

Curriculum Vitæ of Luca Bonaventura

- Full name: Luca Bonaventura
- Languages: Italian, English, Spanish, German
- Address: MOX - Applied Mathematics Laboratory, Department of Mathematics, Politecnico di Milano, Piazza Leonardo da Vinci 32, 20133, Milano, Italy
- Tel: 0039-02-23994600, Fax: 0039-02-23994606 , E-mail: luca.bonaventura@polimi.it
- Main research activity: Numerical methods for environmental and geophysical fluid dynamics problems, Discontinuous Galerkin methods
- Other research interests: LES modelling, exponential methods, multiphase flows, river hydraulics and sediment transport, computational electromagnetism
- Education:
 - 1997: Marie Curie Postdoctoral Fellow for numerical modelling, GKSS Forschungszentrum, Geesthacht, Germany
 - 1994: PhD in Mathematics, University of Trento, Trento, Italy
 - 1994: Meteorological Seminar, ECMWF, Reading, UK
 - 1992-3: Visiting Student, Courant Institute, New York, USA
 - 1989: Degree *cum laude* in Mathematics, University La Sapienza, Rome, Italy
- Awards:
 - 2017: Habilitation as Full Professor of Numerical Analysis by the Italian Ministry of Education and Research
 - 2015: European Meteorological Society Young Scientist Award 2016 awarded to Giovanni Tumolo, for the co-authored publication: *A semi-implicit, semi-Lagrangian discontinuous Galerkin framework for adaptive numerical weather prediction*, G. Tumolo, L. Bonaventura, *Quarterly Journal of the Royal Meteorological Society*, 141:2582-2601, 2015
- Positions:
 - 2015-present: Associate Professor of Numerical Analysis, Politecnico di Milano, Milano, Italy
 - 2005-15: Assistant Professor of Numerical Analysis, Politecnico di Milano, Milano, Italy
 - 2002-2005: Scientist, Max Planck Institute for Meteorology, Hamburg, Germany
 - 1995-2002: Assistant Professor of Mathematical Analysis and Probability, University of Trento, Trento, Italy

- Special temporary positions:
 - Invited Visiting Scientist, Keio University, Tokyo, Japan, 2015
 - Invited Visiting Scientist, Met Office, Exeter, UK, 2015
 - Visiting PhD lecturer, IMUS, Sevilla, Spain, 2015
 - Invited Visiting Scientist, Newton Institute Programme on Multiscale Numerics for the Atmosphere and Ocean, Cambridge, UK, 2012
 - ONR grant Visiting Scientist, Naval Postgraduate School, Monterey, USA, 2011
 - Invited Senior Fellow, IPAM Special Programme on Model and Data Hierarchies for Simulating and Understanding Climate, UCLA, Los Angeles, USA, 2010
 - ERCOFTAC Leonhard Euler Lecturer, ETH Zurich, Switzerland, 2004
- Other temporary positions:
 - Scientific consultant, ARPA Piemonte, Torino, Italy, 2002-3
 - Scientific consultant, Deutscher Wetterdienst, Frankfurt am Main, Germany, 2000-1
 - Scientific consultant, ARPA Emilia Romagna, Bologna, Italy, 2000-1
 - Scientific consultant, PROTECNO s.r.l., Padova, Italy, 2000
 - Scientific consultant, Istituto di Ricerca Scientifica e Tecnologica, Trento, Italy, 1996
- Main conference invitations:
 - Invited participant, Dagstuhl Seminar on *Resiliency in Numerical Algorithm Design for Extreme Scale Simulations*, Dagstuhl, Germany, 2020
 - Invited Keynote Minisymposium Speaker, Finite Elements in Flows Conference, University Sapienza, Rome, Italy, 2017
 - Invited Speaker, INDAM - GNCS 2016 congress, Montecatini, Italy, 2016
 - Invited Speaker, Workshop on Reactive Transport Modeling in the Geological Sciences, Institut Henri Poincaré, Paris, France, 2015
 - Invited Speaker, Conference on Numerical methods for PDEs: optimal control, games and image processing, University Sapienza, Rome, Italy, 2014
 - Invited Speaker, IMUS workshop on mathematical modelling and simulation of sediment transport, Sevilla, Spain, 2014
 - Invited Speaker, Final workshop of COST Action ES0905, Toulouse, France, 2014
 - Invited Speaker, 26th Entretiens Jacques Cartier, Section: Mathématiques et changements climatiques, Lyon, France, 2013
 - Invited Lecturer, Geophysical Fluid Dynamics Workshop, Madeira, Portugal, 2008
 - Invited Speaker, ECMWF Seminar on recent developments in numerical methods for atmosphere and ocean modelling, Reading, UK, 2004
 - Invited Speaker, ECMWF-SPARC Workshop on Modelling and Assimilation for the Stratosphere and Tropopause, ECMWF, Reading, UK, 2003

- Coordination of research projects and individual grants:
 - ESCAPE-2 FET H2020 project, coordinator of the work unit at Politecnico di Milano and co-leader of Work Package 1, 2018-21
 - SMART-SED project, Fondazione CARIPLO, coordinator of the work unit at the Mathematics Department of Politecnico di Milano, 2018-19
 - LISA production project *DECLES: Large Eddy Simulation of Density Currents and Variable Density Flows*, HPL13PJ6YS, 2016-17, principal investigator
 - INDAM - GNCS project *Metodi numerici semi-impliciti e semi-Lagrangiani per sistemi iperbolici di leggi di bilancio*, 2015-16, coordinator
 - ERASMUS MUNDUS Programme, Euro-Asian Sustainable Energy Development Consortium, EM-EASED_10073, 2015, individual grant
 - Office of Naval Research (USA) grant N62909-11-1-4007: *Exponential Time-Integrators for Non-hydrostatic Atmospheric Modeling*, 2011, individual grant
 - MPI for Meteorology, Hamburg and Deutscher Wetterdienst, Frankfurt, *ICON project*, 2002-5, coordinator of Numerical Methods group
 - European Union, Marie Curie Training and Mobility of Researchers Program, Contract ERBFMBICT961555, 1996, individual grant

- Participation to research projects:
 - INDAM - GNCS project *Approssimazione numerica di problemi di natura iperbolica ed applicazioni*, 2019-20
 - ENI - MOX Politecnico di Milano, *Progetto MUFLOT*, 2018-21
 - INDAM - GNCS project *Modellazione numerica di fenomeni idro/geomeccanici per la simulazione di eventi sismici*, 2017-18
 - ENI - MOX Politecnico di Milano, *Progetto BIOGEN*, 2015-17
 - Universidad de Sevilla *Proyecto SIMURISK, Desarrollo de simuladores hidrodinámicos y morfodinámicos eficientes para la evaluación y previsión de riesgos*, MTM2015-70490-C2-2-R, 2016-18
 - INGV *Progetto V1 Valutazione della pericolosità vulcanica in termini probabilistici*, 2013-14
 - INDAM - GNCS project *Metodi ad alta risoluzione per problemi evolutivi fortemente nonlineari*, 2014-15
 - COST Action ES0905 *Basic concepts for convection parameterization in weather forecast and climate models*, 2013-14
 - INDAM - GNCS project *Metodologie teoriche ed applicazioni avanzate nei metodi Semi-Lagrangiani*, 2011-13
 - ENI - MOX Politecnico di Milano, *Progetto GeoDyn*, 2011-13
 - MIUR, PRIN 2008 *Approssimazione Numerica con Tecniche Adattive e Non-Conformi di Problemi Multifisica*, codice 200834WK7H.005, Unità operativa Milano Politecnico, 2008-10
 - MIUR, PRIN 2005 *Modelli numerici nella dinamica dei fluidi con applicazioni al sistema cardiovascolare ed all'ambiente*, codice 2005 2005013982_001, Unità operativa Milano Politecnico, 2006-7

- MIUR, PRIN 2004 *Adattività numerica e di modello per problemi alle derivate parziali*, codice 2004014411_006, Unità operativa di Milano Politecnico, 2005
 - MIUR, PRIN 2002 *Modellazione matematica di estuari e reti a marea*, codice 2002085571_004, Unità operativa di Trento, 2002
 - MIUR, PRIN 2001: *Calibrazione sperimentale di modelli matematici per la valutazione dei carichi massimi ammissibili nei corpi idrici superficiali*, codice 2001085991_001, Unità operativa di Trento, 2001
 - MIUR, PRIN 1997 *Metodi e Modelli Matematici in Fluidodinamica*, codice 9701091751_010, Unità operativa di Trento, 1997
- Organization of international scientific events as main or co-organizer:
 - 2021: Member of the local organizing committee of the 2021 SIAM Geosciences Congress
 - 2021: Head of the organizing committee of the ESCAPE-2 summer school
 - 2019: Co-organizer of Minisymposium on fault tolerant linear solvers, PASC 2019 Conference, Zurich, Switzerland
 - 2019: Co-organizer of Minisymposium on numerical methods for environmental flows, International Congress on Industrial and Applied Mathematics, Valencia, Spain
 - 2019: Organizer of ESCAPE-2 workshop on Fault tolerant algorithms and resilient approaches, Milano, Italy
 - 2018: Member of the scientific committee of the PASC 2018 Conference, Basel, Switzerland
 - 2017: Co-organizer of Minisymposium on numerical methods for numerical weather prediction, SIAM Conference on Numerical Methods for the Geosciences, Erlangen, Germany
 - 2016: Member of the organizing committee of the 2016 SIMAI Congress
 - 2016: Main organizer of *SISL-Day 2016* Workshop on semi-implicit and semi-Lagrangian methods, Politecnico di Milano
 - 2015-16: Co-editor of special issue of *Communications in Applied and Industrial Mathematics* on Semi-Lagrangian Methods
 - 2015: Co-organizer of Minisymposium *Numerical time integration strategies for highly oscillatory systems of hyperbolic PDEs*, SciCADE, International Conference on Scientific Computation and Differential Equations, Potsdam, Germany, 2015
 - 2015: Co-organizer of Workshop Spectral Elements in Elastodynamics: applications to seismic wave propagation problems, Politecnico di Milano
 - 2014: Main organizer of Workshop of EU Cost Action 0905, working group 1, Politecnico di Milano
 - 2013: Main organizer of 'SL-Day 2012' workshop on semi-Lagrangian methods, Politecnico di Milano
 - 2011: Co-organizer of 'SL-Day 2011' workshop on semi-Lagrangian methods, Università Sapienza di Roma
 - 2010: Co-organizer of Minisymposium on numerical methods for environmental problems, joint SIMAI-SEMA Conference, Cagliari, Italy

- 2007: Co-organizer of Minisymposium on numerical methods for free surface flows, ICIAM Conference, Zurich, Switzerland
 - 2005: Co-organizer of Minisymposium on numerical methods for nonhydrostatic atmospheric modelling, SIAM Conference on Numerical Methods for the Geosciences, Avignon, France
 - 2003: Co-organizer of Minisymposium on numerical methods for atmospheric modelling, GAMM Annual Meeting, Padova, Italy
 - 2002: Co-organizer of ICON Project Exploratory Workshop, Hamburg, Germany
 - 1999: Co-organizer of International Workshop on Atmospheric, Oceanic and Groundwater Flows, CIRM, Trento, Italy
- Member of the Editorial Board of *Applied Mathematics and Computation*
 - Reviewer for:
 - *Journal of Computational Physics*
 - *International Journal of Numerical Methods in Fluids*
 - *Computers and Mathematics with Applications*
 - *Monthly Weather Review*
 - *Oceanic Modelling*
 - *Geophysical Model Development*
 - *Advances in Water Resources*
 - *Journal of Advances in Modelling Earth Systems*
 - *Journal of Hydraulic Engineering*
 - *Communications in Applied and Industrial Mathematics*
 - *Communications in Computer Physics*
 - Membership of scientific societies:
 - Society of Industrial and Applied Mathematics
 - Società Italiana di Matematica Applicata e Industriale
 - Books
 - 2) L. Bonaventura, L. Formaggia, E. Miglio, N. Parolini, A. Scotti and C. Vergara (editors), *Proceedings of the XIII SIMAI congress 2016*, ISBN 978-88-6493-035-0, SIMAI, 2016
 - 1) L. Bonaventura, R. Redler, R. Budich, *Earth System Modelling 2: Algorithms, Code Infrastructure and Optimisation*, Springer Briefs in Earth System Science, ISBN 978-3-642-23830-7, Springer Verlag, 2012

- Publications in refereed journals

- 52) A. Abbà, L. Bonaventura, A. Recanatì, M. Tugnoli, Dynamically p -adaptivity for LES of compressible flows in a high order DG framework, *Journal of Computational Physics*, to appear, 2020
- 51) T. Pognat, B. Dalena, A. Simona, L. Bonaventura, Computation of beam based quantities with 3D final focus quadrupoles field in circular hadronic accelerators, *Nuclear Instruments and Methods in Physics Research*, published online, DOI: <https://doi.org/10.1016/j.nima.2020.164350>, 2020
- 50) A. Simona, L. Bonaventura, C. de Falco, S. Schöps, IsoGeometric Approximations for Electromagnetic Problems in Axisymmetric Domains, *Computer Methods in Applied Mechanics and Engineering*, Vol. 369, 113211, 2020
- 49) C. Bassi, A. Abbà, L. Bonaventura, L. Valdetaro, Large Eddy Simulation of non-Boussinesq gravity currents with a DG method *Theoretical and Computational Fluid Dynamics*, Vol. 34, pp. 231-247, 2020
- 48) L. Bonaventura, F. Casella, L. Delpopolo Carciopolo, A. Ranade, A self adjusting multirate algorithm for robust time discretization of partial differential equations, *Computers and Mathematics with Applications*, Vol. 79, pp. 2086-2098, 2020
- 47) L. Delpopolo Carciopolo, L. Bonaventura, A. Scotti, L. Formaggia, A conservative implicit multirate method for hyperbolic problems, *Computational Geosciences*, Vol. 23, pp. 647-664, 2019
- 46) A. Simona, L. Bonaventura, T. Pognat, B. Dalena, High order time integrators for the simulation of charged particle motion in magnetic quadrupoles, *Computer Physics Communications*, Vol. 239, pp. 33-52, 2019
- 45) T. Benacchio, L. Bonaventura, An extension of DG methods for hyperbolic problems to one-dimensional semi-infinite domains, *Applied Mathematics and Computation*, Vol. 350, pp. 266-282, 2019
- 44) L. Bonaventura, E. D. Fernandez Nieto, J. Garres Diaz, G. Narbona Reina, Multilayer shallow water models with locally variable number of layers and semi-implicit time discretization, *Journal of Computational Physics*, Vol. 364, pp. 209-234, 2018
- 43) L. Bonaventura, R. Ferretti, L. Rocchi, A fully semi-Lagrangian discretization for the 2D incompressible Navier-Stokes equations in the vorticity-streamfunction formulation, *Applied Mathematics and Computation*, Vol. 323, pp. 132-144, 2018
- 42) M. Tugnoli, A. Abbà, L. Bonaventura, M. Restelli, A locally p -adaptive approach for Large Eddy Simulation of compressible flows in a DG framework, *Journal of Computational Physics*, Vol. 349, pp. 33-58, 2017
- 41) L. Mari, L. Bonaventura, A. Storto, P. Melià, M. Gatto, S. Masina, R. Casagrandi, Understanding large-scale, long-term larval connectivity patterns: The case of the Northern Line Islands in the Central Pacific Ocean, *PLoS ONE*, Vol. 12, e0182681, 2017
- 40) C. Bassi, A. Abbà, L. Bonaventura, L. Valdetaro, Large Eddy Simulation of gravity currents with a high order DG method, *Communications in Applied and Industrial Mathematics*, Vol. 8, pp. 128-148, 2017
- 39) L. Bonaventura, A. Della Rocca, Unconditional Strong Stability Preserving extensions of the TR-BDF2 method, *Journal of Scientific Computing*, Vol. 70, pp. 859-895, 2017

- 38) L. Bonaventura, M. Falcone, R. Ferretti, Introduction to the Special Issue on New Trends in Semi-Lagrangian Methods, *Communications in Applied and Industrial Mathematics*, Vol. 7, pp. 1-3, 2016
- 37) L. Bonaventura, R. Ferretti, Flux form Semi-Lagrangian methods for parabolic problems, *Communications in Applied and Industrial Mathematics*, Vol. 7, pp. 53-70, 2016
- 36) G. Tumolo, L. Bonaventura, A semi-implicit, semi-Lagrangian, DG framework for adaptive numerical weather prediction, *Quarterly Journal of the Royal Meteorological Society*, Vol. 141, pp. 2582-2601, 2015
- 35) A. Abbà, L. Bonaventura, M. Nini, M. Restelli, Dynamic models for Large Eddy Simulation of compressible flows with a high order DG method, *Computers & Fluids*, Vol. 122, pp. 202 - 222, 2015
- 34) L. Bonaventura, R. Ferretti, Semi-Lagrangian methods for parabolic problems in divergence form, *SIAM Journal of Scientific Computing*, Vol. 36, pp. A2458 - A2477, 2014
- 33) S. Carcano, T. Esposti Ongaro, L. Bonaventura, A. Neri, Influence of grain-size distribution on the dynamics of underexpanded volcanic jets, *Journal of Volcanology and Geothermal Research*, Vol. 285, pp. 60 - 80, 2014
- 32) M. Germano, A. Abbà, R. Arina, L. Bonaventura, On the extension of the eddy viscosity model to compressible flows, *Physics of Fluids*, 041702, 2014
- 31) F. Garcia, L. Bonaventura, M. Net, J. Sanchez, Exponential versus IMEX high-order time integrators for thermal convection in rotating spherical shells, *Journal of Computational Physics*, Vol. 264, pp. 41-54, 2014
- 30) S. Carcano, L. Bonaventura, A. Neri, T. Esposti Ongaro, A second order accurate numerical model for multiphase underexpanded volcanic jets, *Geoscientific Model Development*, Vol. 6, pp. 1905-1924, 2013
- 29) P. Melià, M. Schiavina, M. Gatto, L. Bonaventura, S. Masina, R. Casagrandi, Integrating field data into individual-based models for the migration of European eel larvae, *Marine Ecology Progress Series*, Vol. 487, pp. 135-149, 2013
- 28) G. Garegnani, G. Rosatti, L. Bonaventura, On the range of validity of the Exner-based models for mobile-bed river flow simulations, *Journal of Hydraulic Research*, Vol. 51, pp. 380-391, 2013
- 27) H. Wan, M. A. Giorgetta, G. Zängl, M. Restelli, D. Majewski, L. Bonaventura, K. Fröhlich, D. Reinert, P. Rípodas, L. Kornbluh, J. Förstner, The ICON-1.2 hydrostatic atmospheric dynamical core on triangular grids – Part 1: Formulation and performance of the baseline version, *Geoscientific Model Development*, Vol. 6, pp. 735-763, 2013
- 26) T. Benacchio, L. Bonaventura, Absorbing boundary conditions: a spectral collocation approach, *International Journal of Numerical Methods in Fluids*, Vol. 72, pp. 913-936, 2013
- 25) G. Tumolo, L. Bonaventura, M. Restelli, A semi-implicit, semi-Lagrangian, p -adaptive Discontinuous Galerkin method for the shallow water equations, *Journal of Computational Physics*, Vol. 232, pp. 46-67, 2013
- 24) S. Castruccio, L. Bonaventura, L. M. Sangalli, A Bayesian Approach to Spatial Prediction With Flexible Variogram Models, *Journal of Agricultural, Biological, and Environmental Statistics*, Vol. 17, pp. 209-227, 2012

- 23) G. Garegnani, G. Rosatti, L. Bonaventura, Free surface flows over mobile bed: mathematical analysis and numerical modeling of coupled and decoupled approaches, *Communications in Applied and Industrial Mathematics*, Vol. 1, N. 3, 2011
- 22) L. Bonaventura, A. Iske, E. Miglio, Kernel-Based Vector Field Reconstruction in Computational Fluid Dynamic Models, *International Journal of Numerical Methods in Fluids*, Vol. 66, pp. 714-729, 2011
- 21) G. Rosatti, L. Bonaventura, A. Deponti, G. Garegnani, An Accurate and Efficient Semi-Implicit Method for Section Averaged Free Surface Flow Modelling, *International Journal of Numerical Methods in Fluids*, Vol. 65, pp. 448-473, 2011
- 20) P. Ripodas, A. Gassmann, J. Förstner, D. Majewski, M. Giorgetta, P. Korn, L. Kornblueh, H. Wan, G. Zängl, L. Bonaventura, T. Heinze, Icosahedral Shallow Water Model (ICOSWM): results of shallow water test cases and sensitivity to model parameters, *Geoscientific Model Development*, Vol. 2, pp. 231-251, 2009
- 19) L. Mari, C. Biotto, A. Decoene, L. Bonaventura, A coupled ecological-hydrodynamic model for the spatial distribution of sessile aquatic species in thermally forced basins, *Ecological Modelling*, Vol. 220, pp. 2310-2324, 2009
- 18) A. Decoene, L. Bonaventura, E. Miglio, F. Saleri, Asymptotic Derivation of the Section Averaged Shallow Water Equations for River Hydraulics, *Mathematical Models and Methods in Applied Sciences*, Vol. 19, pp. 387-417, 2009
- 17) H. Wan, M. Giorgetta, L. Bonaventura, Ensemble Held-Suarez test with a spectral transform model: variability, sensitivity and convergence, *Monthly Weather Review*, Vol. 136, pp. 1075-1092, 2008
- 16) A. Abbà, L. Bonaventura, A vorticity preserving finite difference discretization for the incompressible Navier-Stokes equations, *International Journal of Numerical Methods in Fluids*, Vol. 56, pp. 1101-1106, 2008
- 15) M. Restelli, L. Bonaventura, R. Sacco, A semi-Lagrangian discontinuous Galerkin method for scalar advection by incompressible flows, *Journal of Computational Physics*, Vol. 216, pp. 195-215, 2006
- 14) L. Bonaventura, D. Cesari, An efficient nonhydrostatic dynamical core for high-resolution simulations down to the urban scale, *Nuovo Cimento C - Geophysics and Space Physics*, Vol. 28, pp. 105-114, 2006
- 13) L. Bonaventura, T. Ringler, Analysis of discrete shallow-water models on geodesic Delaunay grids with C-type staggering, *Monthly Weather Review*, Vol. 133, pp. 2351-2373, 2005
- 12) G. Rosatti, L. Bonaventura, R. Chemotti, High order interpolation methods for semi-Lagrangian models of mobile-bed river hydrodynamics on cartesian grids with cut cells, *International Journal of Numerical Methods in Fluids*, Vol. 47, pp. 1269-1275, 2005
- 11) L. Bonaventura, L. Kornblueh, T. Heinze, P. Ripodas, A Semi-implicit method conserving mass and potential vorticity for the shallow water equations on the sphere, *International Journal of Numerical Methods in Fluids*, Vol. 47, pp. 863-869, 2005
- 10) G. Rosatti, D. Cesari, L. Bonaventura, Semi-implicit, semi-Lagrangian environmental modelling on cartesian grids with cut cells, *Journal of Computational Physics*, Vol. 204, pp. 352-377, 2005

- 9) J. Steppeler, R. Hess, G. Doms, U. Schättler, L. Bonaventura, Review of numerical methods for nonhydrostatic weather prediction models, *Meteorology and Atmospheric Physics*, Vol. 82, pp. 287-301, 2003
- 8) S. Erlicher, L. Bonaventura, O. S. Bursi, The Analysis of the Generalized- α Method for Non-linear Dynamic Problems, *Computational mechanics*, Vol. 28, pp. 83-104, 2002
- 7) L. Bonaventura, G. Rosatti, A cascadic conjugate gradient algorithm for mass conservative, semi-implicit discretization of the shallow water equations on locally refined structured grids, *International Journal of Numerical Methods in Fluids*, Vol. 40, pp. 217-230, 2002
- 6) J. Steppeler, M. Minotte, H. W. Bitzer, L. Bonaventura, Nonhydrostatic modelling using a z -coordinate representation, *Monthly Weather Review*, Vol. 130, pp. 2143-2149, 2002
- 5) E. S. Gross, L. Bonaventura, G. Rosatti, Consistency with continuity in conservative advection schemes for free-surface models, *International Journal of Numerical Methods in Fluids*, Vol. 38, pp. 307-327, 2002
- 4) L. Bonaventura, A Semi-Implicit, Semi-Lagrangian Scheme Using the Height Coordinate for a Nonhydrostatic and Fully Elastic Model of Atmospheric Flows, *Journal of Computational Physics*, Vol. 158, pp. 186-213, 2000
- 3) E.S. Gross, V. Casulli, L. Bonaventura, J.R. Koseff, A Semi-Implicit Method for Vertical Transport in Multidimensional Models, *International Journal of Numerical Methods in Fluids*, Vol. 28, pp. 157-186, 1998
- 2) L. Bonaventura, V. Casulli, A Semi-Implicit Scheme for the Barotropic Primitive Equations of Atmospheric Dynamics, *International Journal of Numerical Methods for Heat and Fluid Flow*, Vol. 7, pp. 63-80, 1997
- 1) L. Bonaventura, Interface Evolution in an Interacting Spin System, *Journal of Non-linear Analysis, Theory Methods and Applications*, Vol. 25, pp. 799-819, 1995.

- Refereed Conference Proceedings:

- 13) M. Tugnoli, A. Abbà, L. Bonaventura, Dynamical degree adaptivity for DG-LES models, Proceedings of the ICOSAHOM 2018 Conference, London, UK, to appear, 2020
- 12) D. Brambilla, M. Papini, V.I. Ivanov, L. Bonaventura, A. Abbate, L. Longoni, Sediment Yield, Mountain Basins, Analysis, and Management: The SMART-SED Project. In: De Maio M., Tiwari A. (eds) Applied Geology, DOI: https://doi.org/10.1007/978-3-030-43953-8_3, Springer, Cham, 2020
- 11) G. Tumolo, L. Bonaventura, Simulations of Non-hydrostatic Flows by an Efficient and Accurate p-adaptive DG Method, In: van Brummelen H., Corsini A., Perotto S., Rozza G. (eds) Numerical Methods for Flows. Lecture Notes in Computational Science and Engineering, Vol. 132, pp 41–53, Springer, 2020
- 10) L. Bonaventura, E. Calzola, E. Carlini, R. Ferretti, A fully semi-Lagrangian method for the Navier-Stokes equations in primitive variables, In: van Brummelen H., Corsini A., Perotto S., Rozza G. (eds) Numerical Methods for Flows. Lecture Notes in Computational Science and Engineering, Vol. 132, pp 55–62, Springer, 2020

- 9) T. Pognat, B. Dalena, A. Simona, L. Bonaventura, R. De Maria, V. K. Bergyld Olsen, Study Of Fringe Fields Effects From Final Focus Quadrupoles On Beam Based Measured Quantities, Proceedings of IPAC2019, Melbourne, Australia, 2019
 - 8) T. Pognat, B. Dalena, A. Simona, L. Bonaventura, R. De Maria, J. Molson, Accurate And Efficient Tracking In Electromagnetic Quadrupoles, Proceedings of IPAC2018, Vancouver, BC, Canada, 2018
 - 7) V. Covelio, A. Abbà, L. Bonaventura, A. Della Rocca, L. Valdetaro, A multiphase model for the numerical simulation of ice formation in sea water, in: Proceedings of the ECCOMAS Congress 2016, VII European Congress on Computational Methods in Applied Sciences and Engineering, Crete, Greece, June 2016
 - 6) M. Schiavina, R. Casagrandi, M. Gatto, L. Bonaventura, S. Masina, P. Melià, Has the ocean contributed to the decline of European eel recruitment? Results of a 40-year simulation experiment, in: Proceedings of the 1st SISC Congress, Lecce, Italy, September 2013
 - 5) A. Quarteroni, L. Bonaventura, I modelli matematici per la previsione meteorologica, in: *Matematica e cultura 2007*, Springer Milan, p. 241-251, 2007
 - 4) L. Bonaventura, Development of the ICON dynamical core: modelling strategies and preliminary results, in: Proceedings of the ECMWF/SPARC Workshop on Modelling and Assimilation for the Stratosphere and Tropopause, ECMWF, 2003
 - 3) G. Rosatti, L. Bonaventura, L. Poli, Analisi dell’impatto del progetto MOSE sulla dinamica e sul trasporto nella laguna di Venezia, in: *Atti del 28 Convegno di Idraulica e Costruzioni idrauliche*, Potenza, Italia, 2002
 - 2) L. Bonaventura, E. S. Gross, Constancy Preserving, Conservative Methods for Free-Surface Models, in: *Godunov Methods*, E.F. Toro (ed.), Springer, 2001
 - 1) L. Bonaventura, A second order, semi-Lagrangian scheme with accurate approximation of trajectories, in: Proceedings of the 10th International Conference on Numerical Methods in Fluids, Pineridge Press, Swansea, 1997
- Internal reports:
 - 41) T. Benacchio, L. Bonaventura, M. Altenbernd, C. D. Cantwell, P. D. Düben, M. Gillard, L. Giraud, D. Göttsche, E. Raffin, K. Teranishi, N. Wedi, Resilience and fault-tolerance in high-performance computing for numerical weather and climate prediction, *MOX Report 21/2020*, 2020
 - 40) C. Bassi, , L. Bonaventura, S. Busto, M. Dumbser A hyperbolic reformulation of the Serre-Green-Naghdi model for general bottom topographies, *arXiv*, 2003.14309, 2020
 - 39) L. Bonaventura, E. Calzola, E. Carlini, R. Ferretti, Second order fully semi-Lagrangian discretizations of advection–diffusion–reaction systems, *MOX Report 10/2020*, 2020
 - 38) A. Simona, L. Bonaventura, C. de Falco, S. Schöps, IsoGeometric Approximations for Electromagnetic Problems in Axisymmetric Domains, *MOX Report 54/2019*, 2019
 - 37) A. Abbà, L. Bonaventura, A. Recanati, M. Tugnoli, Dinamically p –adaptivity for LES of compressible flows in a high order DG framework, *MOX Report 41/2019*, 2019
 - 36) L. Bonaventura, A. Della Rocca, Convergence analysis of a cell centered finite volume diffusion operator on non-orthogonal polyhedral meshes, *MOX Report 37/2018*, 2018

- 35) C. Bassi, A. Abbà, L. Bonaventura, L. Valdetaro, Direct and Large Eddy Simulation of three-dimensional non-Boussinesq gravity currents with a high order DG method, *MOX Report 24/2018*, 2018
- 34) T. Benacchio, L. Bonaventura, A seamless extension of DG methods for hyperbolic problems to unbounded domains, *MOX Report 23/2018*, 2018
- 33) C. Bassi, A. Abbà, L. Bonaventura, L. Valdetaro, A priori tests of a novel LES approach to compressible variable density turbulence, *MOX Report 20/2018*, 2018
- 32) A. Simona, L. Bonaventura, T. Pognat, B. Dalena, High order time integrators for the simulation of charged particle motion in magnetic quadrupoles, *MOX Report 15/2018*, 2018
- 31) L. Delpopolo Carciopolo, L. Bonaventura, A. Scotti, L. Formaggia, A conservative implicit multirate method for hyperbolic problems, *MOX Report 11/2018*, 2018
- 30) L. Bonaventura, F. Casella, L. Delpopolo Carciopolo, A. Ranade, A self adjusting multirate algorithm based on the TR-BDF2 method, *MOX Report 8/2018*, 2018
- 29) L. Bonaventura, E. D. Fernandez Nieto, J. Garres Diaz, G. Narbona Reina, Multilayer shallow water models with locally variable number of layers and semi-implicit time discretization, *MOX Report 38/2017*, 2017
- 28) L. Bonaventura, R. Ferretti, L. Rocchi, A fully semi-Lagrangian discretization for the 2D Navier-Stokes equations in the vorticity-streamfunction formulation, *MOX Report 27/2017*, 2017
- 27) C. Bassi, A. Abbà, L. Bonaventura, L. Valdetaro, Large Eddy Simulation of gravity currents with a high order DG method, *MOX Report 57/2016*, 2016
- 26) M. Tugnoli, A. Abbà, L. Bonaventura, M. Restelli, A locally p -adaptive approach for Large Eddy Simulation of compressible flows in a DG framework, *MOX Report 37/2016*, 2016
- 25) L. Bonaventura, A. Della Rocca, Monotonicity, positivity and strong stability of the TR-BDF2 method and of its SSP extensions, *MOX Report 56/2015*, 2015
- 24) L. Bonaventura, Local Exponential Methods: a domain decomposition approach to exponential time integration of PDEs, *MOX Report 24/2015*, 2015
- 23) L. Bonaventura, R. Ferretti, Flux form Semi-Lagrangian methods for parabolic problems, *MOX Report 22/2015*, 2015
- 22) A. Abbà, L. Bonaventura, M. Nini, M. Restelli, Anisotropic dynamic models for Large Eddy Simulation of compressible flows with a high order DG method, *MOX Report 36/2014*, 2014
- 21) L. Bonaventura, R. Ferretti, Semi-Lagrangian methods for parabolic problems in divergence form, *MOX Report 19/2014*, 2014
- 20) G. Tumolo, L. Bonaventura, An accurate and efficient numerical framework for adaptive numerical weather prediction, *MOX Report 18/2014*, 2014
- 19) F. Garcia, L. Bonaventura, M. Net, J. Sanchez, Exponential versus IMEX high-order time integrators for thermal convection in rotating spherical shells, *MOX Report 36/2013*, 2013
- 18) S. Carcano, L. Bonaventura, A. Neri, T. Esposti Ongaro, A second order accurate numerical model for multiphase underexpanded volcanic jets, *MOX Report 50/2012*, 2012

- 17) G. Tumolo, L. Bonaventura, M. Restelli, A semi-implicit, semi-Lagrangian, p -adaptive Discontinuous Galerkin method for the shallow water equations, *MOX Report 04/2012*, 2012
- 16) T. Benacchio, L. Bonaventura, A spectral collocation method for the one dimensional shallow water equations on semi-infinite domains, *MOX Report 34/2011*, 2011
- 15) G. Garegnani, G. Rosatti, L. Bonaventura, Mathematical and Numerical Modelling of Fully Coupled Mobile Bed Free Surface Flows, *MOX Report 03/2011*, 2011
- 14) A. Abbà, L. Bonaventura, A mimetic finite difference method for Large Eddy Simulation of incompressible flow, *MOX Report 34/2010*, 2010
- 13) L. Bonaventura, S. Castruccio, L. M. Sangalli, A Bayesian approach to geostatistical interpolation with flexible variogram models, *MOX Report 21/09*, 2009
- 12) L. Bonaventura, C. Biotto, A. Decoene, L. Mari, E. Miglio, A coupled ecological-hydrodynamic model for the spatial distribution of sessile aquatic species in thermally forced basins, *MOX Report 02/09*, 2009
- 11) L. Bonaventura, S. Castruccio, P. Crippa, G. Lonati, Geostatistical estimate of PM10 concentrations in Northern Italy: validation of kriging reconstructions with classical and flexible variogram models, *MOX Report 18/08*, 2008
- 10) A. Deponti, L. Bonaventura, G. Rosatti, G. Garegnani, An Accurate and Efficient Semi-Implicit Method for Section Averaged Free Surface Flow Modelling, *MOX Report 12/07*, 2007
- 9) A. Decoene, L. Bonaventura, E. Miglio, F. Saleri, Asymptotic Derivation of the Section Averaged Shallow Water Equations for River Hydraulics, *Report MOX 16/07*, 2007
- 8) A. Deponti, L. Bonaventura, L. Fraccarollo, E. Miglio, G. Rosatti, Analysis of Hyperbolic Systems for Mobile Bed, Free Surface Flow Modelling in Arbitrary Cross Sections, *MOX Report 06/07*, 2007
- 7) A. Abbà, L. Bonaventura, A vorticity preserving finite difference discretization for the incompressible Navier-Stokes equations, *MOX Report 83*, 2006
- 6) J. Baudisch, L. Bonaventura, A. Iske, E. Miglio, Matrix valued Radial Basis Functions for local vector field reconstruction: applications to computational fluid dynamic models, *MOX Report 75*, 2006
- 5) H. Wan, M. Giorgetta, L. Bonaventura, Held-Suarez test with ECHAM5, *Berichte zur Erdsystemforschung*, Max Planck Institut für Meteorologie, N. 20, 2006
- 4) M. Restelli, L. Bonaventura, R. Sacco, A flux form, semi - Lagrangian method for the scalar advection equation using Discontinuous Galerkin reconstruction, *MOX Report 63*, 2005
- 3) E. Roeckner, G. Bäuml, L. Bonaventura, R. Brokopf, M. Esch, M. Giorgetta, S. Hagemann, L. Kornbluh, U. Schlese, U. Schulzweida, The atmospheric general circulation model ECHAM5: model description, *MPI report n. 349*, Max Planck Institut für Meteorologie, 2003
- 2) L. Bonaventura, A Semi-Implicit, Semi-Lagrangian Scheme for the Compressible Non-hydrostatic Equations of the Atmosphere, GKSS Research Centre External Report, GKSS 98/E/12, 1998

- 1) L. Bonaventura, Studio analitico e numerico di un modello di equazioni primitive per la dinamica atmosferica, *UTM PhDTS 1*, N. 5, Università di Trento, 1995.

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- 2017-18 *Mathematical methods for Engineering*, Corso di Laurea Specialistica in Ingegneria Fisica, Politecnico di Milano; *Numerical Methods for PDEs*, Corso di Laurea specialistica internazionale in *Civil Engineering for Risk Mitigation*, Politecnico di Milano.
- 2010-11/2016-17 *Calcolo Numerico*, Corso di Laurea Specialistica in Ingegneria Civile ed Ingegneria Ambientale, Politecnico di Milano; *Numerical Methods for PDEs*, Corso di Laurea specialistica internazionale in *Civil Engineering for Risk Mitigation*, Politecnico di Milano.
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- 2005-06 *Algebra Lineare e Calcolo Numerico*, Corso di Laurea di I livello in Ingegneria Meccanica, Politecnico di Milano; exercise sessions in *Elementi di Analisi Matematica e Geometria, Equazioni Differenziali Ordinarie*, Corso di Laurea di I livello in Ingegneria Ambientale, Politecnico di Milano.
- 2004-05 *Calcolo Numerico* Corso di Laurea di I livello in Ingegneria Meccanica, Politecnico di Milano.
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- 1998-2001 *Metodi probabilistici e statistici*, Corso di Diploma in Ingegneria Ambientale ed Informatica, Università di Trento; exercise sessions in *Analisi Matematica I, Analisi Matematica II*, Corsi di Laurea in Ingegneria, Università di Trento. Exercise sessions in *Calcolo Numerico*, Corso di Laurea in Matematica, Università di Trento.
- 1995-97 Exercise sessions in *Analisi Matematica I, Analisi Matematica II* Corsi di Laurea in Ingegneria, Università di Trento.

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- 2017 Francesco L. Romeo, Laurea Magistrale in Ingegneria Matematica, Politecnico di Milano
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