologia e di Interazione Fluido-Struttura", Programma Nazionale, Italy; national coordinator: Prof. A. Quarteroni (Politecnico di Milano)
- 2008-2010: Co-Investigator of the research project "PRIN2007: Modelli, metodi e calcolo scientifico per problemi di Elettrocardiologia e di Interazione Fluido-Struttura", Programma Nazionale, Italy; national coordinator: Prof. A. Quarteroni (Politecnico di Milano)
- 2006-2008: Co-Investigator of the research project "PRIN2005: Calcolo Scientifico per problemi dell'Elettrocardiologia e dell'interazione Fluido-Struttura", Programma Nazionale, Italy; national coordinator: Prof. A. Quarteroni (Politecnico di Milano)
- 2004-2005: Grant of 140.000 euros from Fondazione Cariplo for the School for Applications of Mathematics in Industry (SAMI)
- 2003-2005: Co-Investigator of the research project "PRIN2003: Modelli, Metodi e Calcolo Scientifico per l'Elettrocardiologia, l'Elettromagnetismo, l'Interazione Fluido-Struttura e per l'Elasticità", Programma Nazionale, Italy; national coordinator: Prof. A. Quarteroni (Politecnico di Milano)

Review activity

Reviewer for several international Journals, such as: Numerische Mathematik, Mathematical Modelling and Numerical Analysis, Computers & Structures, Mathematical Models and Methods in Applied Sciences, SIAM Journal on Numerical Analysis, Mathematics of Computations, Computer Methods in Applied Mechanics and Engineering, International Journal of Solids and Structures.

Invited talks (last 5 years)

- *When Isoparametric met VEM (VEM for solid mechanics)*, NEMESIS Kick-off Meeting, June 19-21, 2024, Montpellier, France
- *Self-stabilized (a.k.a. Stabilization-Free) Virtual Element Method*, January 15-19, 2024, WONAPDE 2024, Seventh Chilean Workshop on Numerical Analysis of Partial Differential Equations, Universidad de Concepción, Chile

- *Quantitative study of the stabilization parameter in the Virtual Element Method*, CANUTO23, Conference on Advanced NUmerical analysis in TOrino, November 2–4, 2023, Torino, Italy
- *Stabilization-Free Virtual Element Method*, Workshop "Advances in Computational Mechanics 2023", Celebrating the 80th Birthday of Thomas J.R. Hughes, October 22–25, 2023, Austin, USA
- *Course "Virtual Eements for Problmes in Mechanics"*, October 16–20, 2023, CISM, Udine, Italy
- *Plenary Lecture*, 21st International Symposium on Electromagnetic Fields in Mechatronics, Electrical and Electronic Engineering, September 12–15, 2023, Pavia, Italy
- *Applicazione del Metodo degli Elementi Virtuali a un problema di shape optimization in Magnetostatica*, UMI23 (XXII Congresso dell'Unione Matematica Italiana), Settembre 4–9, 2023, Pisa, Italy
- *Avoiding the Stabilization Term in the Virtual Element Method*, CFC2023 (22nd IACM Computational Fluids Conference), April 25–28, 2023, Cannes, France
- *Current status and perspectives of the Virtual Element Method*, PICNDEA22 (Portugal-Italy Conference on Nonlinear Differential Equations and Applications, July 4–6, 2022, Évora, Portugal
- *Introduction to the Virtual Element Method*, Minicourse given at SDS 2022 (Structural Dynamical Systems: Computational Aspects), June 7–11, 2022, Rosa Marina (BR), Italy
- *The Virtual Element Method for curved polygons*, INdAM Online Conference Polygonal methods for PDEs: theory and applications, May 17–19, 2021
- *Online Course on Virtual Elements*, Summer International School, Northwestern Polytechnical University (NPU), September 14–18, 2020, Xi'an, China
- *An application of the Virtual Element Method to Computational Magnetostatics*, WCCM-ECCOMAS 2020 Virtual Congress, January 11–15, 2021
- *The Virtual Element Method for Curved Polygons*, ICIAM 2019, July 15–19, 2019, Valencia, Spain
- *The Virtual Element Method for Curved Polygons: State of the Art and Perspectives*, MAFELAP 2019, Brunel University London, June 18–21, 2019, UK
- *The Virtual Element Method for Polygons with Curved Edges*, POEMs 2019, April 29 – May 3, 2019, CIRM, Marseille, France
- *The Virtual Element Method for Curved Polygons: State of the Art and Perspectives*, WONAPDE 2019, January 21–25, 2019, Universidad de Concepciòn, Chile
- *The Virtual Element Method with Curved Edges*, XXII Convegno Italiano di Meccanica Computazionale, September 13–14, 2018, Ferrara, Italy

- *The Virtual Element Method for Curved Domains*, 13th World Congress in Computational Mechanics, July 17–22, 2018, New York City, NY, USA
- Teacher at the Dobbiaco Summer School *Theory and Practice of the Virtual Element Methods*, June 17–22, 2018, Dobbiaco (Bolzano), Italy
- *Basic Principles of Virtual Element Method*, at the 10th Workshop Structural Dynamical Systems: Computational Aspects (SDS2018), June 12–15, 2018, Monopoli (Bari), Italy
- *Serendipity Virtual Element Spaces*, ENUMATH 2017 Conference, September 25-29, 2017, Voss, Norway
- *The Virtual Element Method*, Lectures given at the School *Valencia Numerica 2017*, July 17–20, 2017, Valencia, Spain
- *The hp Virtual Element Method (and other stuff)*, keynote lecture at the the 19th International Conference on Finite Elements in Flow Problems (FEF), April 4–7, 2017, Rome, Italy

Publications

[1] L. Beirão da Veiga, Y. Liu, L. Mascotto, and A. Russo, "The nonconforming Virtual Element Method with curved edges," *Journal of Scientific Computing*, vol. 99, no. 1, 2024.

[2] M. Cremonesi, A. Lamperti, C. Lovadina, U. Perego, and A. Russo, "Analysis of a stabilization-free quadrilateral Virtual Element for 2D linear elasticity in the Hu-Washizu formulation," *Computers and Mathematics with Applications*, vol. 155, p. 142 – 149, 2024.

[3] F. Dassi, P. Di Barba, and A. Russo, "Curved domains in magnetics: A Virtual Element Method approach for the T.E.A.M. 25 benchmark problem," *Electronics (Switzerland)*, vol. 13, no. 11, 2024.

[4] K. Kirilov, J. Peiró, M. Green, D. Moxey, L. Beirão da Veiga, F. Dassi, and A. Russo, "Curvilinear Mesh Generation for the High-Order Virtual Element Method (VEM)," *Lecture Notes in Computational Science and Engineering*, vol. 147, p. 419 – 439, 2024.

[5] A. Lamperti, M. Cremonesi, U. Perego, A. Russo, and C. Lovadina, "A Hu-Washizu variational approach to self-stabilized quadrilateral Virtual Elements: 2D linear elastodynamics," *Computational Mechanics*, vol. 74, no. 2, p. 393 – 415, 2024.

[6] A. Russo, L. Lopez, and V. Simonicini, "Preface," *Computers and Mathematics with Applications*, vol. 166, p. 50, 2024.

[7] L. Beirão Da Veiga, F. Brezzi, L. D. Marini, and A. Russo, "The virtual element method," *Acta Numerica*, vol. 32, p. 123 – 202, 2023.

[8] A. Lamperti, M. Cremonesi, U. Perego, A. Russo, and C. Lovadina, "A Hu–Washizu variational approach to self-stabilized virtual elements: 2D linear elastostatics," *Computational Mechanics*, vol. 71, no. 5, p. 935 – 955, 2023.

[9] F. Dassi, P. Di Barba, and A. Russo, "Virtual Element Method and Optimal Shape Design in Magnetics," *IEEE Transactions on Magnetics*, vol. 58, no. 9, 2022.

[10] F. Dassi, P. Di Barba, and A. Russo, "A free-cutting mesh strategy for optimal shape synthesis in magnetics," *IET Science, Measurement and Technology*, vol. 16, no. 6, p. 337 – 352, 2022.

[11] L. Beirão Da Veiga, F. Brezzi, L. Marini, and A. Russo, "Polynomial preserving virtual elements with curved edges," *Mathematical Models and Methods in Applied Sciences*, vol. 30, no. 8, p. 1555 – 1590, 2020.

[12] L. Beirão da Veiga, F. Dassi, and A. Russo, "A C^1 Virtual Element Method on polyhedral meshes," *Computers and Mathematics with Applications*, vol. 79, no. 7, p. 1936 – 1955, 2020.

[13] F. Dassi, P. Di Barba, and A. Russo, "Virtual element method and permanent magnet simulations: Potential and mixed formulations," *IET Science, Measurement and Technology*, vol. 14, no. 10, p. 1098 – 1104, 2020.

[14] P. F. Antonietti, C. Facciola, A. Russo, and M. Verani, "Discontinuous galerkin approximation of flows in fractured porous media on polytopic grids," *SIAM Journal on Scientific Computing*, vol. 41, no. 1, p. A109 – A138, 2019.

[15] L. Beirão Da Veiga, A. Russo, and G. Vacca, "The virtual element method with curved edges," *ESAIM: Mathematical Modelling and Numerical Analysis*, vol. 53, no. 2, p. 375 – 404, 2019.

[16] A. Ortiz-Bernardin, C. Alvarez, N. Hitschfeld-Kahler, A. Russo, R. Silva-Valenzuela, and E. Olate-Sanzana, "Veamy: an extensible object-oriented c++ library for the virtual element method," *Numerical Algorithms*, vol. 82, no. 4, p. 1189 – 1220, 2019.

[17] L. Beirão Da Veiga, F. Brezzi, F. Dassi, L. Marini, and A. Russo, "A family of three-dimensional virtual elements with applications to magnetostatics," *SIAM Journal on Numerical Analysis*, vol. 56, no. 5, p. 2940 – 2962, 2018.

[18] L. Beirão Da Veiga, F. Brezzi, F. Dassi, L. D. Marini, and A. Russo, "Serendipity virtual elements for general elliptic equations in three dimensions," *Chinese Annals of Mathematics. Series B*, vol. 39, no. 2, p. 315 – 334, 2018.

[19] L. Beirão da Veiga, F. Brezzi, F. Dassi, L. Marini, and A. Russo, "Lowest order virtual element approximation of magnetostatic problems," *Computer Methods in Applied Mechanics and Engineering*, vol. 332, p. 343 – 362, 2018.

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[21] L. Beirão da Veiga, A. Chernov, L. Mascotto, and A. Russo, "Exponential convergence of the hp virtual element method in presence of corner singularities," *Numerische Mathematik*, vol. 138, no. 3, p. 581 – 613, 2018.

[22] L. Beirão da Veiga, F. Dassi, and A. Russo, "High-order virtual element method on polyhedral meshes," *Computers and Mathematics with Applications*, vol. 74, no. 5, p. 1110 – 1122, 2017.

[23] L. Beirão da Veiga, F. Brezzi, F. Dassi, L. Marini, and A. Russo, "Virtual element approximation of 2D magnetostatic problems," *Computer Methods in Applied Mechanics and Engineering*, vol. 327, p. 173 – 195, 2017.

[24] L. Beirão Da Veiga, F. Brezzi, L. D. Marini, and A. Russo, "Serendipity face and edge VEM spaces," *Atti della Accademia Nazionale dei Lincei, Classe di Scienze Fisiche, Matematiche e Naturali, Rendiconti Lincei Matematica e Applicazioni*, vol. 28, no. 1, p. 143 – 180, 2017.

[25] L. Beirão Da Veiga, C. Lovadina, and A. Russo, "Stability analysis for the virtual element method," *Mathematical Models and Methods in Applied Sciences*, vol. 27, no. 13, p. 2557 – 2594, 2017.

[26] A. Ortiz-Bernardin, A. Russo, and N. Sukumar, "Consistent and stable meshfree galerkin methods using the virtual element decomposition," *International Journal for Numerical Methods in Engineering*, vol. 112, no. 7, p. 655 – 684, 2017.

[27] L. Beirão Da Veiga, A. Chernov, L. Mascotto, and A. Russo, "Basic principles of hp virtual elements on quasiuniform meshes," *Mathematical Models and Methods in Applied Sciences*, vol. 26, no. 8, p. 1567 – 1598, 2016.

[28] L. Beirão da Veiga, F. Brezzi, L. Marini, and A. Russo, "Serendipity nodal VEM spaces," *Computers and Fluids*, vol. 141, p. 2 – 12, 2016.

[29] L. Beirão Da Veiga, F. Brezzi, L. D. Marini, and A. Russo, "Mixed virtual element methods for general second order elliptic problems on polygonal meshes," *ESAIM: Mathematical Modelling and Numerical Analysis*, vol. 50, no. 3, p. 727 – 747, 2016.

[30] L. Beirão Da Veiga, F. Brezzi, L. Marini, and A. Russo, "Virtual element method for general second-order elliptic problems on polygonal meshes," *Mathematical Models and Methods in Applied Sciences*, vol. 26, no. 4, p. 729 – 750, 2016.

[31] L. B. Beirão da Veiga, F. Brezzi, L. Marini, and A. Russo, "$h(div)$ and $h(curl)$-conforming virtual element methods," *Numerische Mathematik*, vol. 133, no. 2, p. 303 – 332, 2016.

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[33] I. Perugia, P. Pietra, and A. Russo, "A plane wave virtual element method for the Helmholtz problem," *ESAIM: Mathematical Modelling and Numerical Analysis*, vol. 50, no. 3, p. 783 – 808, 2016.

[34] A. Russo, "On the choice of the internal degrees of freedom for the nodal virtual element method in two dimensions," *Computers and Mathematics with Applications*, vol. 72, no. 8, p. 1968 – 1976, 2016.

[35] A. Cangiani, G. Manzini, A. Russo, and N. Sukumar, "Hourglass stabilization and the virtual element method," *International Journal for Numerical Methods in Engineering*, vol. 102, no. 3-4, p. 404 – 436, 2015.

[36] A. Russo, S. Serra-Capizzano, and C. Tablino-Possio, "Quasi-optimal preconditioners for finite element approximations of diffusion dominated convection-diffusion equations on (nearly) equilateral triangle meshes," *Numerical Linear Algebra with Applications*, vol. 22, no. 1, p. 123 – 144, 2015.

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[44] S. Bianco, F. Gasparini, A. Russo, and R. Schetti, "A new method for RGB to XYZ transformation based on pattern search optimization," *IEEE Transactions on Consumer Electronics*, vol. 53, no. 3, p. 1020 – 1028, 2007.

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[48] M. Arioli, E. Noulard, and A. Russo, "Stopping criteria for iterative methods: Applications to PDE's," *Calcolo*, vol. 38, no. 2, p. 97 – 112, 2001.

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[57] L. P. Franca and A. Russo, "Mass lumping emanating from residual-free bubbles," *Computer Methods in Applied Mechanics and Engineering*, vol. 142, no. 3-4, p. 353 – 360, 1997.

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[64] A. Russo, "Bubble stabilization of finite element methods for advection-diffusion problems," *Transport Theory and Statistical Physics*, vol. 25, no. 3-5, p. 395 – 408, 1996.

[65] A. Russo, "A posteriori error estimators for the stokes problem," *Applied Mathematics Letters*, vol. 8, no. 2, p. 1 – 4, 1995.

[66] R. Zanino and A. Russo, "Finite element fluid modeling of a poloidal divertor," *Contributions to Plasma Physics*, vol. 34, no. 2-3, p. 410 – 414, 1994.

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Milano, December 12, 2024