Curriculum vitæ

Lorenzo A. Botti

1 Personal Information

Family name	Botti
First name	Lorenzo Alessio
Citizenship	Italian, French
Job position	Full Professor
Affiliation	Università degli Studi di Bergamo, Department of Engineering and Applied Sciences.
Web (me@)	ORCID, Google Scholar, Scopus, unibg.
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Address (work)	Viale Marconi 5, 24044, Dalmine, Italy.

2 Work Experience

Dates	November 2019 - Present
Job position	**Professor** (Associate 2019-2024, Full 2024-Present), Department of Engineering and Applied Sciences, University of Bergamo.
Teaching	Fluid mechanics, Bachelor's Degree in Mechanical Engineering. Turbulence modeling, Master's Degree in Mechanical Engineering. Discontinuous Galerkin methods for continuum mechanics, PhD program.
Research	European research project "HIFI-TURB: HIgh-FIdelity LES/DNS data for innovative TURBulence models", HORIZON 2020 - Multidisciplinary and collaborative aircraft design tools and processes 2019-2022. European research project "ROSAS: RObust simulation Systems exploiting AI based turbulence models and hight-fidelity algorithmS", HORIZON Europe - Energy, Climate, Mobility 2025-2028. International Research Training Group on "Droplet Interaction Technologies (DROPIT)", in collaboration with the Institute for Aerospace Thermodynamics, Stuttgart University.

Dates	September 2014 - November 2019.
Job Position	**Lecturer** (RTD-A 2014-2016, RTD-B 2016-2019), Department of Engineering and Applied Sciences, University of Bergamo.
Teaching	Biofluid mechanics, Bachelor's Degree in Technologies for Health. Turbulence modeling, Master's Degree in Mechanical Engineering.
Research	European research project "Towards industrial LES/DNS in Aeronautics - Paving the way for future Accurate CFD" (TILDA) HORIZON 2020 - Mobility for Growth 2014-2018.

Dates	May 2013 - July 2014
Job position	**Scientist**, Orobix SRL, Bergamo, Italy.
Job description	Development and implementation of image analysis algorithms and machine learning tools for medical-image segmentation. Development of the discontinuous Galerkin solver MultiDGetto for hemodynamics on the cloud based on the VMTKlab platform. Management of cloud computing resources (Amazon EC2) for high performance computing.

Research	European research project "CREACTIVE: Collaborative REsearch on ACute Traumatic brain Injury in intensiVe care medicine in Europe", Seventh Framework Program (FP7/2007-2013).

Dates	June 2011 - May 2013.
Job Position	**Postdoctoral researcher**, Department of Industrial Engineering, University of Bergamo, Dalmine, Italy.
Research	European research project "IDIHIOM: Industrialization of High-Order Methods - A Top-Down Approach, Seventh Framework Program (FP7/2007-2013). PRIN 2008: "Development of a C++ platform (SpaFEDTe) for high-order accurate computational fluid dynamics and aeroacoustic computations".

Dates	January 2010 - May 2011.
Job position	**Postdoctoral researcher**, Medical Imaging Unit, Mario Negri Institute for Pharmacological Research, Bergamo, Italy.
Research	European research project "ARCH: Patient-specific image-based computational modelling for improvement of short- and long-term outcome of vascular access in patients on hemodialysis therapy, Seventh Framework Program (FP7/2007-2013).

Dates	May - July 2008 and March - August 2009.
Job position	**Research fellow**, Department of Industrial Engineering, University of Bergamo, Dalmine, Italy.
Research	European project "ADIGMA: Adaptive Higher-Order Variational Methods for Aerodynamic Applications in Industry", Sixth Framework Program (FP6-Aerospace/2002-2006).

Dates	September 2008 - February 2009.
Job position	**Graduate student internship**, Department of Applied Mathematics, IFP Energies nouvelles (French oil institute), 1 et 4 avenue de Bois-Préau - 92852 Rueil-Malmaison, France.
Job description	Implementation of discontinuous Galerkin formulations for the incompressible Navier-Stokes equations in the massively parallel Arcane C++ framework.

3 Scientific habilitation

Date	July 2020
Institution	Ministero dell'Istruzione dell'Università e della Ricerca (MIUR, Italy)
Commission	National Scientific Commission for Aeronautics, Aerospace and Naval Engineering (Abilitazione Scientifica Nazionale, Settore concorsuale 09/A1).
Qualified as	Full Professor.
Date	April 2016
Institution	Ministero dell'Istruzione dell'Università e della Ricerca (MIUR, Italy)
Commission	National Scientific Commission for Aeronautics, Aerospace and Naval Engineering (Abilitazione Scientifica Nazionale, Settore concorsuale 09/A1).
Qualified as	Associate Professor.
Date	February 2013
Institution	Ministère de l'Einsegnement Supérieur et de la Recherche (France)
Commission	Conseil National des Université (CNU).
Qualified as	Maître de Conférences in Mechanical and Civil Engineering (Section 60) and Applied Mathematics and Application of Mathematics (Section 26).

4 Education and Training

Dates	January 2007 - December 2009.

Institution	University of Bergamo, Dalmine, Italy.
Title	Research doctorate (PhD).
Dates	1999 - 2006.
Institution	University of Bergamo, Dalmine, Italy.
Title	MSc in Mechanical Engineering.

5 Technical know-how

Programming Languages	C++, Python, Fortran, Closure.
Programming Paradigms	Template meta-programming, functional programming, multithreaded concurrency, MPI (Message Passing Interface) based parallelism.
Iterative solution of linear systems	Linear algebra libraries: Eigen 3, PETSc, ViennaCL, Paralution, Ginkgo.
Numerical solution of PDEs	Open-source libraries for Finite Volume and Finite Element discretizations: libmesh, dealII, FEniCS, OpenFOAM, SpaFEDTe (lead developer).
Image segmentation, Visualization	VMTK, Paraview, VTK, Itk.
Machine learning	Balsa C++ random forest library (developer).

6 Work Activities

Main Projects

DROPIT - International Research Training Group on Droplet Interaction Technologies (as principal investigator of subproject "High-order numerical methods for multi-component incompressible flows in pools", Drop-Liquid Interaction Thematic Area).

HIFI-TURB, HORIZON 2020 - HIgh-Fidelity LES/DNS data for innovative TURBulence models, Multidisciplinary and collaborative aircraft design tools and processes (as research assistant).

TILDA, HORIZON 2020 - Towards industrial LES/DNS in Aeronautics, Paving the way for future Accurate CFD (as research assistant).

IDIHIOM, FP7/2007-2013 - Industrialization of High-Order Methods, A Top-Down Approach (as research assistant).

ARCH, FP7/2007-2013 - Patient-specific image-based computational modelling for improvement of short- and long-term outcome of vascular access in patients on hemodialysis therapy (as research assistant).

ADIGMA, FP6/2002-2006 - A European project on the development and implementation of adaptive higher order variational methods for aerospace applications (as research assistant).

Teaching Activity

Fluid mechanics (72h), Bachelor's Degree in Mechanical Engineering, University of Bergamo, AY: 2020-2021, 2021-2022, 2022-2023.

Biofluid mechanics (48h), Bachelor's Degree in Technologies for Health, University of Bergamo, AY: 2017-2018, 2018-2019.

Turbulence modeling (24h), Master's Degree in Mechanical Engineering (module of the thermo-fluid-dynamics course), University of Bergamo, All AYs 2014-2023.

Discontinuous Galerkin methods for continuum mechanics (16h), PhD program in Engineering and Applied Sciences, University of Bergamo, AY: 2020-2021, 2021-2022, 2022-2023.

Modeling and Simulation (8h), Single Cycle Master's degree program in Medicine and Surgery, University of Milano Bicocca in partnership with University of Surrey (UK), University of Bergamo and the Papa Giovanni XXIII Hospital. AY: 2020-2021, 2021-2022, 2022-2023.

Nonconforming high-order methods for elliptic problems, "Journées Numériques a Nice 2016", Laboratoire Dieudonné, Université de Nice Sophia Antipolis.

A CFD solver for the Android platform (running on smartphone and tablets), Innovative teaching project for B.D. in Mechanical Engineering funded by University of Bergamo.

Visiting Professor Activities

Invited by the School of Mathematics for a one month stay at Monash University. Contact: Prof. Jérôme Droniou. 31 January - 24 February 2020, Melbourne, Australia.

Invited by Centre National de la Recherche Scientifique (CNRS) for a three months stay at Institut Montpelliérain Alexander Grothendieck, University of Montpellier. Contact: Prof. Daniele Antonio Di Pietro. 01 April - 30 June 2019, Montpellier, France.

Tutoring Activities

Supervision of PhD Thesis on "Nonconforming Finite Element Methods for Nonlinear Elasticity Problems Featuring Finite Deformations and Frictionless Contact Constraints", Author: Luca Verzeroli. PhD funded by Serioplast SPA - Packaging Group.

Supervision of B.D. and M.D. theses.

Institutional responsibilities

Member of the board of the Department of Engineering and Applied Sciences, University of Bergamo (since 2016).

Member of the Teachers' Committee of the PhD Program in Engineering and Applied Sciences, University of Bergamo (since 2018).

Editorial activity

I have acted as a referee for international journals in the field of computational fluid mechanics, scientific computing and applied mathematics. A non-comprehensive list reads as follows: Journal of Computational Physics, Journal of Scientific Computing, SIAM Journal on Scientific Computing, Computers & Fluids, Cardiovascular Engineering and Technology, International Journal of Artificial Organs, International Journal of Computational Fluid Dynamics, Mathematical Modelling and Numerical Analysis, Frontiers in Physics.

Invited Talks

Multilevel solution strategies for discontinuous Galerkin methods in continuum mechanics (Keynote presentation). Monash Workshop on Numerical Differential Equations and Applications, 10-14 February, 2020. Monash University, Melbourne, Australia.

Multilevel solution strategies for dG and HHO methods. Workshop of Fast4HHO project founded by ANR, 7 September, 2018. Institut Henry Poincaré, Paris, France.

Hybrid High Order methods on curved elements meshes. Workshop on Polytopal Elements Methods in Mathematics and Engineering (POEMS), 5-7 July, 2017. Bicocca University, Milan, Italy.

Agglomeration based h-multigrid discontinuous Galerkin methods with application to elliptic and incompressible fluid flow problems. Workshop on Recent Development in High-Order Discontinuous Galerkin Finite Element schemes, 23 March, 2016. Department of Applied Mathematics, University of Trento, Italy.

Agglomeration based h-multigrid discontinuous Galerkin methods with application to elliptic and incompressible fluid flow problems. Invited talk, 18 March, 2016. Department of Applied Mathematics, University of Montpellier, France.

Agglomeration based dG discretizations for hemodynamics. Invited talk, 19 February, 2013. Department of Applied Mathematics, University of Montpellier, France.

On the accuracy of dG discretizations on curved and polygonal elements meshes. Workshop on Polygonal and Polyhedral Meshes, 18 September, 2012. Bicocca University, Milan, Italy.

Congress Presentations

p-Multivel solution strategies for HHO discretizations. MAFELAP 2019, The Mathematics of Finite Elements and Applications, 18-21 June, 2019. Brunel University, London, United Kingdom.

Multivel solution strategies for dG and HHO discretizations. POEMs 2019, Polytopal Element Methods in Mathematics and Engineering, 29 April- 3 May, 2019. CIRM, Marseille, France.

Multilevel solution strategies for discontinuous Galerkin discretizations of incompressible flow problems. ECFD (ECCOMAS) 2018, 7th European Conference on Computational Fluid Dynamics, 11-15 June, 2018. Scottish Event Campus, Glasgow, United Kingdom.

Agglomeration based h-multigrid solution strategies for discontinuous Galerkin dicretizations of incompressible flow problems. DD XXIV, International Conference On Domain Decomposition Methods, 6-10 February, 2017. Longyearbyen, Svalbard, Norway.

Can h-multigrid redeem coupled variable dG discretizations of the incompressible Navier-Stokes equations? X-DMS 2015, eXtended Discretization MethodS, ECCOMAS thematic conference, 9-11 September, 2015. Palazzo Tassoni Estense, Ferrara, Italy.

Agglomeration-based physical frame dG discretizations for high order accurate CFD. ECCOMAS 2012, European Congress on Computational Methods in Applied Sciences and Engineering, 10-14 September, 2012. University of Vienna, Austria.

Agglomeration-based dG discretizations for high order accurate hemodynamics. SIMAI 2012, Congresso biannuale della Società Italiana di Matematica Applicata ed Industriale, 25-28 June, 2012. Politecnico di Torino, Italy

An open source parallel AMR FE solver for hemodynamics based on the libMesh C++ library. ESB 2008, 16th Congress of the European Society of Biomechanics, 6-9 July, 2008. Lucerne, Switzerland.

Industrial collaborations

Micronit (2023): CFD analysis of a microfluidic Artery-On-A-Chip device designed to unravel novel regulators and therapeutic targets in vascular diseases.

Diapath SPA (2022): Computational modeling of FFPE (Formaline-Fixed Paraffine-Embedded) preparation of liver tissue samples. Simulation of dehydration and clearing as anisotropic (tortuosity and porosity dependent) mass diffusion in porous media.

Serioplast SPA (2021): Computational modelling of blow molding processes for the production of rigid plastic packages. Development of nonconforming finite element methods for computational contact mechanics.

Cogne Acciai Speciali SPA (2018): Simulation of induction furnace's escaped emissions for reducing environmental impact of metal melting processes.

Orobix SPA (2016): Modeling and optimisation of transcranial Direct Current Stimulation (tDCS). Development of a Discontinuous Galerkin solver for the Poisson problem featuring anisotropic heterogeneous coefficients on octree meshes.

Medtronic SPA (2016): Investigation of efficient solution strategies and evaluation of effective boundary conditions for hemodynamics computations featuring multiple artificial boundaries.

Orobix SPA (2014): Development of a Discontinuous Galerkin solver for hemodynamics with efficient h-multigrid solution strategy. Currently available as part of VMTKLab.

Mario Negri Institute For Pharmacological Research (2011): Simulation of idealised anastomoses geometries and derivation of flow-pressure drop relations for the 0D/1D upper body circulation modeling tool pyNS. Currently available as part of the web based system AVF.SYM.

Computer codes

Gnuid: Open-source computational hemodynamics with segregated solution strategy.

pyNS: A modular solver framework for 0D/1D hemodynamics.

SpaFEDTe: C++ library for nonconforming discretizations with application to incompressible Navier-Stokes, Darcy, Brinkman, poroelasticity, nonlinear elasticity, and contact mechanics.

MultiDGetto: Computational hemodynamics with agglomeration based h-multigrid solution strategy. Implemented in the VMTKlab platform.

Balsa: Random Decision Forest library for machine learning written in functional C++ style.

7 Research

Shortlist of Research Topics	High-order accurate nonconforming formulations for the numerical solution of PDEs: Discontinuous Galerkin (DG), Hybridizable Discontinuous Galerkin (HDG) and Hybrid High-Order methods (HHO).
	Computational continuum mechanics: Computational Fluid Dynamics (CFD), turbulence modeling (DNS, ILES, RANS) and Computational Contact Mechanics (CCM).
	Efficient multilevel solution strategies for DG, HDG and HHO discretizations.
	High-order accurate discretications on non-polyhedral meshes (with mesh elements featuring curved boundaries) and on very general polytopal elements meshes.
	Distributed and shared memory parallelism on multi- and many-cores architectures.
	Development of scientific computing libraries providing computational modeling tools for implementing nonconforming formulations on general meshes.
Applications	Hemodynamics, aerodynamics, aeronautics, turbomachinery, flow in porous media, poroelasticity, finite deformations of hyperelastic materials (blow molding), multicomponent incompressible flows (drop collisions on liquid).

7.1 Overview of research activity

Partial Differential Equations (PDEs) are widely employed to model physical problems in engineering based on the continuum mechanics and continuum thermodynamics approach. In this context, numerical strategies for the approximate solution of PDEs are carefully designed and validated, in particular, the theoretical results of a-priori convergence analyses can be verified by testing numerical implementations against analytical or manufactured solutions. High-order schemes might achieve satisfactory error reduction (with respect to the exact solution) by enriching the functional representation of the numerical solution, specifically, the convergence rates can be predicted in each region of the computational domain according to the local solution regularity. Besides the aforementioned error reduction capabilities, the efficiency of computational modelling tools is subdued to the availability of effective solution strategies for the large scale sparse equation systems arising from spatial and temporal discretizations, a-posteriori error analysis tools for driving adaptive solution enrichment strategies and effective High Performance Computing (HPC) implementations of the algorithms on parallel architectures.

My research activity deals with development, implementation and validation of numerical methods and solution strategies for numerical methods in the field of fluid mechanics and contact mechanics.

7.2 Papers in peer-reviewed journals

[1] Lorenzo Botti, Daniele A. Di Pietro, and Francesco Carlo Massa. "Hybrid High-order formulations with turbulence modelling capabilities for incompressible flow problems". In: *Computers & Fluids* 305 (2026), p. 106915. ISSN: 0045-7930. DOI: https://doi.org/10.1016/j.compfluid.2025.106915. URL: https://www.sciencedirect.com/science/article/pii/S0045793025003755.

[2] Lorenzo Botti, Michele Botti, Daniele A. Di Pietro, and Francesco Carlo Massa. "Stability, convergence, and pressure-robustness of numerical schemes for incompressible flows with hybrid velocity and pressure". In: *Math. Comp.* (Jan. 2025). ISSN: 1088-6842. DOI: https://doi.org/10.1090/mcom/4049.

[3] Valentina Paloschi, Jessica Pauli, Greg Winski, Zhiyuan Wu, Zhaolong Li, Lorenzo Botti, Sandro Meucci, Pierangelo Conti, Felix Rogowitz, Nadiya Glukha, Nora Hummel, Albert Busch, Ekaterina Chernogubova, Hong Jin, Nadja Sachs, Hans-Henning Eckstein, Anne Dueck, Reinier A. Boon, Andreas R. Bausch, and Lars Maegdefessel. "Utilization of an Artery-on-a-Chip to Unravel Novel Regulators and Therapeutic Targets in Vascular Diseases". In: *Advanced Healthcare Materials* 13.6 (2024), p. 2302907. DOI: https://doi.org/10.1002/adhm.202302907.

[4] L. Verzeroli, F. C. Massa, and L. Botti. "A HDG formulation for nonlinear elasticity problems featuring finite deformations and frictionless contact constraints". In: *Finite Elements in Analysis and Design* 215 (2023), p. 103887. ISSN: 0168-874X. DOI: https://doi.org/10.1016/j.finel.2022.103887.

[5] F. Bassi, L. Botti, A. Colombo, and F. C. Massa. "Assessment of an Implicit Discontinuous Galerkin Solver for Incompressible Flow Problems with Variable Density". In: *Applied Sciences* 12.21 (2022). ISSN: 2076-3417. DOI: 10.3390/app122111229.

[6] L. Botti and D. A. Di Pietro. "p-Multilevel Preconditioners for HHO Discretizations of the Stokes Equations with Static Condensation". In: *Communications on Applied Mathematics and Computation* 4 (2022), pp. 783–822. ISSN: 2661-8893. DOI: https://doi.org/10.1007/s42967-021-00142-5.

[7] L. Botti and F. C. Massa. "HHO Methods for the Incompressible Navier-Stokes and the Incompressible Euler Equations". In: *Journal of Scientific Computing* 92 (2022). ISSN: 1573-7691. DOI: https://doi.org/10.1007/s10915-022-01864-1.

[8] L. Botti and L. Verzeroli. "BR2 discontinuous Galerkin methods for finite hyperelastic deformations". In: *Journal of Computational Physics* 463 (2022), p. 111303. ISSN: 0021-9991. DOI: https://doi.org/10.1016/j.jcp.2022.111303.

[9] L. Botti, M. Botti, and D. A. Di Pietro. "An abstract analysis framework for monolithic discretisations of poroelasticity with application to Hybrid High-Order methods". In: *Computers & Mathematics with Applications* 91 (2021). Robust and Reliable Finite Element Methods in Poromechanics, pp. 150–175. ISSN: 0898-1221. DOI: https://doi.org/10.1016/j.camwa.2020.06.004.

[10] F. Bassi, L. Botti, A. Colombo, A. Crivellini, M. Franciolini, A. Ghidoni, and G. Noventa. "A p-adaptive Matrix-Free Discontinuous Galerkin Method for the Implicit LES of Incompressible Transitional Flows". In: *Flow, Turbulence and Combustion* 105.2 (2020), pp. 437–470. ISSN: 1573-1987. DOI: https://doi.org/10.1007/s10494-020-00178-2.

[11] M. Franciolini, L. Botti, A. Colombo, and A. Crivellini. "p-Multigrid matrix-free discontinuous Galerkin solution strategies for the under-resolved simulation of incompressible turbulent flows". In: *Computers & Fluids* 206 (2020). ISSN: 0045-7930. DOI: https://doi.org/10.1016/j.compfluid.2020.104558.

[12] L. Botti, A. Colombo, A. Crivellini, and M. Franciolini. "h-p-hp-Multilevel discontinuous Galerkin solution strategies for elliptic operators". In: *International Journal of Computational Fluid Dynamics* 33.9 (2019), pp. 362–370. DOI: 10.1080/10618562.2019.1688306. URL: https://doi.org/10.1080/10618562.2019.1688306.

[13] L. Botti, D. A. Di Pietro, and J. Droniou. "A Hybrid High-Order method for the incompressible Navier-Stokes equations based on Temam's device". In: *Journal of Computational Physics* 376 (2019), pp. 786–816. ISSN: 0021-9991. DOI: 10.1016/j.jcp.2018.10.014.

[14] F. Bassi, F. Massa, L. Botti, and A. Colombo. "Artificial compressibility Godunov fluxes for variable density incompressible flows". In: *Computers & Fluids* 169 (2018). Recent progress in nonlinear numerical methods for time-dependent flow & transport problems, pp. 186–200. ISSN: 0045-7930. DOI: 10.1016/j.compfluid.2017.09.010.

[15] L. Botti, N. Paliwal, P. Conti, L. Antiga, and H. Meng. "Modeling hemodynamics in intracranial aneurysms: Comparing accuracy of CFD solvers based on finite element and finite volume schemes". In: *International Journal for Numerical Methods in Biomedical Engineering* 34.9 (2018). DOI: 10.1002/cnm.3111.

[16] L. Botti and D. A. Di Pietro. "Assessment of Hybrid High-Order methods on curved meshes and comparison with discontinuous Galerkin methods". In: *Journal of Computational Physics* 370 (2018), pp. 58–84. ISSN: 0021-9991. DOI: 10.1016/j.jcp.2018.05.017.

[17] L. Botti, D. A. Di Pietro, and J. Droniou. "A Hybrid High-Order discretisation of the Brinkman problem robust in the Darcy and Stokes limits". In: *Computer Methods in Applied Mechanics and Engineering* 341 (2018), pp. 278–310. ISSN: 0045-7825. DOI: 10.1016/j.cma.2018.07.004.

[18] L. Botti, A. Colombo, and F. Bassi. "h-multigrid agglomeration based solution strategies for discontinuous Galerkin discretizations of incompressible flow problems". In: *Journal of Computational Physics* 347 (2017), pp. 382–415. ISSN: 0021-9991. DOI: 10.1016/j.jcp.2017.07.002.

[19] G. Zenoni, T. Leicht, A. Colombo, and L. Botti. "An agglomeration-based adaptive discontinuous Galerkin method for compressible flows". In: *International Journal for Numerical Methods in Fluids* 85.8 (2017), pp. 465–483. DOI: 10.1002/fld.4390.

[20] F. Bassi, L. Botti, A. Colombo, A. Crivellini, N. Franchina, and A. Ghidoni. "Assessment of a high-order accurate Discontinuous Galerkin method for turbomachinery flows". In: *International Journal of Computational Fluid Dynamics* 30.4 (2016), pp. 307–328. DOI: 10.1080/10618562.2016.1198783.

[21] F. Bassi, L. Botti, A. Colombo, A. Crivellini, A. Ghidoni, and F. Massa. "On the development of an implicit high-order Discontinuous Galerkin method for DNS and implicit LES of turbulent flows". In: *European Journal of Mechanics - B\Fluids* 55 (2016). Vortical Structures and Wall Turbulence, pp. 367–379. ISSN: 0997-7546. DOI: 10.1016/j.euromechflu.2015.08.010.

[22] K. Tzirakis, L. Botti, V. Vavourakis, and Y. Papaharilaou. "Numerical modeling of non-Newtonian biomagnetic fluid flow". In: *Computers & Fluids* 126 (2016), pp. 170–180. ISSN: 0045-7930. DOI: 10.1016/j.compfluid.2015.11.016.

[23] F. Bassi, L. Botti, A. Colombo, A. Ghidoni, and F. Massa. "Linearly implicit Rosenbrock-type Runge-Kutta schemes applied to the Discontinuous Galerkin solution of compressible and incompressible unsteady flows". In: *Computers & Fluids* 118 (2015), pp. 305–320. ISSN: 0045-7930. DOI: 10.1016/j.compfluid.2015.06.007.

[24] L. Botti. "A choice of forcing terms in inexact Newton iterations with application to pseudo-transient continuation for incompressible fluid flow computations". In: *Applied Mathematics and Computation* 266 (2015), pp. 713–737. ISSN: 0096-3003. DOI: 10.1016/j.amc.2015.05.136.

[25] S. Manini, L. Antiga, L. Botti, and A. Remuzzi. "pyNS: An Open-Source Framework for 0D Haemodynamic Modelling". In: *Annals of Biomedical Engineering* 43.6 (June 2015), pp. 1461–1473. ISSN: 1573-9686. DOI: 10.1007/s10439-014-1234-y.

[26] F. Bassi, L. Botti, and A. Colombo. "Agglomeration-based physical frame dG discretizations: An attempt to be mesh free". In: *Mathematical Models and Methods in Applied Sciences* 24.08 (2014), pp. 1495–1539. DOI: 10.1142/S0218202514400028.

[27] S. Manini, K. Passera, W. Huberts, L. Botti, L. Antiga, and A. Remuzzi. "Computational model for simulation of vascular adaptation following vascular access surgery in haemodialysis patients". In: *Computer Methods in Biomechanics and Biomedical Engineering* 17.12 (2014). PMID: 23281788, pp. 1358–1367. DOI: 10.1080/10255842.2012.745857.

[28] L. Botti, K. Van Canneyt, R. Kaminsky, T. Claessens, R. N. Planken, P. Verdonck, A. Remuzzi, and L. Antiga. "Numerical Evaluation and Experimental Validation of Pressure Drops Across a Patient-Specific Model of Vascular Access for Hemodialysis". In: *Cardiovascular Engineering and Technology* 4.4 (Dec. 2013), pp. 485–499. ISSN: 1869-4098. DOI: 10.1007/s13239-013-0162-6.

[29] A. Caroli, S. Manini, L. Antiga, K. Passera, B. Ene-Iordache, S. Rota, G. Remuzzi, A. Bode, J. Leermakers, F. N. van de Vosse, R. Vanholder, M. Malovrh, J. Tordoir, and A. Remuzzi on behalf of the ARCH project Consortium. "Validation of a patient-specific hemodynamic computational model for surgical planning of vascular access in hemodialysis patients". In: *Kidney International* 84.6 (2013), pp. 1237–1245. ISSN: 0085-2538. DOI: 10.1038/ki.2013.188.

[30] F. Bassi, L. Botti, A. Colombo, D.A. Di Pietro, and P. Tesini. "On the flexibility of agglomeration based physical space discontinuous Galerkin discretizations". In: *Journal of Computational Physics* 231.1 (2012), pp. 45–65. ISSN: 0021-9991. DOI: 10.1016/j.jcp.2011.08.018.

[31] F. Bassi, L. Botti, A. Colombo, and S. Rebay. "Agglomeration based discontinuous Galerkin discretization of the Euler and Navier-Stokes equations". In: *Computers & Fluids* 61 (2012). High Fidelity Flow Simulations, Onera Scientific Day, pp. 77–85. ISSN: 0045-7930. DOI: 10.1016/j.compfluid.2011.11.002.

[32] L. Botti. "Influence of Reference-to-Physical Frame Mappings on Approximation Properties of Discontinuous Piecewise Polynomial Spaces". In: *Journal of Scientific Computing* 52.3 (Sept. 2012), pp. 675–703. ISSN: 1573-7691. DOI: 10.1007/s10915-011-9566-3.

[33] L. Botti and D. A. Di Pietro. "A pressure-correction scheme for convection-dominated incompressible flows with discontinuous velocity and continuous pressure". In: *Journal of Computational Physics* 230.3 (2011), pp. 572–585. ISSN: 0021-9991. DOI: 10.1016/j.jcp.2010.10.004.

[34] F. Sangalli, F. Carrara, F. Gaspari, D. Corna, C. Zoja, L. Botti, G. Remuzzi, and A. Remuzzi. "Effect of ACE inhibition on glomerular permselectivity and tubular albumin concentration in the renal ablation model". In: *American Journal of Physiology-Renal Physiology* 300.6 (2011). PMID: 21454255, F1291–F1300. DOI: 10.1152/ajprenal.00656.2010.

[35] L. Botti, M. Piccinelli, B. Ene-Iordache, A. Remuzzi, and L. Antiga. "An adaptive mesh refinement solver for large-scale simulation of biological flows". In: *International Journal for Numerical Methods in Biomedical Engineering* 26.1 (2009), pp. 86–100. DOI: 10.1002/cnm.1257.

[36] L. Antiga, M. Piccinelli, L. Botti, B. Ene-Iordache, A. Remuzzi, and D. A. Steinman. "An image-based modeling framework for patient-specific computational hemodynamics". In: *Medical & Biological Engineering & Computing* 46.11 (Nov. 2008), p. 1097. ISSN: 1741-0444. DOI: 10.1007/s11517-008-0420-1.

7.3 Book chapters

[37] F. Bassi, L. Botti, L. Verzeroli, R. Hartmann, J. Jägersküpper, E. Martin, M. Lorteau, P. E. Vincent, F. D. Witherden, B. C. Vermeire, J. S. Park, A. Iyer, K. Puri, D. Gutzwiller, C. Hirsch, and F. Chalot. "Parallelisation to Several Tens-of-Thousands of Cores". In: *TILDA: Towards Industrial LES/DNS in Aeronautics: Paving the Way for Future Accurate CFD - Results of the H2020 Research Project TILDA, Funded by the European Union, 2015 -2018*. Cham: Springer International Publishing, 2021, pp. 259–319. ISBN: 978-3-030-62048-6. DOI: 10.1007/978-3-030-62048-6_8.

[38] L. Botti, M. Botti, and D. A. Di Pietro. "A Hybrid High-Order Method for Multiple-Network Poroelasticity". In: *Polyhedral Methods in Geosciences*. Cham: Springer International Publishing, 2021, pp. 227–258. ISBN: 978-3-030-69363-3. DOI: 10.1007/978-3-030-69363-3_6.

[39] R. Hartmann, F. Bassi, I. Bosnyakov, L. Botti, A. Colombo, A. Crivellini, M. Franciolini, T. Leicht, E. Martin, F. C. Massa, F. Renac, A. Troshin, V. Vlasenko, M. Wallraff, and A. Wolkov. "Implicit Methods". In: *TILDA: Towards Industrial LES/DNS in Aeronautics: Paving the Way for Future Accurate CFD - Results of the H2020 Research Project TILDA, Funded by the European Union, 2015 -2018*. Cham: Springer International Publishing, 2021, pp. 11–59. ISBN: 978-3-030-62048-6. DOI: 10.1007/978-3-030-62048-6_2.

[40] F. C. Massa, F. Bassi, L. Botti, and A. Colombo. "An Implicit High-Order Discontinuous Galerkin Approach for Variable Density Incompressible Flows". In: *Droplet Interactions and Spray Processes*. Cham: Springer International Publishing, 2020, pp. 191–202. ISBN: 978-3-030-33338-6.

[41] F. Bassi, L. Botti, A. Colombo, A. Crivellini, C. De Bartolo, N. Franchina, A. Ghidoni, and S. Rebay. "Time Integration in the Discontinuous Galerkin Code MIGALE - Steady Problems". In: *IDIHOM: Industrialization of High-Order Methods - A Top-Down Approach: Results of a Collaborative Research Project Funded by the European Union, 2010 - 2014*. Cham: Springer International Publishing, 2015, pp. 179–204. ISBN: 978-3-319-12886-3. DOI: 10.1007/978-3-319-12886-3_10.

[42] F. Bassi, L. Botti, A. Colombo, A. Crivellini, A. Ghidoni, A. Nigro, and S. Rebay. "Time Integration in the Discontinuous Galerkin Code MIGALE - Unsteady Problems". In: *IDIHOM: Industrialization of High-Order Methods - A Top-Down Approach: Results of a Collaborative Research Project Funded by the European Union, 2010 - 2014*. Cham: Springer International Publishing, 2015, pp. 205–230. ISBN: 978-3-319-12886-3. DOI: 10.1007/978-3-319-12886-3_11.

[43] F. Bassi, L. Botti, A. Colombo, A. Ghidoni, and S. Rebay. "Discontinuous Galerkin for Turbulent Flows". In: *Adaptive High-Order Methods in Computational Fluid Dynamics*. 2011, pp. 1–32. DOI: 10.1142/9789814313193_0001. URL: https://www.worldscientific.com/doi/abs/10.1142/9789814313193_0001.

[44] F. Bassi, L. Botti, A. Colombo, A. Crivellini, N. Franchina, A. Ghidoni, and S. Rebay. "Very High-Order Accurate Discontinuous Galerkin Computation of Transonic Turbulent Flows on Aeronautical Configurations". In: *ADIGMA - A European Initiative on the Development of Adaptive Higher-Order Variational Methods for Aerospace Applications*. Berlin, Heidelberg: Springer Berlin Heidelberg, 2010, pp. 25–38. ISBN: 978-3-642-03707-8.

7.4 Proceedings

[45] F. Bassi, L. Botti, A. Colombo, A. Ghidoni, F. Massa, and G. Noventa. "On the Development of an Implicit High-Order Discontinuous Galerkin Solver for a Hybrid RANS-LES Model". In: *Direct and Large-Eddy Simulation XI*. Cham: Springer International Publishing, 2019, pp. 75–82. ISBN: 978-3-030-04915-7.

[46] F. Bassi, L. Botti, A. Colombo, A. Ghidoni, and S. Rebay. "Implementation of an Explicit Algebraic Reynolds Stress Model in an Implicit Very High-Order Discontinuous Galerkin Solver". In: *Spectral and High Order Methods for Partial Differential Equations - ICOSAHOM 2012*. Cham: Springer International Publishing, 2014, pp. 111–123. ISBN: 978-3-319-01601-6.

[47] F. Bassi, L. Botti, A. Colombo, A. Ghidoni, and S. Rebay. "Investigation of Near-Wall Grid Spacing Effect in High-Order Discontinuous Galerkin RANS Computations of Turbomachinery Flows". In: *Spectral and High Order Methods for Partial Differential Equations - ICOSAHOM 2012*. Cham: Springer International Publishing, 2014, pp. 125–134. ISBN: 978-3-319-01601-6.