Curriculum Vitae

Andrea Moiola

12th January 2021

1 Personal data

First name	Andrea
Last name	Moiola
Current position	Associate professor
Work address	Dipartimento di Matematica "F. Casorati", Università degli Studi di Pavia, Via Ferrata 5, 27100 Pavia, Italy
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Scientific IDs:

MathSciNet	931770
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ResearcherID	K-6182-2015 (Web of Science/Publons)
Scopus Author ID	37049069900
Google Scholar	https://scholar.google.com/citations?user=jZXSlW0AAAAJ

2 Employment

- Since July 2020 I am associate professor in numerical analysis at the Department of Mathematics "F. Casorati" of the University of Pavia, Italy. I have obtained the national habilitation in numerical analysis (01/A5) as associate professor (PA, valid 28.3.2017–28.3.2026) and as professor (PO, valid 9.11.2020–9.11.2029).
- From July 2017 to June 2020 I was a "*ricercatore a tempo determinato di tipo B*" (RTDB, equivalent to lecturer/assistant professor) at the Department of Mathematics "F. Casorati" of the University of Pavia.
- From March 2013 to June 2017 I was "senior research fellow" at the Department of Mathematics and Statistics of the University of Reading, UK (permanent position equivalent to lecturer).
- From March 2012 to February 2013, I held a postdoctoral position at the Department of Mathematics and Statistics of the University of Reading under a "Fellowship for prospective researchers" on "Computational wave propagation", funded by the Swiss National Science Foundation (SNSF).[1] During the fellowship I was supervised by Prof. S.N. Chandler-Wilde.
- From September 2008 to November 2011, I was scientific assistant at the Seminar for Applied Mathematics (SAM) of the ETH Zürich, Switzerland. Funded to carry out research on the project "Plane Wave Discontinuous Galerkin" towards a PhD and to carry out teaching duties for undergraduate students.

3 Education

- PhD at ETH Zürich – SAM, Seminar for applied mathematics, 2008–2011

Thesis	Trefftz-discontinuous Galerkin methods for time-harmonic wave problems
Supervisor	Prof. R. Hiptmair
Co-supervisor	Prof. I. Perugia
Viva	15 September 2011
Funding	Swiss National Science Foundation

- Master Degree in Mathematics, University of Pavia (*Laurea specialistica*), 2006–2008, Cinquini–Cibrario prize[2].
- Bachelor Degree in Mathematics, University of Pavia (*Laurea triennale*), 2003–2006.
- Alumnus of Collegio Ghislieri, Pavia, 2003–2008.
- Alumnus of the *Institute for Advanced Study* in Pavia (IUSS), undergraduate internal courses, 2003–2008.

[1] SNSF webpage: http://p3.snf.ch/Project-137294

[2] http://wcm-3.unipv.it/site/home/naviga-per/laureati/premi-di-studio/biografie/articolo12543.html

4 Invited talks

Invited talks at conferences and workshops

- "Interplay of multiscale data assimilation and data science with advanced PDE discretizations", ESI Vienna, 25–29 June, 2018. Part of the ESI programme "Numerical Analysis of Complex PDE Models in the Sciences".
- Oberwolfach workshop on "Space-time Methods for Time-dependent PDEs", 12–18 March 2017.
- "Space-Time Methods for PDEs", RICAM Linz, Austria, 7–11 November 2016.
- LMS–EPSRC Symposium, "Mathematical and Computational Aspects of Maxwell's Equations", Durham, 11–21 July 2016.
- "Computational and Numerical Analysis of Transient Problems in Acoustics, Elasticity, and Electromagnetism", BIRS, Banff, Canada, 17–22 January 2016.
- LMS–EPSRC Symposium, "Building bridges: connections and challenges in modern approaches to numerical PDEs", Durham, 8–16 July 2014.
- "British Computational PDEs Colloquium: New Trends", ICMS, Edinburgh, 23–24 January 2014.
- Oberwolfach workshop on "Computational electromagnetism and acoustics", 20–26 January 2013.
- Workshop on: "Non-Standard Numerical Methods for PDE's", Pavia, Italy, 29 June–2 July 2010.
- Oberwolfach workshop on "Computational electromagnetism and acoustics", 14–20 February 2010.

Invited contributions to minisymposia at conferences

- XXI UMI conference ("Unione Matematica Italiana"), Pavia, 2–7 September 2019.
- ICIAM 2019, Valencia, 15–19 July 2019.
- MAFELAP 2019, Brunel, 17–21 June 2019.
- WONAPDE 2019, Concepción, Chile, 21–25 January, 2019 (two minisymposia).
- "Inverse Problems: Modeling and Simulation" conference, Malta, 21–25 May 2018.
- Equadiff, Bratislava, 24–28 July 2017.
- International Conf. on Domain Decomposition Methods, DD XXIV, Svalbard, Norway, 6–10 February 2017.
- MAFELAP 2016, Brunel university, UK, 14–17 June 2016.
- XXIV CEDYA / XIV CMA conference, Cadiz, Spain, 8–12 June 2015.
- MAFELAP 2013, Brunel university, UK, 10–14 June 2013.
- 3rd European Seminar on Computing (ESCO2012), Pilsen, Czech Republic, 25–29 June 2012.
- DSPDEs'10, Barcelona, 31 May–4 June, 2010.
- WONAPDE 2010, Concepción, Chile, 11–15 January, 2010.
- MAFELAP 2009, Brunel university, UK, 9–12 June, 2009.

Invited research seminars

- Department of Mathematics, Sapienza University, Roma, 14 May 2019.
- Oldenburg, 15 November 2018.
- Bologna, 20 June 2018.
- SBAI, Sapienza University, Roma, 21 March 2018.
- SAM, ETH Zürich, 2 November 2016.
- Hamburg University of Technology, 23 June 2016.
- Laboratoire Poems, ENSTA-INRIA-CNRS, Palaiseau, 18 November 2015.
- Durham, 29 April 2015.
- Bath, 20 February 2015.
- Oxford, 15 May 2014.
- University of Vienna, 24 March 2014.
- Collége de France, Paris, 17 May 2013.
- Leicester, 18 October 2012.
- Strathclyde, 17 April 2012.
- Bath, 23 March 2012.
- Reading, 12 March 2012.
- Chinese University of Hong Kong, 9 September 2009.

5 Other presentations

Contributed talks at conferences

- GNCS meeting, Montecatini, 11-13 February 2020.
- "Waves 2019", Vienna, 25–30 August 2019.
- "New directions in numerical computation", Oxford, 25–28 August 2015.
- "Waves 2015", Karlsruhe, 20–24 July 2015.
- "Boundary & finite element methods for high frequency scattering problems", Reading, 15–16 Dec. 2014.
- "Waves 2013", Gammarth, Tunisia, 3–7 June 2013.
- InnoWave, Nottingham, 3–7 September 2012.
- Finite Element Fair/Rodeo/Circus, Paris, 3–4 June 2011.
- "Highly Oscillatory Problems: From Theory to Applications", Cambridge, 12–17 September 2010.
- Swiss Numerics Colloquium, Basel, 24 April 2009.

Other talks at research seminars

- IMATI–CNR, Pavia, 12 April 2019.
- PDE seminar, Reading, 18 October 2016.
- Numerical analysis research afternoon, Reading, 30 October 2013.
- Brain Embodiment Lab, Reading, 25 September 2013.
- Waves group meeting, Reading, 26 March 2013.
- Reading departmental analysis day, 19 October 2012.
- Pro*Doc summer retreat, Disentis, 18–21 August 2010.

Poster presentations

- "Wave Propagation and Scattering, Inverse Problems and Applications in Energy and the Environment", RICAM Linz, Austria, 21–25 November 2011.

6 Grants and invitations

Grants

- INdAM–GNCS research project 2019, "*Metodi numerici non-standard per PDEs: efficienza, robustezza e affidabilità*", 6 100€, PI.[3]
- ANVUR "*Finanziamento delle attività base di ricerca*" (FFABR), 2017, 3 000€.[4]
- EPSRC (British Engineering and Physical Sciences Research Council) First Grant EP/N019407/1 on "Discretisations of sign-definite formulations for the Helmholtz equation", 2016–2018, £ 100 000.
  Ranked first in November 2015 EPSRC Mathematics Prioritisation Panel Meeting[5].
  (The grant was transferred to S.N. Chandler-Wilde when I left UK.)
- London Mathematical Society Conference Grant–Scheme 1, to organise a workshop on "Recent advances in discontinuous Galerkin methods" at Reading, 2016, with T. Pryer (£ 1 300).
- London Mathematical Society Conference Grant–Scheme 1, to organise a workshop on "Recent advances in discontinuous Galerkin methods" at Reading, 2014, with A. Chernov and T. Pryer (£ 1 800).
- International personal research fellowship "Fellowship for prospective researchers" at the Department of Mathematics and Statistics of the University of Reading, March 2012–February 2013. Funded by the Swiss National Science Foundation (42 000 Swiss francs).
- Exchange Ph.D. student at the Chinese University of Hong Kong under the "Global Scholarship Programme for Research Excellence—CNOOC Grants", September–October 2009 (HK$ 15 000, ∼€ 1 470).
- Several small travel grants to attend conferences (WONAPDE 2010 in Concepción, DSPDEs in Barcelona, ESF conference in Cambridge, two OWLG grants for workshops in Oberwolfach, CIME in Cetraro, UoR "Research Travel Grant" for CEDYA in Cadiz, IMA small grant for workshop in Banff).

[3] https://www.altamatematica.it/gncs/archivi/storico-progetti-di-ricerca
[4] http://www.anvur.org/index.php?option=com_content&view=article&id=1204
[5] http://gow.epsrc.ac.uk/NGBOViewPerson.aspx?PersonId=-525355

Participation in other projects and grants

- GNCS research project 2020, "*Aspetti teorici e numerici di tecniche innovative per la risoluzione efficiente di PDE*". PI: L. Tamellini.
- PRIN 2017 NA-FROM-PDEs, "Numerical analysis for full and reduced order methods for the efficient and accurate solution of complex systems governed by partial differential equations'. PI: G. Rozza. 2019–2022.
- Visiting Researcher on the EPSRC grant EP/S01375X/1, "Integral equations on fractal domains: analysis and computation", August 2019–July 2021. PI: D.P. Hewett (UCL).
- GNCS research project 2018, "*Metodi non conformi per equazioni alle derivate parziali*". PI: A. Veeser.
- SNSF ProDoc grant 124883, "Plane wave discontinuous Galerkin methods", 2009–2011. PI: R. Hiptmair.

Invited research visits and scientific programmes

- SAM, ETH Zürich, Switzerland, 1–4 November 2016, 29 May–1 June 2018, 24–29 June 2019.
- Sapienza University, Roma, 13–16 May 2019.
- Pontifica Universidad Católica de Chile, Santiago, 4–8 February 2019.
- University of Bath, 7–11 January 2019.
- Erwin Schroedinger Institute (ESI) thematic programme, Vienna, 25 June–20 July 2018.
- University of Reading, 23–27 April and 4–8 June 2018.
- University of Vienna, Austria, 24–28 March and 23–27 June 2014, 7–16 April 2016, invited by I. Perugia.
- Laboratório Nacional de Computação Científica, Petropolis (Brazil), 23–27 Jan. 2012, invited by F. Valentin.
- University College of London, 11–13 April 2011, invited by T. Betcke.
- University of Reading, 5–8 April 2011, invited by S.N. Chandler-Wilde.
- University of Reading, 8–10 September 2010, invited by T. Betcke.

7 Publications

Refereed journal papers

[1] P. Bansal, A. Moiola, I. Perugia, Ch. Schwab, *Space–time discontinuous Galerkin approximation of acoustic waves with point singularities*, IMA J. Numer. Anal., 2020. DOI: 10.1093/imanum/draa088.

[2] A. Gibbs, S.N. Chandler-Wilde, S. Langdon, A. Moiola, *A high frequency boundary element method for scattering by a class of multiple obstacles*, IMA J. Numer. Anal., 2020. DOI: 10.1093/imanum/draa025.

[3] K. McCusker, C.D. Westbrook, A. Moiola, *Analysis of the internal electric fields of pristine ice crystals and aggregate snowflakes, and their effect on scattering*, J. Quant. Spectrosc. Radiat. Transf. (JQSRT), 230, June 2019, pp. 155–171. DOI: 10.1016/j.jqsrt.2019.04.019.

[4] A. Moiola, E.A. Spence, *Acoustic transmission problems: wavenumber-explicit bounds and resonance-free regions*, Math. Models Methods Appl. Sci. (M3AS), 29(02) 2019, pp. 317–354. DOI: 10.1142/S0218202519500106.

[5] G.C. Diwan, A. Moiola, E.A. Spence, *Can coercive formulations lead to fast and accurate solution of the Helmholtz equation?*, J. Comput. Appl. Math., 352, 2019, pp. 110–131. DOI: 10.1016/j.cam.2018.11.035.

[6] A. Moiola, I. Perugia, *A space–time Trefftz discontinuous Galerkin method for the acoustic wave equation in first-order formulation*, Numerische Mathematik, 138(2) 2018, pp. 389–435. DOI:10.1007/s00211-017-0910-x.

[7] D.P. Hewett, A. Moiola, *A note on properties of the restriction operator on Sobolev spaces*, Journal of Applied Analysis, 23(1) 2017, pp. 1-8. DOI:10.1515/jaa-2017-0001.

[8] S.N. Chandler-Wilde, D.P. Hewett, A. Moiola, *Sobolev spaces on non-Lipschitz subsets of $\mathbb{R}^n$ with application to boundary integral equations on fractal screens*, Integr. Equat. Oper. Th., 87(2) 2017, pp. 179–224. DOI:10.1007/s00020-017-2342-5.

[9] D.P. Hewett, A. Moiola, *On the maximal Sobolev regularity of distributions supported by subsets of Euclidean space*, Analysis and Applications, 15(5) 2017, pp. 731–770. DOI:10.1142/S021953051650024X.

[10] F. Kretzschmar, A. Moiola, I. Perugia, S.M. Schnepp, *A priori error analysis of space-time Trefftz discontinuous Galerkin methods for wave problems*, IMA J. Numer. Anal., 36(4) 2016, pp. 1599–1635. DOI:10.1093/imanum/drv064.

[11] R. Hiptmair, A. Moiola, I. Perugia, *Plane wave discontinuous Galerkin methods: exponential convergence of the hp-version*, Found. Comput. Math., 16(3) 2015, pp. 637–675. DOI:10.1007/s10208-015-9260-1.

[12] S.N. Chandler-Wilde, D.P. Hewett, A. Moiola, *Interpolation of Hilbert and Sobolev spaces: Quantitative estimates and counterexamples*, Mathematika, 61(2) 2015, pp. 414–443. DOI:10.1112/S0025579314000278.

[13] A. Moiola, E.A. Spence, *Is the Helmholtz equation really sign-indefinite?*, SIAM Review, 56(2) 2014, pp. 274–312. DOI:10.1137/120901301.

[14] C.J. Howarth, P.N. Childs, A. Moiola, *Implementation of an interior point source in the ultra weak variational formulation through source extraction*, J. Comput. Appl. Math., 27 2014, pp. 295–306. DOI:10.1016/j.cam.2014.04.017.

[15] R. Hiptmair, A. Moiola, I. Perugia, Ch. Schwab, *Approximation by harmonic polynomials in star-shaped domains and exponential convergence of Trefftz hp-dGFEM*, ESAIM: Math. Model. Numer. Anal. (M2AN), 48(3) 2014, pp. 727–752. DOI:10.1051/m2an/2013137.

[16] R. Hiptmair, A. Moiola, I. Perugia, *Trefftz discontinuous Galerkin methods for acoustic scattering on locally refined meshes*; Appl. Numer. Math., 79 2014, pp. 79–91. DOI:10.1016/j.apnum.2012.12.004

[17] A. Moiola, *Plane wave approximation in linear elasticity*; Applicable Analysis, 92(6) 2013, pp. 1299–1307. DOI:10.1080/00036811.2012.671300.

[18] R. Hiptmair, A. Moiola, I. Perugia, *Error analysis of Trefftz-discontinuous Galerkin methods for the time-harmonic Maxwell equations*; Math. Comput., 82(281) 2013, pp. 247–268. DOI:10.1090/S0025-5718-2012-02627-5.

[19] R. Hiptmair, A. Moiola, I. Perugia, *Stability results for the time-harmonic Maxwell equations with impedance boundary conditions*; Math. Models Methods Appl. Sci (M3AS), 21(11) 2011, pp. 2263–2287. DOI:10.1142/ S021820251100574X.

[20] A. Moiola, R. Hiptmair, I. Perugia, *Plane waves approximation of homogeneous Helmholtz solutions*; Z. Angew. Math. Phys, 62(5) 2011, pp. 809–837. DOI:10.1007/s00033-011-0147-y.

[21] A. Moiola, R. Hiptmair, I. Perugia, *Vekua theory for the Helmholtz operator*; Z. Angew. Math. Phys, 62(5) 2011, pp. 779–807. DOI:10.1007/s00033-011-0142-3.

[22] R. Hiptmair, A. Moiola, I. Perugia, *Plane wave discontinuous Galerkin methods for the 2D Helmholtz equation: analysis of the p-version*; Siam J. Numer. Anal., 49(1) 2011, pp. 264–284. DOI:10.1137/090761057.

Refereed book chapters

[23] R. Hiptmair, A. Moiola, I. Perugia, *A survey of Trefftz methods for the Helmholtz equation*. In: G.R. Barrenechea, F. Brezzi, A. Cangiani, E.H. Georgoulis (editors), "Building Bridges: Connections and Challenges in Modern Approaches to Numerical Partial Differential Equations", Springer Lect. Notes Comput. Sci. Eng., 2016, pp. 237–278. DOI:10.1007/978-3-319-41640-3_8.

Reports and preprints

[24] L.M. Imbert-Gérard, A. Moiola, P. Stocker, *A space-time quasi-Trefftz DG method for the wave equation with piecewise-smooth coefficients*, arXiv:2011.04617, 2020 (submitted).

[25] S.N. Chandler-Wilde, D.P. Hewett, A. Moiola, J. Besson, *Boundary element methods for acoustic scattering by fractal screens*, arXiv:1909.05547, 2019 (submitted).

[26] A. Caetano, D.P. Hewett, A. Moiola, *Density results for Sobolev, Besov and Triebel–Lizorkin spaces on rough sets*, arXiv:1904.05420, 2019 (submitted).

[27] A. Gibbs, S. Langdon, A. Moiola, *Numerically stable computation of embedding formulae for scattering by polygons*, arXiv:1805.08988, 2018 (submitted).

[28] A. Moiola, *Approximation properties of plane wave spaces and application to the analysis of the plane wave discontinuous Galerkin method*; SAM report 2009-06, ETH Zürich.

Conference proceedings

[29] N. Wulbusch, R. Roden, A. Chernov, M. Blau, A. Moiola, *On the impact of the shape of the artificial boundary in exterior Helmholtz problems*, proceedings of 23rd International Congress on Acoustics (ICA), Aachen, pp. 7504–7511.

[30] S.N. Chandler-Wilde, D.P. Hewett, A. Moiola, *Boundary element methods for scattering by fractal screens*, proceedings of Waves 2019, Vienna, pp. 78–79. DOI:10.34726/waves2019

[31] P. Bansal, A. Moiola, I. Perugia, C. Schwab, *Space-time discontinuous Galerkin method for the wave equation in polygonal domains*, proceedings of Waves 2019, Vienna, pp. 296–297. DOI:10.34726/waves2019

[32] A. Gibbs, S. Langdon, A. Moiola, *Stable implementation of embedding formulae for computation of far field patterns*, proceedings of Waves 2017, Minneapolis, USA, pp. 157–158.

[33] A. Moiola, *Space–time Trefftz discontinuous Galerkin methods for wave problems*; in Mathematisches Forschungsinstitut Oberwolfach Report 15/2017, 2017, pp. 913–915. DOI:10.4171/OWR/2017/15.

[34] A. Moiola, *Trefftz discontinuous Galerkin methods on unstructured meshes for the wave equation*, arXiv:1505.00120, 2015 (proceedings of the XXIV CEDYA / XIV CMA conference, pp. 387–395).

[35] S.N. Chandler-Wilde, D.P. Hewett, A. Moiola, *Function spaces for integral equations on fractal domains*, proceedings of Waves 2015, Karlsruhe, Germany, pp. 73–74.

[36] A. Gibbs, S.N. Chandler-Wilde, S. Langdon, A. Moiola, *Hybrid numerical asymptotic approximation for multiple scattering problems*, proceedings of Waves 2015, Karlsruhe, Germany, pp. 130–131.

[37] F. Kretzschmar, A. Moiola, I. Perugia, S.M. Schnepp, *The space-time Trefftz discontinuous Galerkin method for the wave equation*, proceedings of Waves 2015, Karlsruhe, Germany, pp. 140–141.

[38] A. Moiola, E.A. Spence, *Is the Helmholtz equation really sign-indefinite?*, proceedings of Waves 2013, Gammarth, Tunisia, pp. 245–246.

[39] R. Hiptmair, A. Moiola, I. Perugia, Ch. Schwab, *Trefftz-discontinuous Galerkin methods: hp-version and exponential convergence*, proceedings of Waves 2013, Gammarth, Tunisia, pp. 359–360.

[40] A. Moiola, *A sign-definite formulation of the Helmholtz impedance problem*; in Mathematisches Forschungsinstitut Oberwolfach Report 03/2013, 2013, pp. 210–214. DOI:10.4171/OWR/2013/03.

[41] A. Moiola, *Approximation by plane waves*; in Mathematisches Forschungsinstitut Oberwolfach Report 10/2010, 2010, pp. 479–482. DOI:10.4171/owr/2010/10.

Thesis

[42] A. Moiola, *Trefftz-discontinuous Galerkin methods for time-harmonic wave problems*; Ph.D. dissertation, 2011, Seminar for applied mathematics, ETH Zürich. DOI:10.3929/ethz-a-006698757. Available at `http://e-collection.library.ethz.ch/view/eth:4515`.

Preprints are available on `https://arxiv.org/search/?searchtype=author&query=Moiola`
The accepted or published versions of some of the papers are available on:
`http://centaur.reading.ac.uk/view/creators/90005242.html`
`https://iris.unipv.it/browse?type=author&authority=rp11759`

8 Teaching and supervision

Courses

- Autumn terms 2017, 2018, 2019 and 2020, "*Modellistica numerica*" (numerical modelling), third-year undergraduate mathematics students, Pavia.
- Autumn terms 2019 and 2020, "*Complementi di matematica*" (numerical methods for PDEs), engineering, master students, Pavia. Together with L.D. Marini.
- Spring term 2020, "*Advanced numerical methods for PDEs*", mathematics, master students, Pavia. Together with F. Brezzi and G. Sangalli.

- Spring term 2019, "*Metodi numerici avanzati per le equazioni alle derivate parziali*" (advanced numerical methods for PDEs), mathematics, master students, Pavia. Together with G. Sangalli.
- Spring terms 2016 and 2017, "*Numerical methods for financial engineering*", master students at the ICMA Centre of the Henley Business School in Reading.
- Autumn terms 2013, 2014, 2015 and 2016, "*Vector calculus*", second-year mathematics students at Reading (100∼160 students).

Student evaluation reports: https://sisvaldidat.unifi.it/ (in Italian).

From January 2014 to July 2015 I have attended the Academic Practice Programme (APP) at the University of Reading and in October 2015 I have been recognised as Fellow of the Higher Education Academy (HEA).

Lecture notes and teaching material available online

- Numerical modelling (in Italian), https://euler.unipv.it/moiola/T/MN2020/MN2020.html
- Scattering of time-harmonic acoustic waves: Helmholtz equation, boundary integral equations and BEM, https://euler.unipv.it/moiola/T/ANMPDE2020/ANMPDE2020.html
- Vector calculus, https://euler.unipv.it/moiola/ReaDG/VC2016/VC2016.html

Tutorial series

Term/Semester:	Course:	Students:	
Spring 2017	*linear algebra*	mathematics	Reading
Autumn 2016	*linear algebra*	mathematics	Reading
Spring 2016	*real analysis*	mathematics	Reading
Spring 2015	*algebra*	mathematics	Reading
Autumn 2014	*foundation of mathematics*	mathematics	Reading
Spring 2014	*real analysis 1*	mathematics	Reading
Autumn 2013	*foundation of mathematics*	mathematics	Reading
Autumn 2012&Spring 2013	*algebra 1*	mathematics	Reading
Autumn 2010	*numerical methods for CSE*	computer science & CSE	ETH Zürich
Spring 2010	*numerical mathematics*	mechanical engineering	ETH Zürich
Autumn 2008	*linear algebra*	civil engineering	ETH Zürich
Autumn 2006 & 2007	*mathematical analysis and informatics*	biotechnology	Pavia
Autumn 2006 & 2007	"pre-class" of *mathematics*	biology	Pavia

For some of these courses, I have been in charge of the design of extensive teaching material, the preparation, the supervision and the grading of the exams.

Supervision

- G.C. Diwan, postdoctoral research assistant, Reading 2016–2017. Now Acoustic Engineer at FT Technologies.
- A. Gibbs, PhD student, Reading, 2013–2017, thesis on "Numerical methods for high frequency scattering by multiple obstacles", co-supervised with S. Langdon and S.N. Chandler-Wilde. Now postdoc at UCL.
- K. McCusker, PhD student, Reading, 2016–2020, thesis on "Fast, approximate methods for electromagnetic wave scattering by complex ice crystals and snowflakes", main supervisor C. Westbrook (Meteorology). Now postdoc at Reading.
- P. Stocker, visiting PhD student, Pavia, October 2019–February 2020.
- S. Gómez, PhD student, Pavia, from 2020.
- F. Locatelli, PhD student, Pavia, from 2020.
- Master in mathematics final dissertations (*Laurea magistrale*), Pavia:
  - F. Locatelli, "*Migrazione di CO2 in strutture geologiche profonde: modelli e metodi numerici*", 2020.
- BSc in mathematics final dissertations (*Laurea triennale*), Pavia:
  - A. Kushova, "*Calcolo dello spettro dell'operatore di Schroedinger senza risoluzione di problemi agli autovalori*", 2018;
  - A. Massimini, "*Modellizzazione degli tsunami: il metodo aggiunto per il raffinamento della griglia computazionale*", 2019;
  - M. Silvestri, "*Approssimazione numerica delle figure di Chladni tramite metodo spettrale*", 2019;
  - U. Zerbinati, "Second order finite difference methods for the wave equation with Dirichlet boundary conditions", 2020;
  - N. Galante, "*Un'analisi a posteriori per il metodo degli elementi finiti*", 2020;
  - E. Cerri, "*Quantificazione dell'incertezza per un problema di diffusione*", 2020.
  - M. Carcano, "*Analisi di alcuni modelli di reazione e diffusione per la dinamica delle popolazioni*", 2020.

  - S. Regola, "*Onde acustiche: metodi numerici per la risoluzione dell'equazione di Helmholtz*", 2020.
- Between 2013 and 2017 at Reading I have supervised an MMath fourth-year project and 14 BSc third-year projects. I have also been personal tutor of 22 undergraduate students.

PhD student examination

- S. Fragapane, "Regularity and asymptotics for p-Laplace type operators in fractal and pre-fractal domains", Roma, advisor M.A. Vivaldi, 2018, external examiner.
- L. Swift, "Geometrically unfitted finite element methods for the Helmholtz equation", UCL, advisor E. Burman, 2017, external examiner.
- A. Reinarz, "Sparse space-time boundary element methods for the heat equation", Reading, advisor A. Chernov, 2015, internal examiner.

I am member of the faculty board (*collegio dei docenti*) of the UniPv–USI "International PhD Program in Computational Mathematics and Decision Sciences" (`http://compmat.unipv.it/`). I have also been in the monitoring committee for several PhD students at Reading.

9 Other activities

Organisation of scientific events

- Minisymposium on "Analysis and numerical methods for wave problems in heterogeneous media and complicated domains", at the Waves 2019 conference, 25–30 August 2019.
- Part of the local organising committee of HOFEIM 2019, High-Order Finite Element and Isogeometric Methods Workshop, Pavia, 28–31 May 2019.
- Workshop on "Wave propagation in complex domains", UCL, 30 March 2017. Co-organised with D.P. Hewett and S.N. Chandler-Wilde.
- "ReaDG" workshop on "Recent advances in discontinuous Galerkin methods", Reading, 13 June 2016. Supported by the London Mathematical Society, co-organised with T. Pryer.
- Minisymposium on "Wave-based discretisations" at the Waves 2015 conference, Karlsruhe, 20–24 July 2015. Co-organised with D.P. Hewett.
- "ReaDG" workshop on "Recent advances in discontinuous Galerkin methods", Reading, 11–12 September 2014. Supported by the London Mathematical Society, co-organised with A. Chernov and T. Pryer.

Other conferences and schools attended

- HOFEIM 2019, High-Order Finite Element and Isogeometric Methods Workshop, Pavia, 28–31 May 2019.
- IGA 2017, International Conference on Isogeometric Analysis, Pavia, 11–13 September 2017.
- IperPV2017, the XVII Italian Meeting on Hyperbolic Equations, Pavia, 6–8 September 2017.
- POEMS 2017, Polytopal Element Methods in Mathematics and Engineering, Milano, 5–7 July 2017.
- 7th meeting of Reading-Bath-Cardiff network on gener. solutions for nonlinear PDEs, Reading 13 June 2017.
- Mathematics in the Spirit of Joe Keller, Turing Gateway to Mathematics, Cambridge, 2–3 March 2017.
- Modern topics in nonlinear PDEs and geometric analysis, LMS–CMI research school, Reading, 4–8 July 2016.
- 3rd International Conference on Neural Field Theory, Reading, 16–18 June 2014.
- CIME course on Computational Electromagnetism, Cetraro, Italy, 9–14 June 2014.
- Recent Advances in Nonlinear PDEs and Calculus of Variations, Reading, 12–14 February 2014.
- Analysis of PDEs, symposium in honour of V. Maz'ya, Liverpool, 16–17 December 2013.
- From Spectral Gaps to Particle Filters workshop, Reading, 17–18 September 2013.
- Data Assimilation and Inverse Problems summer school, Reading, 22–26 July 2013.
- CNS 2013, Computational Neurosciences Meeting, Paris, 13–18 July 2013.
- LMS–EPSRC short course on Modern Nonlinear PDE Methods in Fluid Dynamics, Reading, 8–12 July 2013.
- NETT Neural Engineering summer school, Nottingham, 1–5 July 2013.
- Meeting on Riemann-Hilbert problems and their applications, Reading, 29–30 May 2013.
- SIAM–UKIE annual meeting, Reading, January 8, 2013.

- Zürich Summer School 2012 on "A Posteriori Error Control and Adaptivity", 20–24 August 2012.
- "Mathmondes 2012", French-British Network on Waves, Reading, 9–10 July 2012.
- Conference in honour of Nancy Nichols' 70th birthday, Reading, 2–3 July 2012.
- ICMS Workshop on "BVPs for linear elliptic and integrable PDEs", Edinburgh, 28 May–1 June 2012 (invited).
- Second international conference on Neural Field Theory, Reading, 19–21 April 2012.
- Numerical analysis postgraduate seminar day, Reading, 30 March 2012.
- Colloquium on "Analysis and numerics of PDEs", in memory of Enrico Magenes, Pavia, 2–4 November 2011.
- Workshop on "Advances in computational wave propagation", UCL, London, 2–3 September 2011 (invited).
- Pro*Doc summer retreat, Disentis, 17–19 August 2011.
- Swiss Numerics Colloquium, Università della Svizzera Italiana, Lugano, 6 May, 2011.
- "Numerical methods for hyperbolic equations, recent trends and future directions", 18–19 February 2011.
- "Next generation numerical methods for comput. wave propagation", Cambridge, 17–18 Sept. 2010 (invited).
- Zürich Summer School on "Sparse tensor discretisations of high-dimensional problems", 23–27 August 2010.
- ACE'10–6th Workshop on Advanced Computational Electromagnetics, ETH Zürich, 5–7 July 2010.
- Swiss Numerics Colloquium, ETH Zürich, 16 April 2010.
- Pro*Doc summer retreat, Disentis, 16–19 August 2009.

Visitors hosted (in Pavia)

- D. Huybrechs, 13–17 January 2020.
- P. Stocker, October 2019–February 2020.
- A. Gibbs, 12–15 November 2019.
- C. Jerez-Hanckes, 23–25 October 2018.
- D.P. Hewett, 16–19 April 2018.
- E.A. Spence, 12–16 February 2018.

Professional affiliation

- SIAM, Society for Industrial and Applied Mathematics, since 2010.
  Computational Science and Engineering (CSE) and Analysis of PDEs (APDE) activity groups.
- GNCS, Gruppo Nazionale di Calcolo Scientifico of the Istituto Nazionale di Alta Matematica (INdAM).
- UMI, Unione Matematica Italiana, since 2019.

Refereeing activity

Advances in Computational Mathematics (ACOM),
Applied Mathematics and Computation (AMC),
Applied Numerical Mathematics (APNUM),
BIT Numerical Mathematics,
Cogent Mathematics,
Communications in Computational Physics (CiCP),
Communications in Mathematical Sciences (CMS),
Computational and Applied Mathematics (COAM),
Computers and Mathematics with Applications (CAMWA),
Computer Methods in Applied Mechanics and Engineering (CMAME),
Computer Physics Communications (CPC),
Engineering Analysis with Boundary Elements (EABE),
IMA Journal of Applied Mathematics (IMA-MAT),
IMA Journal of Numerical Analysis (IMA-JNA),
Journal of Computational Physics (JCP),
Journal of Computational and Applied Mathematics (JCAM),
Journal of Computational Mathematics,
Journal of Engineering Mathematics (ENGI),
Journal of Integral Equations and Applications (JIEA),
Journal of Mathematical Analysis and Applications (JMAA),

Journal of Scientific Computing (JSC/JOMP),
Mathematical Models and Methods in Applied Sciences (M3AS),
Mathematical Modelling and Numerical Analysis (M2AN),
Mathematics of Computation (Math. Comp.),
Numerical Algorithms (NUMA),
Numerical Mathematics: Theory, Methods and Applications (NMTMA),
Numerical Methods for Partial Differential Equations (NMPDE),
Numerische Mathematik (Numer. Math.),
Sampling Theory in Signal and Image Processing (STSIP),
SIAM Journal on Numerical Analysis (SINUM),
SMAI Journal of Computational Mathematics (SMAI-JCM)
Transactions of Mathematics and Its Applications,
Wave Motion (WaMot),
Zeitschrift für Angewandte Mathematik und Physik (ZAMP);

ICOSAHOM conference proceedings,
Waves—international conference on mathematical and numerical aspects of wave propagation proceedings;

Springer Verlag books;

Mathematical Reviews (MR) / MathSciNet;

Fondecyt/Conicyt grants (Chile),
Deutsche Forschungsgemeinschaft (DFG) grants,
London Mathematical Society Bursaries,
Swiss National Science Foundation grants,
STIC Math AmSud.

Selection committees

- Postdoctoral position "Adaptive multi-fidelity methods for forward and inverse UQ of PDEs and ODEs with random coefficients", IMATI-CNR, 12.2020.
- Two postdoctoral position on "Innovative methods for PDEs", Mathematics, Pavia, 10.2020.
- Postdoctoral position "Mathematical methods for the analysis of PDEs on networks", IMATI-CNR, 10.2020.
- Admission to the joint PhD in Mathematics, Universities of Milano Bicocca and Pavia, 9.2020.
- Scholarship on "Computational fluid dynamics in geological structures", Mathematics, Pavia, 7.2020.
- Internal selection committee for the best master dissertation and best PhD dissertation prize "Con.Scienze", Department of Mathematics, University of Pavia, 9.2019 and 9.2020.
- Postdoctoral position on EPSRC grant EP/N019407/1, Reading, 4.2016.

Other responsibilities

I am the departmental representative in the science faculty quality assurance committee[6].

At Reading I have been the departmental representative at the Isaac Newton Institute and scrutineer for the applied maths undergraduate exams.

10 Scientific interests

- Numerical methods for PDEs and integral equations: finite element methods (FEM), discontinuous Galerkin methods (DG), boundary element methods (BEM).
- FEM with non-polynomial basis, Trefftz and quasi-Trefftz methods.
- Computational electromagnetics, computational acoustics, wave propagation.
- Approximation of PDE solutions by special functions.
- Stability and regularity of PDE solutions in polyhedral and non-smooth domains, wavenumber-explicit analysis of time-harmonic boundary value problems, applications of Rellich- and Morawetz-type identities.
- Integral and differential equations modelling wave scattering by rough domains and screens. Sobolev spaces on non-Lipschitz domains and fractals.

[6] http://www-aq.unipv.it/