

Feb 13, 2024

## Curriculum Vitae of Daniele Boffi

### **Contacts**

Daniele Boffi  
Mathematical and Computer Sciences and Engineering Division  
King Abdullah University of Science and Technology  
Thuwal 23955-6900  
Kingdom of Saudi Arabia

email: [daniele.boffi@kaust.edu.sa](mailto:daniele.boffi@kaust.edu.sa)

url: <https://cemse.kaust.edu.sa/people/person/daniele-boffi>

group url: <https://cemse.kaust.edu.sa/numpde>

### **Personal information**

Born in Pavia, Italy, 17 January 1968  
Married with three children

## BASIC INFORMATION

### **Present position**

2019.12.29 – to date: Professor, King Abdullah University of Science and Technology

### **Affiliations**

Member of the Dipartimento di Matematica “F. Casorati”, University of Pavia, Italy

### **Education**

Ph.D. in Mathematics, University of Pavia, 21 November 1996. Thesis title: *Elementi finiti misti per il problema di Stokes* (advisor prof. Franco Brezzi)

Degree in Mathematics (*Laurea in Matematica*), University of Pavia, 21 November 1990 (grade *110/110 e lode*, cum laude, with honors). Thesis title: *Criteri di ampiezza su spazi algebrici* (advisor prof. Maurizio Cornalba)

### **Past positions**

2005.01.01 – on leave Full professor of Numerical Analysis, University of Pavia

2000.10.01 – 2004.12.31: Associate professor of Numerical Analysis, University of Pavia

1995.01.17 – 2000.9.30: Assistant professor (*ricercatore*) of Mathematical Analysis, University of Pavia

1991.11.1 – 1995.10.30: Ph.D. student in Mathematics (joint program at Universities Milano-Pavia-Brescia)

### **Visiting positions**

Here I am only listing visits longer than a week

2019.09.28 – 2019.10.11: Isaac Newton Institute, Cambridge, UK

2019.08.3 – 2019.09.2: Department of Mathematics and System Analysis, Aalto University, Helsinki

2018.08.20 – 2018.09.19: Department of Mathematics and System Analysis, Aalto University, Helsinki

2017.09.12 – 2017.11.10: Department of Mathematics and System Analysis, Aalto University, Helsinki

2016.10.17 – 2016.11.17: Department of Mathematics and System Analysis, Aalto University, Helsinki (host R. Stenberg)

- 2016.09.09 – 2016.10.09: Institut Henri Poincaré, Paris (within the IHP quarter on Numerical Methods for PDEs)
- 2016.01.08 – 2016.01.23: Departamento de Ingeniería Matemática, Universidad de Concepción, Chile (host R. Rodríguez)
- 2014.02.24 – 2014.03.03: Indian Institute of Technology, Kanpur and South Asian University, Delhi (hosts Rathish Kumar and Kapil Sharma)
- 2013.07.08 – 2013.07.19: Indian Institute of Technology, Mumbai and Indian Institute of Science, Bangalore (hosts N. Nataraj and T. Gudi)
- 2011.06.27 – 2011.07.08: University of Buenos Aires, Departamento de Matemática (host R. Durán)
- 2011.08.07 – 2011.08.19: Kunming University, Peking University, Chinese Academy of Sciences, China (hosts J. Xu and J. Hu)
- 2010.10.20 – 2010.11.07: IMA, University of Minnesota, USA (host D.N. Arnold)
- 2009.05.06 – 2009.05.20: IRMAR, Université de Rennes 1, France (hosts M. Costabel and M. Dauge)
- 2008.04.27 – 2008.05.12: ICES, University of Texas at Austin, USA (host L. Demkowicz)
- 2004.05.17 – 2004.05.28: ICES, University of Texas at Austin, USA (host L. Demkowicz)
- 2003.01.20 – 2003.01.31: IRMAR, Université de Rennes 1, France (hosts M. Costabel and M. Dauge)
- 2002.05.01 – 2002.05.31: TICAM, University of Texas at Austin, USA (host L. Demkowicz)
- 1999.10.01 – 1999.10.31: Departamento de Ingeniería Matemática, Universidad de Concepción, Chile (host R. Rodríguez)
- 1998.08.16 – 1999.08.15: Math. Department, Penn State University, USA (host D.N. Arnold)

## RESEARCH

### *Research highlights*

**FEMS FOR MIXED FORMULATIONS AND STOKES PROBLEM.** I've been working on the mathematical analysis of the mixed finite element approximation of several partial differential equations (Stokes problem, in particular). I contributed to the book: D. Boffi, F. Brezzi, M. Fortin “*Mixed Finite Element Methods and Applications*”, Springer Series in Computational Mathematics, Vol. 44, 2013 (extended 2nd edition of Brezzi–Fortin book).

**APPROXIMATION OF EIGENVALUE PROBLEMS AND APPLICATIONS TO ELECTROMAGNETISM.** One of my primary research achievements concerns the methodological study of finite element approximation of eigenvalue problems in mixed form. I contributed to the study of edge finite element approximation of eigenvalue problem arising from Maxwell's equation (discrete compactness). See, in particular, D. Boffi “*Finite element approximation of eigenvalue problems*, Acta Numer., 19, 2010, pp. 1–120.

### *Research interests*

My primary research interests concern with the finite element approximation of partial differential equations. In general, I am working on the finite element approximation of partial differential equations in mixed form. I started during my Ph.D. with the study of **mixed finite elements for Stokes problem**. In particular, I proved the stability for the generalized Hood–Taylor elements in two and three space dimensions, thus giving a final solution to a problem that had been investigated by many researchers, including Bercovier, Pironneau, Verfürth, Stenberg, Brezzi, and Falk.

In 1996, I started working on the application of finite elements to **electromagnetism and eigenvalue problems**. In particular, I made my name with the study of the **discrete compactness property for edge finite elements**. This research topic involved also the analysis of the **discretization of eigenvalue problems in mixed form**, where it has been proved that the classical inf-sup conditions are not the natural hypotheses for the good behavior of the discretized eigenmodes. In 2010 I was invited to write a survey article for Acta Numerica; readers can find there the state of the art of the approximation of eigenvalues and eigenvectors arising from partial differential equations: conforming and nonconforming discretizations, mixed form,

eigenvalue problem in the language of differential forms. Collaborators for this research include F. Brezzi, M. Costabel, M. Dauge, L. Demkowicz, and L. Gastaldi. Some parts of this research have strong connections with the **finite element exterior calculus**.

During the same years, I also investigated other topics related to finite elements. In particular, I studied the approximation properties of various quadrilateral elements, showing, for instance, that serendipity elements can only achieve suboptimal approximation properties when the meshes are not affine. The same drawback has been shown for popular vector-valued finite element (Raviart–Thomas, Brezzi–Douglas–Marini). Collaborators for this research include D.N. Arnold and R.S. Falk.

Starting in 2003, I begun studying **fluid-structure interactions**. I started investigating the **Immersed Boundary Method** (IBM) and, in particular, its finite element version. My main collaborator for this research is L. Gastaldi. We showed how to get rid of Dirac delta function, whose approximation is one of the main issues in the framework of the original finite difference version of the IBM. We presented a model capable to describe simple configurations and we performed a stability analysis for the time marching scheme. We have a code (2D and 3D) that can confirm our theoretical results.

I have written over **100 publications**. According to Google Scholar and Scopus, respectively, my **h-index** is equal to 37 and 26, and the total number of **citations** to my papers is equal to 7647 and 2624, respectively.

### *Conference invitations*

Here I am only listing a selection of main invitations to conferences and minisymposia

- BIRS 24* Invitation to participate in the (by invitation only) workshop “Structured Mesh Methods for Moving Interface and Free Boundary Problems and Applications”, at the Banff International Research Station for Mathematical Innovation and Discovery, Hangzhou, October 20-25, 2024
- WCCM* Minisymposium invitation (organizers Alexander Düster, John A. Evans, Baskar Ganapathysubramanian, Ming-Chen Hsu, Mats Larson, Ernst Rank, Jinhui Yan) within the “16th World Congress on Computational Mechanics/4th Pan American Congress on Computational Mechanics”, Vancouver, July 21-26, 2024
- CMAM-10* Invited speaker at the “10th International Conference on Computational Methods in Applied Mathematics (CMAM-10), Bonn, June 10-14, 2024
- Eccomas* Minisymposium invitation (organizers Kent-Andre Mardal, Paolo Zunino), within the “9th European Congress on Computational Methods in Applied Sciences and Engineering”, Lisbon, June 3-7, 2024
- LACAM 24* Invited speaker at the conference “Latest Advances in Computational and Applied Mathematics\* (LACAM-2024)”, Kerala, February 21-24, 2024
- Wonapde* Two minisymposium invitations (organizers Felipe Lepe, Gonzalo Rivera, Jesus Vellojin and Thomas Führer, Michael Karkulik) within the “Seventh Chilean Workshop on Numerical Analysis of Partial Differential Equations”, Concepción, January 15-19, 2024
- HK 23* Invited speaker at the “International Workshop on Multiscale Model Reduction and Scientific Machine Learning” (Hong Kong, December 4-6, 2023)
- Canuto 23* Invited speaker at the conference “Advances in numerical analysis” (Torino, November 2-4, 2023)
- JCM 2023* Invited speaker at the “International Workshop on Computational Mathematics” (Hangzhou, China, October 16-20, 2023)
- STEM* Invited speaker in the workshop “Saudi STEM Education Summit”, Riyadh, September 19-20, 2023
- NMSP2023* Invited speaker in the workshop “Numerical methods for spectral problems: theory and applications (NMSP2023)” (Hokkaido, Japan, August 26-31, 2023)
- ICIAM 23* Minisymposium invitation (organizer Xuefeng Liu) within the 10th International Congress on Industrial and Applied Mathematics (ICIAM 2023) (Tokyo, August 20-25, 2023)

- ICOSAHOM* Minisymposium invitation (organizer Eun-Jae Park) within the International Conference on Spectral and High Order Methods (ICOSAHOM 2023), Seoul, August 14-18, 2023
- LSSC 23* Invited plenary speaker at the 14th International Conference on “Large Scale Scientific Computations (LSSC’23)” (Sozopol, Bulgaria, June 5-9, 2023)
- HOFEIM 23* Invited speaker at the workshop “High-Order Finite Element and Isogeometric Methods (HOFEIM 2023)” (Larnaca, Cyprus, May 29 - June 1, 2023)
- StochNum* Invited speaker at the workshop “Stochastic Numerics, Statistical Learning, Optimization, Approximations, with Applications”, KAUST, May 21-June 1, 2023
- Nochetto* Invited speaker at the conference “Frontiers of Numerical PDE: Fractional Differential Equations, Geometric Evolution, Liquid Crystals, Optimal Transport, and Adaptivity” (Maryland at College Park, USA, May 16-19, 2023)
- CFC 2023* Minisymposium invitation (organizers Jinhui Yan, Guglielmo Scovazzi, John Evans, Ming-Chen Hsu, Artem Korobenko, Oriol Colomés Gené) within the 2023 IACM Computational Fluids Conference, Cannes, April 25-28, 2023
- Leszek 70* Invited speaker at the “Workshop in Honor of Leszek Demkowicz’s 70th Birthday” (Austin, TX, USA, April 11, 2023)
- ICES 2023* Invited speaker at the International Conference and Exhibition for Science (ICES 2023) (Riyadh, February 6-8, 2023)
- MHU 2022* Invited speaker at the 4th International Conference on “Modern Mathematical Methods and High Performance Computing in Science & Technology (M3HPCST-2022)” (Motherhood University, Roorkee, India, December 22-24, 2022)
- SCML* Invited speaker at the KAUST Research Conference on Scientific Computing and Machine Learning (SCML 2022) (KAUST, November 14-18, 2022)
- MinRes* Invited speaker at the 5th Workshop on Minimum residual and Least-Squares Finite Element Methods (Santiago, Chile, October 5-7, 2022)
- ICCPDEA* Invited speaker at the conference “Computational Partial Differential Equations and Applications (ICCPDEA-2022)” (BML Munjal University, Gurgaon, India, September 6-8, 2022)
- CMAM2022* Invited speaker at the conference “Computational Methods in Applied Mathematics” (Vienna, August 29 - September 2, 2022)
- WCCM 22* Minisymposium invitation (organizers Constantin Bacuta and Hengguang Li) within the 15th World Congress on Computational Mechanics & 8th Asian Pacific Congress on Computational Mechanics (WCCM-APCOM) (Yokohama, online, July 31 - August 5, 2022)
- ACTA* Invited to the conference “Thirty years of Acta Numerica” (Bedlewo, June 26 - July 2, 2022)
- ECCOMAS22* Minisymposium invitation (organizers Victor Calo, David Pardo, Carla Manni, Quanling Deng, Ali Hashemian) within the 8th European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS 2022) (Oslo, June 5-9, 2022)
- M&S 2022* Invited speaker at the workshop “Modeling and Simulation” (KAUST, March 21-24, 2022)
- ICMA2021* Invited speaker within the Second International Conference of Mathematics and its Applications (ICMA2021) (Abha, October 2021)
- Augsburg* Invited speaker at the workshop “Scattering by random heterogeneous media” (Augsburg, September 13-15, 2022)
- USNCCM16* Keynote speaker within the USNCCM16 conference (Chicago, July 25-29, 2021)
- ECM8* Minisymposium invitation (organizers Luca Heltai and Wenyu Lei) within the 8th European Congress of Mathematics (8ECM) (Portoroz, July 5-11, 2021)
- CSRC* Invited speaker within the “International Conference on Eigenvalue Problems and Related Topics” (Beijing, May 8-9, 2021)
- WCCM 20* Minisymposium invitation (organizers D. Boffi, F. Bertrand) within the WCCM 20 / ECCOMAS conference (Paris, January 2021)

- O. Wolfach 21* Invitation to Oberwolfach workshop (Organizers D. Boffi, C. Carstensen, A. Ern, J. Hu), (Oberwolfach, Germany, January 2021)
- Chandigarh* Invited speaker within the “International Faculty Development program” at Chandigarh University, India (July 6, 2020)
- Covid 2020* Invited to several conferences that have been canceled because of the sanitary emergency, including Banff/Hangzhou, ICE 2020/Beijing, BIRS-IAS/Hangzhou, CMAM/Vienna, ESCO 2020/Plzeň, Workshop/Freiburg, Inria/Paris, Advanced Finite Elements Methods for Non-linear PDEs/Sanya
- STRUCTAPP* Invited speaker within the the STRUCTAPP2020 workshop (L’Aquila, January 2020)
- DEA 2019* Minisymposium invitation (organizer Michael Neilan) within the DEA 2019 conference (Krakow, September 2019)
- LS 19* Invited speaker within the workshop Minimum Residual & Least-Squares Finite Element Methods (Berlin, September 2019)
- Tokyo 19* Invited speaker within the annual conference of JSIAM (Tokyo, September 2019)
- RIMS 19* Invited speaker within the workshop Numerical Methods for Spectral Problems: Theory and Applications (Kyoto, September 2019)
- USNCCM2019* Minisymposium invitation (organizers Tan Bui-thanh and Leszek Demkowicz) within the USNCCM15 congress (Austin, July-August 2019)
- ICIAM 19* Minisymposium invitation (organizers Fleurianne Bertrand and Marius Weimar) within ICIAM 2019 (Valencia, July 2019)
- Mafelap 19* Minisymposium invitation (organizers Fleurianne Bertrand and Pavel Bochev) within Mafelap 2019 (Uxbridge, June 2019)
- Bari 2019* Invited speaker within the III One-day workshop on Applied Mathematics (Bari, June 2019)
- E. V. Day 19* Invited speaker within the workshop Eigenvalue Day 2019 (Berlin, May 2019)
- GAMM 19* Minisymposium invitation (organizers Mario Ohlberger and Ilaria Perugia) within the 90th GAMM Annual Meeting (Vienna, February 2019)
- Paris 19* Invited speaker within the Workshop on Spectral Properties of Disordered Systems (Paris, January 2019)
- ICCM 18* Invited speaker within the International conference on computational mathematics (Seoul, September-October 2018)
- Vienna 18* Invited speaker within the Workshop 3 on Interplay of geometric processing, modelling, and adaptivity in Galerkin methods of the programme on Numerical Analysis of Complex PDE Models in the Sciences (Vienna, July 2018)
- JCM 18* Invited speaker within the International Workshop on Computational Mathematics (Suzhou, June 2018)
- ICCEM 18* Invited speaker within the Fourth IEEE International Conference on Computational Electromagnetics 2018 (Chengdu, March 2018)
- MFET 17* Keynote lecturer at the Eccomas Thematic Conference Modern Finite Element Technologies 2017 (Bad Honnef, August 2017)
- USNCCM 17* Minisymposium invitation (organizers Bacuta and Li) within the 14th US National Congress on Computational Mechanics (Montreal, July 2017)
- Dauge 17* Invited speaker within the Conference Analyse mathématique et numérique de singularités et de valeurs propres (Rennes, February 2017)
- WSC 16* Keynote lecturer of the Woudschoten Conference on Numerical Analysis (Zeist, October 2016)
- MICH 16* Invited speaker within the International Conference on Comp. Math. and Inverse Problems (Houghton, Michigan, August 2016)
- FSI 16* Invited speaker within the International Workshop on Fluid-Structure Interaction Problems (Singapore, June 2016)

- Wonapde 16* Invited speaker within the Fifth Chilean Workshop on Numerical Analysis of Partial Differential Equations (Concepción, Chile, January 2016)
- O. Wolfach 15* Invitation to Oberwolfach workshop (organizers S. Brenner, C. Carstensen, L. Demkowicz, P. Wriggers), (Oberwolfach, Germany, October 2015)
- USNCCM 15* Minisymposium invitation (organizers Cirak, Dünster, Harari, Hsu, Ruess, Schillinger) within the 13th US National Congress on Computational Mechanics (San Diego, July 2015)
- SISSA 15* Invited keynote speaker within the Workshop “Advances in numerical analysis, scientific computing and computational mechanics (SISSA Trieste, Italy, July 2015)
- PANAM 15* Minisymposium invitation (organizer R. Durán) within the 1st Panamerican Congress on Computational Mechanics (Buenos Aires, April 2015)
- IMA 14* Invited speaker at the IMA Special Workshop: Structure Preserving Discretizations of Partial Differential Equations, on the Occasion of Douglas N. Arnold’s 60th Birthday, (Minneapolis, October 2014)
- ECMI 2014* Minisymposium invitation (organizers L. Pavarino, P. Colli Franzone, S. Scacchi) within the conference ECMI 2014, The 18th European Conference on Mathematics for Industry, (Taormina, June 2014)
- Levico 14* Invited speaker at Fluid Dynamics and Electromagnetism: Theory and Numerical Approximation (Levico Terme, June 2014)
- ICERM 14* Invited speaker at Robust Discretization and Fast Solvers for Computable Multi-Physics Models, ICERM, (Brown University, Providence, May 2014)
- VN4* Invited speaker at Valparaíso Numérico IV (Séptimo Encuentro de Análisis Numérico de Ecuaciones Diferenciales Parciales), (Valparaíso, Chile, December 2013)
- O. Wolfach 13* Invitation to Oberwolfach workshop (organizers A. Knyazev, V. Mehrmann, J. Xu), (Oberwolfach, Germany, November 2013)
- JSA 13* Invited speaker at the Journées Singulières Augmentées en l’honneur de Martin Costabel (Rennes, France, August 2013)
- Africomp 13* Keynote lecturer within the 3rd African Conference on Computational Mechanics (Livingstone, Zambia, July-August, 2013)
- Yonsei 13* Invited speaker at the International Workshop and Tutorial on Computational Mathematics (Yonsei University, Seoul, Korea, March 2013)
- TH70* Minisymposium invitation (organizers L. Beirao da Veiga, A. Buffa, G. Sangalli) within the conference Advances in Computational Mechanics (San Diego, USA, February 2013)
- Wonapde 13* Two minisymposium invitations (organizers A. Bermúdez and R. Rodríguez and E.-J. Park) within the Fourth Chilean Workshop on Numerical Analysis of Partial Differential Equations (Concepción, Chile, January 2013)
- JMM 13* Minisymposium invitation (organizers D.N. Arnold, A. Gillette, M. Holst) within the Joint Math Meetings 2013 (San Diego, USA, January 2013)
- WCCM 12* Minisymposium invitation (organizers F. Brezzi, L. Franca, D. Marini) within the Tenth World Congress on Computational Mechanics (San Paulo, Brazil, July 2012)
- O. Wolfach 12* Invitation to Oberwolfach workshop (organizers O. Allix, C. Carstensen, J. Schröder, P. Wriggers), (Oberwolfach, Germany, February 2012)
- NELIA 11* Plenary talk at the workshop Numerical Simulation in Electromagnetism and Industrial Applications (Santiago de Compostela, Spain, October 2011)
- SC2011* Minisymposium invitation (organizers C Carstensen and A. Quarteroni) within the International Conference on Scientific Computing (Santa Margherita di Pula, Italy, October 2011)
- EFSWaves* Plenary talk at the conference Fast Solvers for Simulation, Inversion, and Control of Wave Propagation Problems (Würzburg, Germany, October 2011)
- UMI 11* Plenary talk at the XIX Congresso UMI (Bologna, Italy, September 2011)

- MG 11* Plenary talk at the conference Workshop on Algebraic and Multigrid Methods (Kunming, China, August 2011)
- Banff 10* Invited speaker at the workshop Nonstandard Discretizations for Fluid Flows (Banff, Canada, November 2010)
- IMA 10* Invited speaker at the workshop Numerical Solutions of Partial Differential Equations: Novel Discretization Techniques (IMA Minneapolis, USA, November 2010)
- ECCM 10* Minisymposium invitation (organizers L.E. García-Castillo, D. Pardo) within the Forth European Conference on Computational Mechanics (Paris, France, May 2010)
- O. Wolfach 10* Invitation to Oberwolfach workshop (organizers R.Hiptmair, R Hoppe, P. Joly, U. Langer), (Oberwolfach, Germany, February 2010)
- Levico 09* Plenary talk at the workshop Mathematical Physics and PDEs, (Levico Terme Italy, September 2009)
- Enumath 09* Plenary talk at the conference Enumath 2009, (Uppsala, Sweden, July 2009)
- GNCS 09* Plenary talk at the Assemblea annuale del GNCS (Montecatini Terme, Italy, February 2009)
- ICCPDE 08* Plenary talk at the conference Recent Trends in Computational Partial Differential Equations 2008 (Mumbai, India, December 2008)
- O. Wolfach 08* Invitation to Oberwolfach workshop (organizers S.C. Brenner, C. Carstensen, P Monk), (Oberwolfach, Germany, August 2008)
- ECCOMAS* Minisymposium invitation (organizers T.J. Hughes, A. Masud, T. Tezduyar) within the joint WCCM VIII - ECCOMAS V World Congress (Venezia, Italy, June-July 2008)
- USCM09* Minisymposium invitation (organizers L. Demkowicz, P. Devloo, W. Rachowicz) within the Ninth U.S. National Congress on Computational Mechanics (San Francisco, USA, July 2007)
- O. Wolfach 07* Invitation to Oberwolfach workshop (organizers R.Hiptmair, R Hoppe, P. Joly, U. Langer), (Oberwolfach, Germany, February 2007)
- 7WCCM* Minisymposium invitation (organizers H. Matthies and R. Ohayon) within the 7th World Congress on Computational Mechanics (Los Angeles, USA, July 2006)
- Mafelap 06* Minisymposium invitation (organizers I. Aavatsmark and R. Helmig) within Mafelap 2006 (Uxbridge, UK, June 2006)
- MATHEON* Invited speaker at the Matheon Workshop on Computational PDEs (Berlin, Germany, February 2006)
- Oslo05* Invitation to the workshop Compatible Discretizations for Partial Differential Equations (Oslo, Norway, September 2005)
- USCM08* Minisymposium invitation (organizer M Ainsworth) within the Eighth U.S. National Congress on Computational Mechanics (Austin, USA, July 2005)
- O. Wolfach 04* Invitation to Oberwolfach workshop (organizers R.Hiptmair, R Hoppe, U. Langer), (Oberwolfach, Germany, February 2004)
- IMA 04* Invited speaker at the workshop Compatible Spatial Discretization for Partial Differential Equations (IMA Minneapolis, USA, May 2004)
- IT-CHINA 03* Invited speaker at the Convegno Italo-Cinese di Analisi Numerica (Grado, Italy, November 2003)
- ICIAM 03* Minisymposium invitation (organizers H. Kanayama and F. Kikuchi) within ICIAM 2003 (Sydney, Australia, July 2003)
- Mafelap 03* Minisymposium invitation (organizer L. Demkowicz) within Mafelap 2003 (Uxbridge, UK, June 2003)
- LMS 02* Invitation to LMS Durham Symposium on Computational methods for wave propagation in direct scattering (Durham, UK, July 2002)
- NSF-CBMS* Invited speaker within NSF-CBMS conference (Colorado School of Mines, USA, June 2002)

- JEE2* Minisymposium invitation (organizer R. Hoppe) within JEE2 (Toulouse, France, March 2002)
- Enumath 01* Minisymposium invitation (organizers M. Costabel and M. Dauge) within Enumath 2001 (Ischia, Italy, July 2001)
- ECCM 01* Minisymposium invitation (organizer L. Demkowicz) within ECCM-2001 (Krakow, Poland, June 2001)
- Strasbourg 01* Invitation to workshop Numerical Simulation of charged particles (Strasbourg, France, June 2001)
- O. Wolfach 01* Invitation to Oberwolfach workshop (organizers D.N. Arnold, C. Carstensen, R Hoppe), (Oberwolfach, Germany, February 2001)
- ICIAM 99* Minisymposium invitation (organizer J.M. Thomas) within ICIAM 99 (Edinburgh, UK, July 1999)
- Mafelap 99* Minisymposium invitation (organizers M. Costabel and M. Dauge) within Mafelap 99 (Uxbridge, UK, June 1999)
- Plovdiv-98* Plenary speaker at the Ninth International Colloquium on Differential Equations (Plovdiv, Bulgaria, August 1998)
- UMI-95* Keynote lecture (*Conferenza di 30 minuti*) within the XV Convegno UMI (Padova, Italy, September 1995)

### **Seminars**

Here is a list of the most relevant seminars I have given at international institutions

- Nov. 2023 ETH Zurich, Switzerland
- Jul. 2023 TU Chemnitz, Germany
- Dec. 2022 IIT Roorkee, India
- Dec. 2022 University of Goa, India
- Dec. 2022 University of Milano, Italy
- Feb. 2022 University of Chalmers, Sweden
- May. 2021 University of Twente, The Netherlands
- Apr. 2021 Middle East Technical University, Turkey
- Aug. 2020 IIT Roorkee, India
- Oct. 2019 Isaac Newton Institute, Cambridge, UK
- Dec. 2018 Humboldt Universität zu Berlin, Germany
- Dec. 2018 AMCS, King Abdullah University of Science and Technology, Saudi Arabia
- Jun. 2018 Humboldt Universität zu Berlin, Germany (Von Mises lecture)
- Apr. 2018 Technical University of Milano, Italy. MOX Laboratory
- Mar. 2018 University of Science and Technology of China (Hefei)
- Sep. 2017 Aalto University, Finland, Department of Mathematics and System Analysis (Colloquium)
- Oct. 2016 Aalto University, Finland, Department of Mathematics and System Analysis
- Sep. 2016 Inria, France, Rencontres Inria-LJLL en calcul scientifique
- Sep. 2016 University of Rennes, France, Mathématiques
- Jul. 2016 University of Bari, Italy, Dipartimento di Matematica
- Jun. 2015 Humboldt Universität zu Berlin, Germany
- Oct. 2014 FRIT, Pavia (IMATI) - Paris (LJLL) joint seminar
- May 2014 Rutgers University, USA. Department of Mathematics
- Dec. 2013 University of Pavia, Italy, Mathesis
- Aug. 2011 Peking University, Beijing, China. School of Mathematical Sciences
- Aug. 2011 Chinese Academy of Science, Beijing, China
- May 2008 University of Maryland at College Park, USA. Department of Mathematics
- Oct. 2007 University of Karlsruhe, Germany. Institut für Angewandte Mathematik II



Jun. 2007	Pennsylvania State University, State College, USA. Department of Mathematics
Apr. 2005	University of Milano, Italy. Dipartimento di Matematica
Jun. 2004	University of Genova, Italy. Dipartimento di Ingegneria Elettrica
Jan. 2003	École Normale Supérieure de Cachan, Antenne de Bretagne, Bruz, France
May 2002	University of Texas at Austin, USA. TICAM Institute
Apr. 2002	University of Brescia. Seminario Matematico
Apr. 2002	Technical University of Milano, Italy. MOX Laboratory
Sep. 1999	University of Padova, Italy. Dipartimento di Matematica Pura e Applicata
May 1999	University of Texas at Austin, USA. TICAM Institute
Nov. 1998	Pennsylvania State University, State College, USA. Department of Mathematics
Nov. 1998	University of Maryland at College Park, USA. Department of Mathematics
Sep. 1998	Pennsylvania State University, State College, USA. Department of Mathematics
Feb. 1996	University of Milano, Italy. Dipartimento di Matematica
Jun. 1994	CRS4, Cagliari, Italy
Dec. 1993	University of Pavia, Italy. Dipartimento di Matematica

## GRANTS

### **Research Grants**

Here is a list of the most recent grants.

2023: KAUST: OFP2023 grant (PI)

2023: KAUST: OFP2023 grant (CoPI)

2020: KAUST: CRG9 grant (PI)

2019: Unipv, local research funding (PI)

2019-2021: MIUR PRIN 2018 (PI of the Pavia Unit, PI: Gianluigi Rozza)

2018: Unipv, local research funding (PI)

2017: GNCS-INDAM (PI)

2017: Unipv, local research funding (PI)

2016-2017: ASci Visitor Fellow Programme at Aalto University Science Institute (PI)

2015: GNCS-INDAM (Investigator, PI: G. Rozza)

2013-2015: MIUR PRIN 2012 (Investigator, PI: A. Quarteroni)

2013: GNCS-INDAM (PI)

2012: GNCS-INDAM (Investigator, PI: A. Ve eser)

2011-2013: Bilateral project Italy–Argentina (Investigator, PI: P. Pietra, R. Durán)

2011-2012: Bilateral project CNR-CONICET (Investigator)

2011: GNCS-INDAM (PI)

2010-2013: MIUR PRIN 2009 (Investigator, PI: A. Quarteroni)

2010: GNCS-INDAM (Investigator, PI: L. Gastaldi)

2007-2010: MIUR PRIN 2007 (Investigator, PI: A. Quarteroni)

2005-2006: MIUR PRIN 2005 (Investigator, PI: A. Quarteroni)

### **Other recent grants**

I was the PI of the national program **Piano Lauree Scientifiche** for Mathematics during the period 2018/2019 and 2015/2017 (more information in the next paragraph). The total amount of this grant is about 2.3 Meuro.

From 2005 to 2012 I have been the coordinator of the unit of the Department of Mathematics at the University of Pavia within the **Progetto/Piano Lauree Scientifiche**. The aim of the project, named *Orientamento e formazione degli insegnanti - MATEMATICA*, was twofold. From one side, *Orientamento* means to help high school students with their choice for the forthcoming studies. From the other side, *formazione insegnanti* means to provide high school teachers with an opportunity of advanced training in collaboration

with university professors. Within this framework I managed a complex network comprising the Department of Mathematics of the University of Pavia and several high schools in Pavia and in the neighboring area.

In 2010 I have been the principal investigator for a research contract in collaboration with **7pixel s.r.l.**. The aim of the research was related to a statistical model of an on-line price search engine; more precisely, the Italian title of the research was: *Modello di previsione dei click ricevuti, all'interno di un motore online di ricerca prezzi, da nuovi prodotti*

In 2009 I have been a co-investigator of a research contract with E. Regazzini in collaboration with **R.S. Ricerca Sviluppato s.r.l.**. The aim of the research was to help the company in the development of an automatic image recognition tool; the ultimate goal was to locate, read, and decode the letters and the numbers appearing in car license plates.

## TEACHING AND ADVISING

Most of teaching activity, before joining KAUST, can be seen from <http://www-dimat.unipv.it/boffi/teach.html>

### *Teaching activity*

From 1991 to 2000 I have been teaching assistant (*esercitatore*) for the following courses at the University of Pavia, Italy: Analisi Matematica 1 (for students of Engineering: five times); Analisi Matematica 1 (for students of Physics, four times).

From 1998 to 1999 I taught the course Math 141 (Analysis, Numerical Analysis, and Geometry) at the Pennsylvania State University (twice).

From 1999 to date I taught the following courses at the University of Pavia, Italy: Analisi Matematica 2 (students of Physics: twice); Metodi di approssimazione (students of Mathematics: three times); Strumenti Informatici e Matematici di Base (students of Mathematics: five times); Complementi di Analisi Matematica di base (students of Physics: three times); Modellistica Numerica (students of Mathematics: once); Metodi Numerici per la Chimica (students of Chemistry: five times); Elementi Finiti (students of Mathematics: six times); Analisi Numerica delle equazioni differenziali (students of Mathematics: once); Analisi Numerica (students of Mathematics: seven times); Istituzioni di Matematiche (students of Biology: twice); Matematica (students of Biology: six times); Laboratorio di Matematica Computazionale (students of Mathematics: once); Calcolo Numerico e Programmazione (students of Engineering: twice); Metodi Numerici con Laboratorio di Informatica (students of Chemistry: three times); Analisi Numerica 2 (students of Mathematics: twice).

I am supervising an average of two/three undergraduate theses (*Tesi di Laurea*) per year.

### *Teaching of advanced courses*

Here is a partial list of my activity during the last years

2021 May	<i>Finite element approximation of eigenvalue problems.</i> CSRC Beijing (China)
2019 January/February	<i>Introduction to the finite element method.</i> Gran Sasso Science Institute (Italy)
2018 January/February	<i>Introduction to the finite element method.</i> Gran Sasso Science Institute (Italy)
2017 May	<i>Finite element approximation of eigenvalue problems.</i> Frontiers in partial differential equations analysis and solvers, Pavia (Italy)
2017 March	<i>Introduction to the finite element method.</i> Gran Sasso Science Institute (Italy)
2016 September	<i>Finite element approximation of eigenvalue problems.</i> Institut Henri Poincaré, Paris (France)
2016 August	<i>Finite Element Methods for Eigenvalue Problems.</i> IMA Graduate Summer Program, Michigan Technological University (USA)
2016 February	<i>Introduction to the finite element method.</i> Gran Sasso Science Institute (Italy)

- 2013 July: *Finite elements for mixed variational formulations*. IISc Bangalore, CIMPA Research School (India)
- 2012 March/April: *Modellistica numerica*. IUSS, The Institute for Advanced Studies in Pavia (Italy)
- 2011 August: *Approximation of Maxwell's equations and eigenvalue problems*. Summer School at the Peking University (China)
- 2010 July: *Finite Element Approximation of Eigenvalue Problems*. Summer School in Computational Mathematics and Scientific Computing, Durham (UK)
- 2009 March/April: *Modellistica numerica*. IUSS, The Institute for Advanced Studies in Pavia (Italy)
- 2008 March/April: *Classical computational methods*. IUSS, The Institute for Advanced Studies in Pavia (Italy)
- 2007 June: *Finite element approximation of eigenvalue problems and applications*. Summer School Zaragoza Numerica, Zaragoza (Spain)
- 2007 May: *Approximation of variationally posed eigenvalue problems*, Advanced course More efficiency in finite elements. Marseille-Luminy, France
- 2006 November/December: *Fondamenti di calcolo scientifico*. IUSS, The Institute for Advanced Studies in Pavia (Italy)
- 2006 June/July: *Finite elements for the Stokes problem*. C.I.M.E. Summer Course Mixed Finite Elements, Compatibility Conditions, and Applications. Cetraro (Italy)
- 2006 May: *Stability and Geometric Conservation Laws*. ECCOMAS Course on Advanced Computational Methods for Fluid-Structure Interaction, Ibiza (Spain)
- 2006 March/April: *Classical computational methods*. IUSS, The Institute for Advanced Studies in Pavia (Italy)
- 2005 March/April: *Classical computational methods*. IUSS, The Institute for Advanced Studies in Pavia (Italy)

#### **Students and other young collaborators** (chronological order)

Here I am giving some information about my former students and other young researchers collaborating with me and who are now carrying on their research in Italian or foreign institutions

**Stefano Giani** has been a student in Pavia and I supervised his Master thesis in 2003. The title of his thesis is “Calcolo degli Autovalori della Cavità Risonante” (Eigenvalue computation in a resonant cavity): after he got his degree, he moved to England (Oxford, Bath, Nottingham) where he is now Lecturer at the University of Durham. He published several interesting papers; among those, let me highlight his research on the convergence of adaptive method for the approximation of eigenvalue problems. In 2009, he was awarded with a second Leslie Fox Prize. More information is available from

<http://www.dur.ac.uk/stefano.giani/>

**Francesca Gardini** has obtained her Ph.D. degree in 2006 from the University of Pavia under my supervision. She wrote a thesis on “A posteriori error estimates for eigenvalue problems in mixed form”. During her undergraduate studies, she proved a discrete compactness property for quadrilateral finite elements for the approximation of  $H(\text{div})$ . Recently, she has started working with me on fluid-structure interactions. She is now Assistant Professor (*ricercatore*) at the University of Pavia, Italy. More information is available from

<http://www-dimat.unipv.it/gardini/>

**Luca Heltai** has obtained his Ph.D. degree in 2007 from the University of Pavia under my supervision. He wrote a thesis on “The finite element immersed boundary method”. He is the author of the first 3D code we have been using for the approximation of fluid-structure interactions. He is an active contributor to the opensource deal.II project and contributed to the project with a module for the IBM. He is now Assistant Professor (*ricercatore*) at the International School for Advanced Studies (SISSA) in Trieste, Italy. More information is available from

<http://people.sissa.it/~heltai/>

**Paolo Gatto** has been a student in Pavia and I supervised his Master thesis in 2003. In his thesis he carried on research on the approximation properties of finite elements on distorted hexahedra. His results contributed to a joint paper with R.S. Falk and P. Monk. He defended his Ph.D. thesis in Austin (ICES institute) under the supervision of L. Demkowicz. Then he worked with Jan Hesthaven at Brown University and EPFL and he is now post-doc at Aachen. More information is available from

[https://www.researchgate.net/profile/Paolo\\_Gatto2](https://www.researchgate.net/profile/Paolo_Gatto2)

**Francesca Bonizzoni** has been a student in Pavia and I supervised her Master thesis in 2009. She has obtained interesting result on the topic of Finite Element exterior calculus and the results of our collaboration are included in the paper D.N. Arnold, D. Boffi, and F. Bonizzoni, “Finite element differential forms on curvilinear cubic meshes and their approximation properties”. She has been working on the approximation of stochastic partial differential equations at MOX, Milano where she defended her Ph.D. thesis under the supervision of F. Nobile. She is now Post-Doc at Vienna University. More information is available from

<http://www.mat.univie.ac.at/~f.bonizzoni/>

**Nicola Cavallini** came to Pavia in 2009 as a Post-Doc. Since then, he has been working with my group on fluid-structure interactions. Before coming to Pavia, he obtained his Ph.D. from the University of Ferrara and, during the Ph.D., visited for two years the University of Houston, where he worked with R. Glowinski and collaborators. He has been involved with the latest computations with the finite element immersed boundary method. He has been enrolled within the TERRIFIC European Project (local investigator C. Lovadina). Then he worked at SISSA (Trieste, Italy), involved with a HPC project and he is now working in a start-up in Parma (Italy).

**Michele Ruggeri** has been a student in Pavia. In 2013 I supervised his thesis at the IUSS (Istituto Universitario di Studi Superiori) entitled “Fictitious domain method with distributed Lagrange multiplier for elliptic interface problems”. He is now a Ph.D. student at Vienna University of Technology under the supervision of D. Praetorius. More information is available from

<http://www.asc.tuwien.ac.at/~mruggeri/>

**Marco Artina** has been a student in Pavia and I supervised his Master thesis in 2012. He is now Ph.D. student at the Technical University of Munich working with M. Fornasier. More information is available from

<http://www-m15.ma.tum.de/Allgemeines/MarcoArtina>

**Michele Botti** has been a student in Pavia and I supervised his Master thesis in 2015. He defended his Ph.D. from the University of Montpellier working with D.A. Di Pietro.

**Umberto Zerbinati** has been my MS student at KAUST and he is now a PhD student at Oxford.

**Fabio Credali** has been my PhD student at KAUST and he is now a postdoctoral fellow at IMATI-CNR, Pavia

<https://imati.cnr.it/mypage.php?idk=PG-178>

## ADMINISTRATION AND EVALUATION

### *Administrative duties*

Here I am listing some of the most relevant activities I was involved with

- ADF** Associate Dean for Faculty of the CEMSE Division of KAUST from February 2024
- AC** Elected member of the Academic Council of KAUST from October 2022
- ASC** Member of the Academic Standing Committee at KAUST from October 2022
- Admission** Chair of the admission committee of AMCS (KAUST) from August 2021 to January 2023
- ASN** From October 2018 to 2021 I was member of the national committee for the “Abilitazione Scientifica Nazionale” (national habilitation) of professor of numerical analysis
- SA** From October 2018 to December 2019 I was member of the Academic Senate of the University of Pavia
- SAFD** From 2015 to 2018 I was the Director of the SAFD (Scuola di Alta Formazione Dottorale), the PhD Higher Education School of the University of Pavia

- ItaCdS* From 2012 to 2019 I was the Italian National Coordinator of the Undergraduate Studies in Mathematics (*Coordinatore Nazionale dei Corsi di Studio in Matematica*)
- Con.Sci* From 2012 to 2019 I was a member of the executive board (*Consiglio Direttivo*) of the *Conferenza Nazionale dei Presidenti e dei Direttori delle Strutture Universitarie di Scienze e Tecnologie* in Italy
- Ph.D.* Since 2012 I am a member of the *Collegio docenti* (board) of the Ph.D. programm in Mathematics and Statistics of the University of Pavia (joint programme with the University of Milano Bicocca since 2015)
- 15* In 2011 I was a member of the *Commissione dei 15* (committee for the new University statute) of the University of Pavia
- PLS* From 2015 to 2019 I served as Italian national coordinator of the *Piano Lauree Scientifiche*. From 2005 to 2012 I was the local coordinator at the University of Pavia, Dipartimento di Matematica of the same project. From 2008 to 2012 I was the coordinator of the unit at the University of Pavia (Chemistry, Mathematics, and Physics)
- NuV* I have been member of the *Nucleo di Valutazione* (University evaluation committee) of the University of Pavia since 2006 to 2013
- CCL* I served as *Presidente del Consiglio Didattico in Matematica* (Dean responsible for the studies in mathematics) at the University of Pavia from 2004 to 2010
- CCL* I served as *Vicepresidente del Consiglio Didattico in Matematica* (Vice-Dean responsible for the studies in mathematics) at the University of Pavia from 2001 to 2004
- COR* I have been a university curriculum counselor (*delegato per l'orientamento universitario*) for the Department of Mathematics of the University of Pavia from 2000 to 2004
- AMS* I have been organizer of the Applied Mathematics Seminar at the Department of Mathematics of the University of Pavia and IAN-IMATI/CNR from 2000 to 2003
- IT* I served as a member of the IT Committee (*Commissione informatica*) of the Department of Mathematics of the University of Pavia from 1999 to 2004 and from 2010 to 2015. I am in charge of the computer classroom of the Department since 2000. I served as a member of the IT Committee (*Commissione informatica*) of the faculty of Science of the University of Pavia from 2006 to 2009 and of the University of Pavia from 2006 to 2007
- Giunta* I served as a member of the *Giunta del Dipartimento di Matematica* (Executive Committee of the Department of Mathematics) at the University of Pavia from 1998 to 2004

#### ***More details on administrative activities***

I served for the challenging service of Director of the PhD Higher Education School of the University of Pavia. I was responsible of carrier of more than 500 PhD students. For more information, I refer to the web page of the school

<http://www.unipv.eu/site/en/home/research/phd-courses.html>

A significant part of my administrative effort has been devoted to the **managing of teaching activities** related to the Department of Mathematics of the University of Pavia. During the years when I was *Presidente del Consiglio Didattico in Matematica* the Italian universities were undergoing a major change in the teaching system. I was in charge of adapting the structure of the courses offered in Pavia according to the evolving national situation. For this task, I managed to match the requirements of several involved entities (students, professors of different fields, rules, etc.) and to get the consensus of all the participants. In the process of accreditation of our studies in mathematics, we had the only two courses in Pavia (*Laurea Triennale in Matematica*, *Laurea Magistrale in Matematica*, out of more than 130 courses in Pavia) which got the national approval without any modifications. The change of the teaching system introduced a more formal admission process and I was in charge for that as well. More precisely, all student who apply to the *Laurea Triennale* (Bachelor) are admitted, but they are required to take a test which aims at assessing their starting knowledges; admission to the *Laurea Magistrale* (Master) is limited to students who are above a certain threshold which is measured in terms of their previous grades and/or with an *ad hoc* exam.

The duties of the *Presidente del Consiglio Didattico in Matematica* include: supervising the teaching activities, quality assurance and accreditation, course and class scheduling, curriculum development and maintenance, monitoring compliance to teaching duties by the faculty, overseeing the student admission process, student performance monitoring. Another important task of the *Presidente del Consiglio Didattico in Matematica* was to discuss with the Dean of the Faculty of Science (*Preside della Facoltà di Scienze*) and with the Deans of the other courses of the Faculty (Physics, Chemistry, Biology, Geology, Natural Science) in order to develop and implement our strategies for faculty recruitment.

As a follow-up of my service in the aforementioned activity, I've been asked to act as a **National Coordinator** of all *Presidenti dei Consigli Didattici in Matematica*. This is a challenging task, since this activity occurs again when the national system is undergoing a new major change. My activity includes the participation in the *Conferenza Nazionale dei Presidenti e dei Direttori delle Strutture Universitarie di Scienze e Tecnologie* as an invited member of its executive board.

This task involves frequent interactions with all heads of Italian Math Departments and with all Italian Deans responsible for the studies in mathematics. Moreover, we have interactions with representatives of the Minister and of the ANVUR (national evaluation agency of Italian universities). The reader may have more information of some of the activities from the national mailing list

<http://fermat.unipv.it/pipermail/matematica/>

and from the web site of the *Conferenza Nazionale dei Presidenti e dei Direttori delle Strutture Universitarie di Scienze e Tecnologie* (in Italian)

<http://www.conscienze.it/>

As a consequence of this service, I have been the national PI of the *Piano Lauree Scientifiche* in Mathematics during the period 2015/2019.

Another important portion of my time has been devoted to the *Nucleo di Valutazione (University evaluation committee)* of the University of Pavia. In this framework, I was required to express my opinion on all activities of the University of Pavia. This included evaluation of teaching activities (all courses which ask for accreditation should undergo an evaluation by the *Nucleo di Valutazione*), evaluation of Ph.D. programs where the University of Pavia is involved, evaluation of the administration of the University of Pavia (including budget, staff, etc.), assessment of the research performed at the University of Pavia. In particular, my primary expertise concerned the **assessment of the scientific research** and of the Ph.D. programs. In this framework, we had long discussions about the effectiveness of automatic assessments performed via bibliometric indicators as compared to peer review based evaluations.

In 2011 all Italian universities have been required to modify their Statutes (*Statuto*: the main constitutional law governing a university) according to a change in the system. I had the honor to be chosen as one of the fifteen members of the *Commissione dei quindici* who had the responsibility of writing the **new Statute of the University of Pavia**. Besides the heavy load related to this work, it has been an incredibly meaningful and substantial experience for my academic life. The approved Statute has been the result of a not easy balance among various and sometimes incompatible visions of the future of our university.

### **Conference organization**

Here I am listing the more relevant scientific events that I contributed to organize during the last years

**EFEF** I am a founder member of the European Organizing Committee of the EFEF Conference Series (European Finite Element Fair). More information on the event can be retrieved, for instance, from

<http://www.math.chalmers.se/~stig/efef.html>

The series started in 2003 in Cambridge and continued in Berlin (2004), Pavia (2005), Zürich (2006), Marseille (2007), Göteborg (2008), Helsinki (2009), Warwick (2010), Paris (2011), Bilbao (2012), Heraklion (2013), Vienna (2014), Prague (2015), Bonn (2016), Milan (2017), Heidelberg (2018), Cyprus (2019), Paris (2021), Helsinki (2022), Twente (2023). The 2024 edition will take place in London.

- CTS* I am member of the Editorial Board of “CST 2024: The Fifteenth International Conference on Computational Structures Technology” (Prague, Czech Republic, September, 4-6, 2024)
- 9ECM* I am organizing a mini-symposium (with Fleurianne Bertrand) within the 9th European Congress of Mathematics (ECM) (Sevilla, Spain, July 15-19, 2024)
- PIERS* I am organizing a mini-symposium (with Lucia Gastaldi) within the 45th Photonics and Electromagnetics Research Symposium (PIERS) (Chengdu, China, April 21-25, 2024)
- DD28* I was one of the local organizers of the 28 International Conference on Domain Decomposition Methods (DD28) (KAUST, January 28 - February 1, 2024)
- Enumath* I organized a mini-symposium (with Fleurianne Bertrand and Jakub Both) within the Enumath 2023 conference (Lisbon, Portugal, September 4-8, 2023)
- Biennial* I organized a mini-symposium (with Fleurianne Bertrand and Arbaz Khan) within the 29th Biennial Numerical Analysis Conference (Strathclyde, UK, June 27-30, 2023)
- COUPLED* I am member of the scientific committee of the tenth edition of the International Conference on Computational Methods for Coupled Problems in science and Engineering (COUPLED PROBLEMS 2023) (Chania, Greece, June 5-7, 2023)
- AFRICOMP* I organized a mini-symposium (with Lucia Gastaldi) within the 5th African Conference on Computational Mechanics (AFRICOMP 5) (Cape Town, November 2-4, 2022)
- ICCPDEA* I am member of the scientific advisory committee of the International Conference on Computational Partial Differential Equations and Applications (ICCPDEA-2022) (BML Munjal University, Gurgaon, India, September 6-8, 2022)
- ICFMST* I am member of the International Advisory Committee of ICFMST-2021 (Chandigarh University, November 2021)
- COUPLED* I am member of the Scientific Committee of Computational Methods for Coupled Problems in Science and Engineering (COUPLED PROBLEMS 2021)
- O. Wolfach 21* I organized a workshop (with Carsten Carstensen, Alexandre Ern, and Jun Hu) at the Oberwolfach Mathematical Institute (Oberwolfach, January 2021)
- WCCM 20* I organized a mini-symposium (with Fleurianne Bertrand) within the WCCM 20 /ECCOMAS conference (Paris, January 2021)
- COUPLED* I am member of the Scientific Committee of Coupled Problems in Science and Engineering (Stiges, Spain, June 2019)
- ECT2018* I am member of the Editorial Board of the Tenth International Conference on Engineering Computational Technology (Stiges, Spain, September 2018)
- USNCCM14* I organized a mini-symposium (with Harri Hakula) within the 14th U.S. National Conference on Computational Mechanics (Montreal, Canada, July 2017)
- COUPLED* I am member of the Scientific Committee of Coupled Problems in Science and Engineering (Rhodes, Greece, June 2017)
- MAFELAP16* I organized a mini-symposium (with Lucia Gastaldi) with the 2016 Mafelap conference (Brunel University, UK, June 2016)
- COUPLED* I was member of the Scientific Committee of Coupled Problems in Science and Engineering (Venice, Italy, June 2015)
- COUPLED* I organized an invited session (with L. Gastaldi) within Coupled Problems in Science and Engineering (Venice, Italy, June 2015)
- AFRICOMP* I organized a mini-symposium (with D. Reddy) within the 4th African Conference on Computational Mechanics (Marrakech, Morocco, January 2015)
- ECT2014* I am member of the Editorial Board of The Ninth International Conference on Engineering Computational Technology (Napoli, Italy, September 2014)
- COUPLED* I was member of the Scientific Committee of Coupled Problems in Science and Engineering (Ibiza, Spain, June 2013)

- COUPLED** I organized an invited session (with L. Gastaldi) within Coupled Problems in Science and Engineering (Ibiza, Spain, June 2013)
- CST2012** I was a member of the Editorial Board of The Eleventh International Conference on Computational Structures Technology (Dubrovnik, Croatia, September 2012)
- COUPLED** I was member of the Technical Advisory Panel of Coupled Problems in Science and Engineering (Kos, Greece, June 2011)
- 3INDAMPV** In 2010 I organized an international workshop in Pavia (with A. Buffa, C. Lovadina, I. Perugia, G. Sangalli) on “Non-Standard Numerical Methods for PDE’s”. More information can be retrieved from  
<http://www-dimat.unipv.it/3indampv>  
 The workshop had over 100 participants. Invited speakers included D.N. Arnold, F. Brezzi, E. Cohen, L. Demkowicz, T. Dokken, R. Hiptmair, K. Lipnikov, P. Monk.
- ECT2010** I was a member of the Editorial Board of The Seventh International Conference on Engineering Computational Technology (Valencia, Spain, September 2010)
- COUPLED** I contributed to the organization (with L. Gastaldi) of an invited session within Coupled Problems in Science and Engineering (Ischia, Italy, June 2009)
- CST2008** I was a member of the Editorial Board of The Ninth International Conference on Computational Structures Technology (Athens, Greece, September 2008)
- ICIAM 07** I contributed to the organization (with L. Zikatanov) of a minisymposium within the 6th International Congress on Industrial and Applied Mathematics (Zürich, Switzerland, July 2007)
- CIME 06** In 2006 I organized (with Lucia Gastaldi) a C.I.M.E. summer school on “Mixed finite elements, compatibility conditions, and applications”. The main lecturers were D. Boffi, F. Brezzi, L. Demkowicz, R. Durán, R.S. Falk, and M. Fortin.
- MIT 05** I contributed to the organization (with L. Gastaldi) of a minisymposium within the Third M.I.T. Conference on Computational Fluid and Solid Mechanics (MIT Cambridge, USA, June 2005)
- COUPLED** I contributed to the organization (with L. Gastaldi) of an invited session within Coupled Problems in Science and Engineering (Santorini, Greece, June 2005)
- MIT 03** I contributed to the organization (with L. Gastaldi) of a minisymposium within the Second M.I.T. Conference on Computational Fluid and Solid Mechanics (MIT Cambridge, USA, June 2003)
- MIT 01** I contributed to the organization (with L. Gastaldi) of a minisymposium within the First M.I.T. Conference on Computational Fluid and Solid Mechanics (MIT Cambridge, USA, June 2001)
- AMIF 00** I contributed to the organization (with L. Gastaldi) of a minisymposium within the AMIF conference (Il Ciocco, Italy, October 2000)

#### ***Editorial activities and research evaluation***

I am Editor in Chief of **Computers & Mathematics with Applications** since January 1st, 2019.

I am member of the Editorial Board of the **SMAI Journal of Computational Mathematics** since 2018.

I am member of the Editorial Board of **Journal of Computational Mathematics** since 2017.

I am member of the Editorial Board of **Computational Methods in Applied Mathematics** since 2015.

I was member of the Editorial Board of **Mathematics of Computation** from 2014 to 2022.

I am serving as a reviewer for most journals in the field (including, SINUM, Math. Comp., CMAME, JCP, M<sup>3</sup>AS...).

I have been asked to assess several research project. Institutions asking me to assess projects or people include: Natural Sciences and Engineering Research Council of Canada (NSERC), Chilean National Commission for Science and Technology Research (CONICYT), Istituto Nazionale di Alta Matematica (INdAM), Chalmers University of Technology in Sweden, National Council for Research and Development of



Romania, ISCRA Italian SuperComputing Resource Allocation, Agenzia Nazionale di Valutazione del Sistema Universitario e della Ricerca (ANVUR), Netherlands Organisation for Scientific Research, US NSF, University of Rutgers Math. Department, University of Padova Italy, University of Cagliari Italy, University of Cape Town South Africa.

**BIBLIOGRAPHY*****Papers in refereed journals (reverse chronological order)***

- [1] F. Bertrand, D. Boffi, and L. Gastaldi, “Approximation of the Maxwell eigenvalue problem in a least-squares setting,” *Comput. Math. Appl.*, vol. 148, pp. 302–312, 2023.
- [2] D. Boffi, A. Cangiani, M. Feder, L. Gastaldi, and L. Heltai, “A comparison of non-matching techniques for the finite element approximation of interface problems,” *Comput. Math. Appl.*, vol. 151, pp. 101–115, 2023.
- [3] C. Astuto, D. Boffi, J. Haskovec, P. Markowich, and G. Russo, “Asymmetry and condition number of an elliptic-parabolic system for biological network formation,” *Communications on Applied Mathematics and Computation*, 2024.
- [4] D. Boffi, F. Credali, L. Gastaldi, and S. Scacchi, “A parallel solver for FSI problems with fictitious domain approach,” *Math. Comput. Appl.*, vol. 28, no. 2, p. 59, 2023.
- [5] F. Bertrand, D. Boffi, and A. Halim, “Data-driven reduced order modeling for parametric PDE eigenvalue problems using Gaussian process regression,” *J. Comput. Phys.*, vol. 495, pp. Paper No. 112503–28, 2023.
- [6] D. Boffi, F. Credali, L. Gastaldi, and S. Scacchi, “A parallel solver for fluid structure interaction problems with Lagrange multiplier,” *Math. Comput. Simul.*, 2024. to appear.
- [7] N. Alshehri, D. Boffi, and L. Gastaldi, “Unfitted mixed finite element methods for elliptic interface problems,” *Numer. Methods Partial Differential Equations*, vol. 40, no. 1, pp. Paper No. e23063, 24, 2024.
- [8] D. Boffi and F. Bertrand, “On the necessity of the inf-sup condition for a mixed finite element formulation,” *IMA J. Numer. Anal.*, 2024. to appear.
- [9] D. Boffi, S. Gong, J. Guzmán, and M. Neilan, “Convergence of Lagrange finite element methods for Maxwell eigenvalue problem in 3D,” *IMA J. Numer. Anal.*, 2023. drad053.
- [10] C. Astuto, D. Boffi, J. Haskovec, P. Markowich, and G. Russo, “Comparison of two aspects of a PDE model for biological network formation,” *Mathematical and Computational Applications*, vol. 27, no. 5, 2022.
- [11] F. Bertrand, D. Boffi, and H. Schneider, “Discontinuous Petrov–Galerkin Approximation of Eigenvalue Problems,” *Comput. Methods Appl. Math.*, vol. 23, no. 1, pp. 1–17, 2023.
- [12] F. Bertrand, D. Boffi, and A. Halim, “A reduced order model for the finite element approximation of eigenvalue problems,” *Comput. Methods Appl. Mech. Engrg.*, vol. 404, pp. Paper No. 115696, 26, 2023.
- [13] D. Boffi, F. Credali, and L. Gastaldi, “On the interface matrix for fluid-structure interaction problems with fictitious domain approach,” *Comput. Methods Appl. Mech. Engrg.*, vol. 401, no. part B, pp. Paper No. 115650, 23, 2022.
- [14] L. Alzaben, F. Bertrand, and D. Boffi, “On the spectrum of the finite element approximation of a three field formulation for linear elasticity,” *Ex. Countex.*, vol. 2, pp. Paper No. 100076, 6, 2022.
- [15] L. Alzaben, F. Bertrand, and D. Boffi, “On the spectrum of an operator associated with least-squares finite elements for linear elasticity,” *Comput. Methods Appl. Math.*, vol. 22, no. 3, pp. 511–528, 2022.
- [16] D. Boffi and L. Gastaldi, “Existence, uniqueness, and approximation of a fictitious domain formulation for fluid-structure interactions,” *Atti Accad. Naz. Lincei Rend. Lincei Mat. Appl.*, vol. 33, no. 1, pp. 109–137, 2022.
- [17] A. Cioncolini and D. Boffi, “Superconvergence of the MINI mixed finite element discretization of the Stokes problem: an experimental study in 3D,” *Finite Elem. Anal. Des.*, vol. 201, pp. Paper No. 103706, 12, 2022.
- [18] F. Bertrand, D. Boffi, and H. Schneider, “DPG approximation of eigenvalue problems,” *arXiv preprint 2012.06623*, 2020.

- [19] D. Boffi and L. Gastaldi, “On the existence and the uniqueness of the solution to a fluid-structure interaction problem,” *Journal of Differential Equations*, vol. 279, pp. 136–161, 2021.
- [20] F. Bertrand, D. Boffi, and G. de Diego, “Convergence analysis of the scaled boundary finite element method for the laplace equation,” *Advances in Computational Mathematics*, vol. 47, no. 34, 2021.
- [21] D. Boffi, J. Guzmán, and M. Nielan, “Convergence of Lagrange finite elements for the Maxwell eigenvalue problem in 2D,” *IMA Journal of Numerical Analysis*, 2022. drab104.
- [22] F. Bertrand, D. Boffi, and R. Ma, “An adaptive finite element scheme for the hellinger-reissner elasticity mixed eigenvalue problem,” *Comput. Methods Appl. Math.*, vol. 21, no. 3, pp. 501–512, 2021.
- [23] F. Bertrand and D. Boffi, “Least-squares for linear elasticity eigenvalue problem,” *Computers and Mathematics with Applications*, vol. 95, pp. 19–27, 2021.
- [24] F. Bertrand and D. Boffi, “First order least-squares formulations for eigenvalue problems,” *IMA J. Numer. Anal.*, vol. 42, no. 2, pp. 1339–1363, 2022.
- [25] D. Boffi, F. Gardini, and L. Gastaldi, “Approximation of pde eigenvalue problems involving parameter dependent matrices,” *Calcolo*, vol. 57, no. 41, pp. 1–21, 2020.
- [26] D. Boffi, Z. Lu, and L. Pavarino, “Iterative ILU preconditioners for linear systems and eigenproblems,” *Journal of Computational Mathematics*, vol. 39, pp. 633–654, 2021.
- [27] D. Boffi, L. Gastaldi, and S. Wolf, “Higher-order time-stepping schemes for fluid-structure interaction problems,” *Discrete & Continuous Dynamical Systems - B*, vol. 25, no. 10, pp. 3807–3830, 2020.
- [28] F. Bertrand, D. Boffi, and R. Stenberg, “Asymptotically exact a posteriori error analysis for the mixed Laplace eigenvalue problem,” *Comput. Methods Appl. Math.*, vol. 20, no. 2, pp. 215–225, 2020.
- [29] A. Cioncolini and D. Boffi, “The mini mixed finite element for the stokes problem: An experimental investigation,” *Computers and Mathematics with Applications*, vol. 77, no. 9, pp. 2432–2446, 2019.
- [30] D. Boffi and L. Gastaldi, “Adaptive finite element method for the Maxwell eigenvalue problem,” *SIAM J. Numer. Anal.*, vol. 57, no. 1, pp. 478–494, 2019.
- [31] D. Boffi, L. Gastaldi, R. Rodríguez, and I. Šebestová, “A posteriori error estimates for maxwell’s eigenvalue problem,” *Journal of Scientific Computing*, vol. 78, no. 2, pp. 1250–1271, 2019.
- [32] D. Boffi and R. Stenberg, “A remark on finite element schemes for nearly incompressible elasticity,” *Computers and Mathematics with Applications*, no. 74, pp. 2047–2055, 2017.
- [33] D. Boffi and D. A. Di Pietro, “Unified formulation and analysis of mixed and primal discontinuous skeletal methods on polytopal meshes,” *ESAIM: Mathematical Modelling and Numerical Analysis*, vol. 52, no. 1, pp. 1–28, 2018.
- [34] Ö. Türk, D. Boffi, and R. Codina, “A stabilized finite element method for the two-field and three-field stokes eigenvalue problems,” *Comp. Meth. Appl. Mech. Eng.*, vol. 310, pp. 886–905, 2016.
- [35] D. Boffi, L. Gastaldi, R. Rodríguez, and I. Šebestová, “Residual-based *a posteriori* error estimation for the Maxwell’s eigenvalue problem,” *IMA J. Numer. Anal.*, vol. 37, no. 4, pp. 1710–1732, 2017.
- [36] D. Boffi and L. Gastaldi, “A fictitious domain approach with distributed lagrange multiplier for fluid-structure interactions,” *Numer. Math.*, vol. 135, no. 3, pp. 711–732, 2017.
- [37] D. Boffi, M. Botti, and D. A. Di Pietro, “A nonconforming high-order method for the biot problem on general meshes,” *SIAM J. Sci. Comp.*, vol. 38, no. 3, pp. A1508–A1537, 2016.
- [38] D. Boffi, D. Gallistl, F. Gardini, and L. Gastaldi, “Optimal convergence of adaptive fem for eigenvalue clusters in mixed form,” *Math. Comp.* To appear.
- [39] D. Boffi, N. Cavallini, and L. Gastaldi, “The finite element immersed boundary method with distributed lagrange multiplier,” *SIAM J. Numer. Anal.*, vol. 53, no. 6, pp. 2584–2604, 2015.
- [40] D. Boffi and L. Gastaldi, “Discrete models for fluid-structure interactions: the finite element immersed boundary method,” *Discrete and Continuous Dynamical Systems, Series S*, vol. 9, no. 1, pp. 89–107, 2016.
- [41] D. Boffi, R. G. Durán, F. Gardini, and G. Lucia, “A posteriori error analysis for nonconforming approximation of multiple eigenvalues,” *Mathematical Methods in the Applied Sciences*. To appear.
- [42] D. Boffi, L. Gastaldi, and M. Ruggeri, “Mixed formulation for interface problems with distributed

- Lagrange multiplier,” *Comp. Math. Appl.*, vol. 68, pp. 2151–2166, 2014.
- [43] F. Auricchio, D. Boffi, L. Gastaldi, A. Lefieux, and A. Reali, “On a fictitious domain method with distributed Lagrange multiplier for interface problems,” *Appl. Numer. Math.*, vol. 95, pp. 36–50, 2015.
- [44] F. Auricchio, D. Boffi, L. Gastaldi, A. Lefieux, and A. Reali, “A study on unfitted 1D finite element methods,” *Comp. Math. Appl.*, vol. 68, pp. 2080–2102, 2014.
- [45] D. N. Arnold, D. Boffi, and F. Bonizzoni, “Finite element differential forms on curvilinear cubic meshes and their approximation properties,” *Numer. Math.*, vol. 129, pp. 1–20, 2015.
- [46] D. Boffi and L. Gastaldi, “Some remarks on finite element approximation of multiple eigenvalues,” *Appl. Numer. Math.*, vol. 79, pp. 18–28, 2014.
- [47] D. Boffi, A. Buffa, and L. Gastaldi, “Convergence analysis for hyperbolic evolution problems in mixed form,” *Applied Numerical Mathematics*, vol. 20, no. 4, pp. 541–556, 2013.
- [48] D. Boffi, N. Cavallini, F. Gardini, and L. Gastaldi, “Stabilized Stokes elements and local mass conservation,” *Bollettino U.M.I.*, vol. 9, no. V, pp. 543–573, 2012.
- [49] D. Boffi, “The immersed boundary method for fluid-structure interactions: mathematical formulation and numerical approximation,” *Bollettino U.M.I.*, vol. 9, no. V, pp. 711–724, 2012.
- [50] D. Boffi and L. Gastaldi, “Some remarks on quadrilateral mixed finite elements,” *Computers & Structures*, vol. 87, pp. 751–757, 2009.
- [51] D. Boffi, N. Cavallini, F. Gardini, and L. Gastaldi, “Local mass conservation of Stokes finite elements,” *J. Sci. Comput.*, vol. 52, no. 2, pp. 383–400, 2012.
- [52] D. Boffi, N. Cavallini, and L. Gastaldi, “Finite element approach to immersed boundary method with different fluid and solid densities,” *Math. Models Methods Appl. Sci.*, vol. 21, no. 12, pp. 2523–2550, 2011.
- [53] D. Boffi, M. Costabel, M. Dauge, L. Demkowicz, and R. Hiptmair, “Discrete compactness for the  $p$ -version of discrete differential forms,” *SIAM J. Numer. Anal.*, vol. 49, no. 1, pp. 135–158, 2011.
- [54] D. Boffi, “Finite element approximation of eigenvalue problems,” *Acta Numer.*, vol. 19, pp. 1–120, 2010.
- [55] D. Boffi, F. Brezzi, and M. Fortin, “Reduced symmetry elements in linear elasticity,” *Commun. Pure Appl. Anal.*, vol. 8, no. 1, pp. 95–121, 2009.
- [56] D. Boffi, L. Gastaldi, L. Heltai, and C. S. Peskin, “On the hyper-elastic formulation of the immersed boundary method,” *Comput. Methods Appl. Mech. Engrg.*, vol. 197, no. 25-28, pp. 2210–2231, 2008.
- [57] D. Boffi, L. Gastaldi, and L. Heltai, “Numerical stability of the finite element immersed boundary method,” *Math. Models Methods Appl. Sci.*, vol. 17, no. 10, pp. 1479–1505, 2007.
- [58] D. Boffi, “Approximation of eigenvalues in mixed form, discrete compactness property, and application to  $hp$  mixed finite elements,” *Comput. Methods Appl. Mech. Engrg.*, vol. 196, no. 37-40, pp. 3672–3681, 2007.
- [59] D. Boffi, L. Gastaldi, and L. Heltai, “On the CFL condition for the finite element immersed boundary method,” *Comput. & Structures*, vol. 85, no. 11-14, pp. 775–783, 2007.
- [60] D. Boffi, L. Gastaldi, and L. Heltai, “Stability results and algorithmic strategies for the finite element approach to the immersed boundary method,” in *Numerical mathematics and advanced applications*, pp. 575–582, Berlin: Springer, 2006.
- [61] D. Boffi, M. Conforti, and L. Gastaldi, “Modified edge finite elements for photonic crystals,” *Numer. Math.*, vol. 105, no. 2, pp. 249–266, 2006.
- [62] D. Boffi and L. Gastaldi, “Interpolation estimates for edge finite elements and application to band gap computation,” *Appl. Numer. Math.*, vol. 56, no. 10-11, pp. 1283–1292, 2006.
- [63] D. Boffi, “On the finite element method on quadrilateral meshes,” *Appl. Numer. Math.*, vol. 56, no. 10-11, pp. 1271–1282, 2006.
- [64] D. Boffi, M. Costabel, M. Dauge, and L. Demkowicz, “Discrete compactness for the  $hp$  version of rectangular edge finite elements,” *SIAM J. Numer. Anal.*, vol. 44, no. 3, pp. 979–1004, 2006.
- [65] D. Boffi, F. Kikuchi, and J. Schöberl, “Edge element computation of Maxwell’s eigenvalues on general

- quadrilateral meshes,” *Math. Models Methods Appl. Sci.*, vol. 16, no. 2, pp. 265–273, 2006.
- [66] D. N. Arnold, D. Boffi, and R. S. Falk, “Quadrilateral  $H(\text{div})$  finite elements,” *SIAM J. Numer. Anal.*, vol. 42, no. 6, pp. 2429–2451 (electronic), 2005.
- [67] D. Boffi and L. Gastaldi, “Analysis of finite element approximation of evolution problems in mixed form,” *SIAM J. Numer. Anal.*, vol. 42, no. 4, pp. 1502–1526 (electronic), 2004.
- [68] D. Boffi and L. Gastaldi, “Stability and geometric conservation laws for ALE formulations,” *Comput. Methods Appl. Mech. Engrg.*, vol. 193, no. 42-44, pp. 4717–4739, 2004.
- [69] D. Boffi and L. Gastaldi, “On the time-harmonic Maxwell equations in general domains,” in *Numerical mathematics and advanced applications*, pp. 243–253, Springer Italia, Milan, 2003.
- [70] D. Boffi, L. Demkowicz, and M. Costabel, “Discrete compactness for  $p$  and  $hp$  2D edge finite elements,” *Math. Models Methods Appl. Sci.*, vol. 13, no. 11, pp. 1673–1687, 2003.
- [71] D. Boffi and L. Gastaldi, “A finite element approach for the immersed boundary method,” *Comput. & Structures*, vol. 81, no. 8-11, pp. 491–501, 2003. In honour of Klaus-Jürgen Bathe.
- [72] D. Boffi and L. Gastaldi, “On the quadrilateral  $Q_2$ - $P_1$  element for the Stokes problem,” *Internat. J. Numer. Methods Fluids*, vol. 39, no. 11, pp. 1001–1011, 2002.
- [73] D. Boffi and L. Gastaldi, “Edge finite elements for the approximation of Maxwell resolvent operator,” *M2AN Math. Model. Numer. Anal.*, vol. 36, no. 2, pp. 293–305, 2002.
- [74] D. N. Arnold, D. Boffi, and R. S. Falk, “Approximation by quadrilateral finite elements,” *Math. Comp.*, vol. 71, no. 239, pp. 909–922 (electronic), 2002.
- [75] D. Boffi and L. Gastaldi, “Eigenmodes computation on quadrilateral meshes,” *Comput. Vis. Sci.*, vol. 4, no. 2, pp. 87–92, 2001. Second AMIF International Conference (Il Ciocco, 2000).
- [76] D. N. Arnold, D. Boffi, R. S. Falk, and L. Gastaldi, “Finite element approximation on quadrilateral meshes,” *Comm. Numer. Methods Engrg.*, vol. 17, no. 11, pp. 805–812, 2001.
- [77] D. Boffi, “A note on the de Rham complex and a discrete compactness property,” *Appl. Math. Lett.*, vol. 14, no. 1, pp. 33–38, 2001.
- [78] D. Boffi, M. Farina, and L. Gastaldi, “On the approximation of Maxwell’s eigenproblem in general 2D domains,” *Computers & Structures*, vol. 79, pp. 1089–1096, 2001.
- [79] D. Boffi, “Fortin operator and discrete compactness for edge elements,” *Numer. Math.*, vol. 87, no. 2, pp. 229–246, 2000.
- [80] D. Boffi, C. Chinosi, and L. Gastaldi, “Approximation of the grad div operator in nonconvex domains,” *CMES Comput. Model. Eng. Sci.*, vol. 1, no. 2, pp. 31–43, 2000.
- [81] D. Boffi, C. Chinosi, and L. Gastaldi, “Penalized approximation of the vibration frequencies of a fluid in a cavity,” *Comput. Visual Sci.*, vol. 3, pp. 19–23, 2000.
- [82] D. Boffi, F. Brezzi, and L. Gastaldi, “On the problem of spurious eigenvalues in the approximation of linear elliptic problems in mixed form,” *Math. Comp.*, vol. 69, no. 229, pp. 121–140, 2000.
- [83] D. Boffi, R. G. Duran, and L. Gastaldi, “A remark on spurious eigenvalues in a square,” *Appl. Math. Lett.*, vol. 12, no. 3, pp. 107–114, 1999.
- [84] D. Boffi, P. Fernandes, L. Gastaldi, and I. Perugia, “Computational models of electromagnetic resonators: analysis of edge element approximation,” *SIAM J. Numer. Anal.*, vol. 36, no. 4, pp. 1264–1290, 1999.
- [85] D. Boffi and G. Cornetti, “A mixed finite element projection method for the incompressible Navier–Stokes equations,” *Pubblicazione IAN/CNR*, vol. 1092, 1998.
- [86] D. Boffi, F. Brezzi, and L. Gastaldi, “On the convergence of eigenvalues for mixed formulations,” *Ann. Scuola Norm. Sup. Pisa Cl. Sci. (4)*, vol. 25, no. 1-2, pp. 131–154, 1997. Dedicated to Ennio De Giorgi.
- [87] E. Alessandrini, D. Boffi, and A. Torelli, “Study of an obstacle vortex free boundary problem,” *Boll. Un. Mat. Ital. A (7)*, vol. 11, no. 3, pp. 747–757, 1997.
- [88] D. Boffi, “Three-dimensional finite element methods for the Stokes problem,” *SIAM J. Numer. Anal.*, vol. 34, no. 2, pp. 664–670, 1997.

- [89] D. Boffi and C. Lovadina, “Remarks on augmented Lagrangian formulations for mixed finite element schemes,” *Boll. Un. Mat. Ital. A (7)*, vol. 11, no. 1, pp. 41–55, 1997.
- [90] D. Boffi and C. Lovadina, “Analysis of new augmented Lagrangian formulations for mixed finite element schemes,” *Numer. Math.*, vol. 75, no. 4, pp. 405–419, 1997.
- [91] E. Alessandrini, D. Boffi, and A. Torelli, “On a new weak formulation for an obstacle vortex free boundary problem,” *Istit. Lombardo Accad. Sci. Lett. Rend. A*, vol. 130, no. 1-2, pp. 237–253 (1997), 1996.
- [92] D. Boffi, “Minimal stabilizations of the  $P_{k+1}$ - $P_k$  approximation of the stationary Stokes equations,” *Math. Models Methods Appl. Sci.*, vol. 5, no. 2, pp. 213–224, 1995.
- [93] D. Boffi and D. Funaro, “An alternative approach to the analysis and the approximation of the Navier-Stokes equations,” *J. Sci. Comput.*, vol. 9, no. 1, pp. 1–16, 1994.
- [94] D. Boffi, “Stability of higher order triangular Hood-Taylor methods for the stationary Stokes equations,” *Math. Models Methods Appl. Sci.*, vol. 4, no. 2, pp. 223–235, 1994.

### **Editorial activity**

- [1] D. Boffi, L. Pavarino, G. Rozza, S. Sacchi, and C. Vergara, eds., *Mathematical and Numerical Modeling of the Cardiovascular System and Applications*, vol. 16 of *SEMA SIMAI Springer Series*. Springer-Verlag, 2018.
- [2] D. Boffi, F. Brezzi, L. F. Demkowicz, R. G. Durán, R. S. Falk, and M. Fortin, *Mixed finite elements, compatibility conditions, and applications*, vol. 1939 of *Lecture Notes in Mathematics*. Berlin: Springer-Verlag, 2008. Lectures given at the C.I.M.E. Summer School held in Cetraro, June 26–July 1, 2006, Edited by Boffi and Lucia Gastaldi.

### **Books or chapters of book (reverse chronological order)**

- [1] D. Boffi, F. Gardini, and L. Gastaldi, “Virtual element approximation of eigenvalue problems,” in *The virtual element method and its applications*, vol. 31 of *SEMA SIMAI Springer Ser.*, pp. 275–320, Springer, Cham, [2022] ©2022.
- [2] F. Bertrand and D. Boffi, “The Prager–Synge theorem in reconstruction based a posteriori error estimation,” in *Contemporary Mathematics, Celebrating 75 Years of Mathematics of Computation* (S. C. Brenner, I. Shparlinski, C.-W. Shu, and D. B. Szyld, eds.), vol. 754, pp. 45–67, AMS, 2020.
- [3] D. Boffi, L. Gastaldi, and L. Heltai, “A distributed lagrange formulation of the finite element immersed boundary method for fluids interacting with compressible solids,” in *Mathematical and Numerical Modeling of the Cardiovascular System and Applications* (D. Boffi, L. Pavarino, G. Rozza, S. Sacchi, and C. Vergara, eds.), pp. 1–21, Springer-Verlag, 2018.
- [4] D. Boffi, F. Hecht, and O. Pironneau, “Distributed Lagrange multiplier for fluid–structure interactions,” in *Numerical Methods for PDEs. Lectures from the fall 2016 thematic quarter at Institut Henri Poincaré* (D. Di Pietro, A. Ern, and L. Formaggia, eds.), pp. 129–145, Springer-Verlag, 2018.
- [5] D. Boffi, F. Brezzi, and M. Fortin, *Mixed finite element methods and applications*, vol. 44 of *Springer Series in Computational Mathematics (SSCM)*. Springer-Verlag, 2013.
- [6] D. Boffi, F. Gardini, and L. Gastaldi, “Some remarks on eigenvalue approximation by finite elements,” in *Frontiers in Numerical Analysis – Durham 2010*, vol. 85 of *Springer Lecture Notes in Computational Science and Engineering*, pp. 1–77, Springer-Verlag, 2012.
- [7] D. Boffi, F. Brezzi, and M. Fortin, “Finite elements for the Stokes problem,” in *Mixed finite elements, compatibility conditions, and applications* (D. Boffi and L. Gastaldi, eds.), vol. 1939 of *Springer Lecture Notes in Mathematics*, pp. 45–100, Springer-Verlag, 2008.
- [8] D. Boffi, “Compatible discretizations for eigenvalue problems,” in *Compatible spatial discretizations*, vol. 142 of *IMA Vol. Math. Appl.*, pp. 121–142, New York: Springer, 2006.

- [9] D. Boffi, “Finite elements for the time harmonic Maxwell’s equations,” in *Computational electromagnetics (Kiel, 2001)*, vol. 28 of *Lect. Notes Comput. Sci. Eng.*, pp. 11–22, Berlin: Springer, 2003.

***Papers in refereed proceedings (reverse chronological order)***

- [1] M. M. Alghamdi, F. Bertrand, D. Boffi, F. Bonizzoni, A. Halim, and G. Priyadarshi, “On the matching of eigensolutions to parametric partial differential equations,” in *Eccomas22*, www.scipedia.com, 2022.
- [2] F. Bertrand and D. Boffi, “A counterexample for the inf-sup stability of the  $RT_0 - P_1 \subset L^2 \times H_0^1$  finite element combination for the mixed poisson equation,” in *Proceedings in Applied Mathematics and Mechanics - 90th GAMM Annual Meeting - 2019*, vol. 19, Wiley, 2019.
- [3] F. Bertrand, D. Boffi, and R. Stenberg, “A posteriori error analysis for the mixed laplace eigenvalue problem: investigations for the BDM-element,” in *Proceedings in Applied Mathematics and Mechanics - 90th GAMM Annual Meeting - 2019*, vol. 19, Wiley, 2019.
- [4] D. Boffi, N. Cavallini, and L. Gastaldi, “Advances in the mathematical theory of the finite element immersed boundary methods,” in *Progress in Industrial Mathematics at ECMI 2014. Mathematics in Industry 22* (G. Russo, V. Capasso, G. Nicosia, and V. Romano, eds.), pp. 303–310, Springer, 2016.
- [5] D. Boffi, N. Cavallini, G. Francesca, and L. Gastaldi, “Mass preserving distributed lagrange multiplier approach to immersed boundary method,” in *COUPLED PROBLEMS 2013* (S. Idelsohn, M. Papradakakis, and B. Schrefler, eds.), pp. 323–334, Cimne, 2013.
- [6] D. Boffi, N. Cavallini, G. Francesca, and L. Gastaldi, “Immersed boundary method: performance analysis of popular finite element spaces,” in *COUPLED PROBLEMS 2011* (M. Papradakakis, E. Oñate, and B. Schrefler, eds.), pp. 1–12, Cimne, 2011.
- [7] D. Boffi, “Discrete differential forms, approximation of eigenvalue problems, and application to the  $p$  version of edge finite elements,” in *Numerical Mathematics and Advanced Applications 2009* (G. Kreiss, P. Lötstedt, A. Målqvist, and M. Neytcheva, eds.), pp. 3–14, Springer-Verlag, 2010.
- [8] D. Boffi, L. Gastaldi, and L. Heltai, “The finite element immersed boundary method: model, stability, and numerical results,” in *COUPLED PROBLEMS 2005* (M. Papradakakis, E. Oñate, and B. Schrefler, eds.), Cimne, 2005.
- [9] D. Boffi, L. Gastaldi, and L. Heltai, “Stability results for the finite element approach to the immersed boundary method,” in *Computational fluid and solid mechanics 2005* (K.-J. Bathe, ed.), pp. 93–96, 2005.
- [10] D. Boffi, L. Gastaldi, and L. Heltai, “A finite element approach to the immersed boundary method,” in *Progress in Engineering Computational Technology* (B. Topping and C. Mota Soares, eds.), ch. 12, pp. 271–298, Stirling: Saxe-Coburg Publications, 2004.
- [11] D. Boffi and L. Gastaldi, “The immersed boundary method: a finite element approach,” in *Computational fluid and solid mechanics 2003* (K.-J. Bathe, ed.), pp. 1263–1266, 2003.
- [12] D. Boffi, “On the time harmonic Maxwell equations,” in *Proceedings of the JEE’02 Symposium* (B. Michielsen and F. Dacavèle, eds.), pp. 25–28, 2002.
- [13] D. Boffi, L. Gastaldi, and G. Naldi, “Application of Maxwell equations,” in *SIMAI 2002*, 2002.
- [14] D. Arnold, D. Boffi, and R. Falk, “Remarks on quadrilateral Reissner–Mindlin plate elements,” in *WCCM V, Fifth Congress on Computational Mechanics* (H. Mang, F. Rammerstorfer, and J. Eberhardsteiner, eds.), 2002.
- [15] D. Boffi and L. Gastaldi, “On the “ $-\text{grad div} + s \text{ curl rot}$ ” operator,” in *Computational fluid and solid mechanics, Vol. 1, 2 (Cambridge, MA, 2001)*, pp. 1526–1529, Amsterdam: Elsevier, 2001.
- [16] D. Boffi and L. Gastaldi, “On the q2-p1 stokes element,” in *Proceedings of the 14th Nordic Seminar on Computational Mechanics* (Beldie et als., ed.), pp. 91–93, 2002.
- [17] D. Boffi and L. Gastaldi, “Remarks on quadrilateral finite elements for a fluid-structure eigenproblem,” in *European Congress on Computational Methods in Applied Sciences and Engineering. EC-*

COMAS 2000, 2000.

- [18] D. Boffi and L. Gastaldi, "Finite element approximation of maxwell's eigenproblem," in *Proceedings of Enumath99* (P. Neittaanmäki, T. Tiihonen, and P. Tarvainen, eds.), pp. 502–509, Singapore: World Scientific, 2000.
- [19] D. Boffi, P. Fernandes, L. Gastaldi, and I. Perugia, "Edge approximation of eigenvalue problems arising from electromagnetics," in *Numerical methods in Engineering '96* (Desideri, L. Tallec, Oñate, Periaux, and Stein, eds.), pp. 502–509, 1996.
- [20] D. Boffi, F. Brezzi, and L. Gastaldi, "Mixed finite elements for Maxwell's eigenproblem: the question of spurious modes," in *ENUMATH 97 (Heidelberg)*, pp. 180–187, World Sci. Publ., River Edge, NJ, 1998.