CURRICULUM VITÆ ET STUDIORUM OF LUIGI C. BERSELLI

Personal data

Born in Vicenza, ITALY, October 30, 1972. Married, two children.

Education

November 1991-October 1995, after written and oral admission examinations (Mathematics and Physics), **full-grant student position** in the class of SCIENCE at the Scuola Normale Superiore of Pisa, Italy.

January 1994, **visiting research student** at the École Normale Supérieure of Paris, France.

July 13, 1995, **degree (Laurea) in Mathematics**, University of Pisa/Scuola Normale Superiore, with mark 110/110 *cum laude*, defending the research dissertation of mathematical analysis: *On the global existence for the solutions to the equations of ideal fluids* (Italian), directed by Prof. H. Beirão da Veiga, and co-directed by Prof. S. Spagnolo. This thesis has been awarded with the prize from the "*Accademia Olimpica*" of Vicenza, May 1997.

November 1995–October 1999, after being the 1st classified in the written and oral entrance examinations, **Ph.D. student in Mathematics** at the Dept. of Mathematics "L. Tonelli", University of Pisa. During the four years of the school, I spent some time (about one year) visiting the Dept. of Mathematics of the University of Trento, Italy.

July 11, 1997, **Ms. in Mathematics**, Scuola Normale Superiore di Pisa, with mark 70/70 *cum laude*, defending original results on the subject *Numerical methods for the PDEs of Mathematical Physics*.

February 28, 2000, **Ph.D. in Mathematics** defending (with an international committee) the thesis: *Some topics in fluid mechanics*, with Proff. Hugo Beirão da Veiga (Pisa) and Alberto Valli (Trento) as advisors.

Positions and titles

December 2015-present, **Full Professor of Mathematical Analysis (MATH-03/A)**, University of Pisa.

December 2013, **National Scientific Qualification (Habilitation), Full Professor of Mathematical Analysis.**

October 2006-November 2015, **Associate Professor of Mathematical Analysis**, University of Pisa.

March 2000-September 2006, permanent research and teaching position of **Assistant Professor of Mathematical Analysis**, University of Pisa.

November 1999–February 2000, research associate under the project: *"Mathematical models in engineering and industry: theoretical and computational tools,"* University of Pisa.

Professional Societies

- American Mathematical Society (AMS)
- Italian National Institute for Higher Mathematics (INdAM/GNAMPA)

Research interests

- Navier-Stokes equations, theory of existence and regularity for weak solutions.
- Mathematical foundations of analytical methods for Large Eddy Simulation of turbulent flows.
- Applications of Mathematical Analysis to bio-fluids and to geophysical flows.
- Numerical treatment and approximate models for large scale flows.
- Non-Newtonian fluids with shear dependent viscosities.

Bibliometric indicators

- Scopus: Documents: 100; citations: 1294; h-index: 19, SC: 6602770666
- Web of Science: Documents: 109; citations: 1535, h-index: 19 I-4763-2012
- Mathematical Reviews: Documents: 104, citations: 1334, h-index: 17, MR636037
- zbMATH: Documents: 112, citations: 1236, h-index: 17, berselli.luigi-carlo
- Google Scholar: Documents: 120, citations: 2746, h-index: 24; Profile
- ORCiD: 0000-0001-6208-9934l

Participation to and coordination of National Research projects

- PRIN 2000, Theory and applications of linear and nonlinear hyperbolic equations, national coordinator S. Spagnolo.
- PRIN 2002, Hyperbolic and parabolic nonlinear equations, national coordinator P. Marcati.
- PRIN 2005, Fluid dynamics and conservation laws, national coordinator P. Secchi.

- PRIN 2007, Nonlinear systems of conservation laws and fluid mechanics, national coordinator S. Bianchini.

- PRIN 2009, Systems of conservation laws and fluid mechanics: method and applications, national coordinator S. Bianchini.

- PRIN 2012, Nonlinear hyperbolic partial differential equations, dispersive and transport equations: theoretical and applicative aspects, national coordinator S. Bianchini.

- PRIN 2016 Hyperbolic systems of conservation laws and fluid dynamics: analysis and applications, national coordinator S. Bianchini.

- PRIN 2020 Nonlinear evolution PDEs, fluid dynamics and transport equations: theoretical foundations and applications, coordinator of the unit in Pisa.

- GNAMPA 2007, Random and computational models for the analysis of turbulence generated by rough walls, national coordinator M. Romito

- GNAMPA 2011, Continuous and discrete statistical models for the study of the transport of the kinetic energy in ideal fluids, national coordinator.

- GNAMPA 2012, Analysis of trajectories of solutions of stochastic partial differential equations, national coordinator M. Romito.

- GNAMPA 2017, Stability, continuation and turbulence in evolution problems, national coordinator.

- GNAMPA 2023, Analytical and numerical studies for systems of partial differential equations, coordinator A. Abbatiello.

- PRA_2016_6 UNIPI: Evolution problems: qualitative analysis and asymptotic behavior, coordinator N. Visciglia.

- PRA_2018_52 UNIPI: Energy and regularity: New techniques for classical PDE problems, coordinator E. Chiodaroli.

Editorial services

Editor

- Advances in Mathematical Physics, Hindawi [2008-present]

- Guest editor for the special volume *Fluid Dynamics and Electromagnetism: "Theory and Numerical Approximation"* of the journal Discrete Contin. Dynam. Systems Series S. **9** 2016 doi:10.3934/dcdss.2016.9.1i

- Boundary Value Problems, Springer [2016-present]

- Advances in Nonlinear Analysis, De Gruyter [2019-present]

- Co-Editor of the volume *Progress in Fluid Mechanics*, Lecture Notes in Mathematics 2272, 2020, ISBN 978-3-030-54898-8 doi:10.1007/978-3-030-54899-5

- Zeitschrift für angewandte Mathematik und Physik (ZAMP), Birkhäuser [2022-present]

Reviewer

- I reviewed about 250 paper for international mathematical journals, obtaining also the certificate of excellence by Elsevier in 2014.
- Reviewer for the Mathematical Reviews (2002-present, 192 reviews).

Other services

Administrative services

Elected member of the internal committee that evaluates the research activity and research grants in: "Mathematics, Applied Mathematics, and Computer Sciences," for the whole University of Pisa. [2002-2004], [2014-2018].

Elected member of the executive committee for the Ph.D. school in Mathematics, University of Pisa. [November 1, 2006-January 31, 2012], [March 1, 2023-present]

Elected member of the executive committee of the Dean of the faculty of Engineering, University of Pisa. [July 1, 2009-Sep 18, 2012.]

Elected member of the Department Joint Committee [Nov. 1, 2016-2021]

Department delegate for Research. [May 2017-present]

Member of the Scientific Committee of the CIME Foundation (Florence) [Gen. 1, 2020-present]

Outside ex-valuator

- U.S. Universities (2006 & 2018)
- U.K. Universities (2014)
- Portugal Universities (2023)
- MIUR (FIRB 2013) and (SIR 2015)
- (ANEP)-Agencia Nacional de Evaluación y Prospectiva, Spain (2015)
- National Science Centre Poland (2019)
- ERC (2020)
- The Czech Science Foundation-GACR (2020)

Organization of conferences/schools

- Co-organizer of the workshop: "Partial Differential equations, fluid mechanics and conservation laws," Pisa, November 28-30, 2007.
- Organizer of the mini-symposium: "Navier-Stokes equations and LES models", within the conference MFD2010 (Mathematical fluid dynamics and its applications) Rennes (France, June 21–24, 2010).
- Co-organizer of the workshop: "Fluid Dynamics and Electromagnetism: Theory and Numerical Approximation," CIRM-FBK, Levico Terme, June 3-6, 2014.

- Co-organizer of the workshop: "New trends in Partial Differential Equations", Centro De Giorgi, Pisa, October 3–7, 2016.
- Co-organizer of the workshop: "Recent Progresses in PDEs" Dep. Mathematics, University of Pisa, January, 19-20th, 2017.
- Co-organizer of the workshop: "Equazioni alle Derivate Parziali nella Dinamica dei Fluidi" Centro De Giorgi, Pisa, February, 5–7th, 2018.
- Co-organizer of the workshop: "Variational problems, PDEs and applications", Dept. Mathematics, University of Pisa, January, 17-19th, 2019.
- Co-organizer of the CIME summer school: "Progress in Mathematical Fluid Dynamics" Cetraro (CS), June 17–21th, 2019.
- Co-organizer of the workshop: "Variational problems, PDEs and applications", Dep. Mathematics, University of Pisa, January, 17-18th, 2020.
- Co-organizer of the workshop: "Analysis of nonlinear, PDEs", Dep. Mathematics, University of Pisa, June, 6-7th, 2024.

Member of the admission committee for the Ph.D. in Applied and Industrial Mathematics, 2002, 2003, 2008, & 2009, Scuola Normale Superiore, Pisa.

Member of the admission committee for the Ph.D. in Industrial Engineering, 2009 & 2011, University of Pisa.

Member of the admission committee for the Ph.D. in Mathematics, 2021, University of Pisa.

Member of the committee for midterm examination of Ph.D. students in Mathematics, University of Pisa, 2008.

Member of the hiring committee for: a) research contract in Mathematical Analysis, 2002, 2007, 2022, 2023, 2024 (Univ. of Pisa); b) Researcher in Mathematical Analysis, 2016 & 2021 (Univ. of Pisa); c) Full professor in Probability 2017 (Univ. of Pisa); d) Tenure track associate professor in Mathematical Analysis, 2017 (GSSI, L'Aquila), 2018 (Univ. of Pisa), 2024 (GSSI, L'Aquila); c) Full professor in Mathematical Analysis 2023 (Univ. of Brescia)

Member of the jury for Ph.D. final examinations for

- Enrica Salvatici, Ph.D. in Aerospace Engineering, University of Pisa, September 2005.
- Luis Borges, Ph.D. in Mathematics, Instituto Superior Técnico, Lisbon, December 2006.
- Jmmy Alfonso Mauro, Ph.D. in Mathematics, University of Pisa, January 2010.
- Angel Castro Martínez, Ph.D. in Mathematics, Universidade Autónoma de Madrid, July 2010
- Hani Ali, Ph.D. in Mathematics, University Rennes 1, Rennes (France), December 2011, referee.
- Monica Twarogowska, Ph.D. in Mathematics, University of L'Aquila, February 2012.
- M. Ahmed Rejaiba, Ph.D. in Mathematics, University of Pau et des Pays de l'Adour (France), December 2014.
- Elena Di Iorio, Ph.D. in Mathematics, SISSA (Trieste) and GSSI (L'Aquila), October 2018.
- Giada Cianfarani Carnevale, Ph.D. in Mathematics, University of L'Aquila, July 2022.

Graduate students

- Stefano Spirito, "The artificial compressibility approximation and the inviscid limit for the incompressible Navier-Stokes equations," PhD from the University of L'Aquila, thesis defended in February 2012. (Currently associate professor at the Univ. of L'Aquila)

- Matteo Cerminara, "Modeling dispersed gas-particle turbulence in volcanic ash plumes," PhD from the Scuola Normale Superiore (Pisa), thesis defended in July 2016. (Currently permanent researcher at the INGV, National Institute of Geophysics and Volcanology).

- Dinh Duong Nguyen, "Some results about turbulent models," PhD. from Rennes Univ. 1 (France), thesis defended in Oct. 1, 2020. (Currently research associate at Vietnam Institute for Advanced Study in Mathematics (VIASM), Hanoi, Vietnam)

Undergraduate students .

Bachelor students (third year)

- Matteo Ballero, Introduction to the wavelet transform (2016)

- Eric Stenhede, Curves with constant width described by Fourier Series (2017)

- Ginvevra Biondi, Sobolev integral formula and applications (2017)

- Martino Fortuna, The Schwarz alternating method (2017)

- Matteo Aldovardi, On the implicit function theorem (2018)

- Sean Berti, On the Polya function (2018)

- Marco Miani, From the Calderón problem to the Harry Potter's cloak (2018)

Master Students (fifth year)

- Arturo Battinelli, "On the analysis of a probabilistic model for viscous flows in channels with rough walls" (Probability and Analysis, in Italian) University of Florence (2008), mark 110/110 *cum laude* (co-advisor with M. Romito)

- Alice Borselli, Existence and uniqueness of very-weak solutions for generalized Stokes systems (Analysis, in Italian) University of Pisa (2009), mark 110/110 (co-advisor with M. Romito).

- Michele Erba, Mathematical models for the wind flow over a hill and applications to aeolian factories collocation. (Applied Mathematics) (2010), mark 107/110 (co-advisor with Dr. Eng. P. di Marco).

- Nicolas Orsini, Equations de Navier-Stokes et modélisation de la turbulence (2019), Stage ENS Cachan.

Post doc mentoring

- Luca Bisconti, Dept. of Appl. Math, University of Florence, 2009-2011 (Currently associate professor at the Univ. of Florence).

- Rossano Sannipoli, Dept. of Math, University of Pisa, June 2023-May 2024. (Currently post-doc at the Univ. of Padova).

- Alex Kaltenbach, Dept. of Math, TU Berlin, June 2023-March 2024 (Currently post-doc at TU Berlin).

Courses Taught

FOR UNDERGRADUATE STUDENTS:

- Support teaching activity of **Mathematics I** (Calculus I), 1999-2000 Univ. of Trento; 2000-2004, Univ. of Pisa, Faculty of Engineering.

- Support teaching activity of **Mathematical Analysis III** (Fourier series and transform, stability for system of ODEs, function of one complex variable), 2000-2001 Univ. of Pisa, Faculty of Engineering.

- **Introductory mathematics for engineers** (pre-calculus), 2002-2007 Univ. of Pisa.

- **Mathematics** (Calculus I and Linear Algebra), 2004-2008 Univ. of Pisa, Faculty of Engineering.

- **Introduction to automata theory**, Honor class, 2005-2006, Univ. of Pisa, Faculty of Engineering.

- **Mathematical Analysis I** (Calculus I), 2008–present, Univ. of Pisa, Computer Science Engineering.

- **Mathematical Analysis II** (Calculus II), 2021–2022, Univ. of Pisa, Computer Science Engineering.

- **Semigroup theory**, 2012-2013, Univ. of Pisa, School of Mathematics.

- **Mathematical Analysis III** (Fourier series and transform and applications to partial differential equations, basic of Hilbert spaces, surface integrals and Stokes theorem) 2014–2018, Univ. of Pisa, School of Mathematics.

- **Equations of Mathematical Fluid Mechanics**, 2020–22, 2023-24, Univ. of Pisa, School of Mathematics.

FOR GRADUATE STUDENTS:

- **Domain Decomposition Methods for PDE's**, Ph.D. in Applied and Industrial Mathematics, 2001-2002 Scuola Normale Superiore, Pisa.

- Lectures on the **Navier-Stokes theory**, 2002-2003 University of Pisa.

- **Introduction to the LES of turbulent flows** for MS. students, 2005-2006, IST (Instituto Superior Técnico) Lisbon.

- **An introduction to the mathematics of Large Eddy Simulation of turbulent flows** SIMUMAT summer school 2008, CIEM (International Center of Mathematical meetings), Castro Urdiales, Cantabria, Spain, July 7-18, 2008.

- **Introduction to PDE** for Ph.D. students, '08-'09 University of Pisa, Faculty of Engineering.

- **Introduction to mathematics of Large Eddy Simulation of turbulent flows**, Ph.D. program in industrial mathematics 2008-2011, Scuola Normale Superiore, Pisa.

- **On the Stokes Problem with Navier Boundary Conditions**, September 2009, SISSA/ISAS (International School for Advanced Studies), Trieste.

- **Some Selected Topics in Incompressible Fluid Mechanics** Summer School 2011 (Analytic Methods in PDEs), Department of Mathematics, University of Surrey, UK, September 12-16, 2011

- **Mathematical fluid dynamics**, Master-PhD class, KAUST, Saudi Arabia, Jan-May, 2023,

Research periods in foreign institutions

i) Pittsburgh University, Department of Mechanical Engineering, September 26–October 3, 2000, Pittsburgh (PA, U.S.)

ii) Pittsburgh University, Department of Mechanical Engineering and Department of Mathematics, March 23–April 12, 2001, Pittsburgh (PA, U.S.)

iii) Instituto Superior Técnico, Departamento de Matemática, April 16–25, 2002, Lisbon, (Portugal).

iv) Pittsburgh University, Department of Mechanical Engineering and Department of Mathematics, February 1-28, 2003, Pittsburgh (PA, U.S).

vi) Otto-von-Guericke-Universität, Institut für Analysis and Numerik, May 8-15, 2004, Magdeburg (Germany).

vii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, May 9–28 and August 20–September 13, 2005, Freiburg (Germany)

viii) Universidade de Lisboa, Centro de Matemàtica e Aplicações Fundamentais and Instituto Superior Técnico, March 20–April 7, 2006, Lisboa (Portugal).

vii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, March 3–15, 2008, Freiburg (Germany).

viii) Virginia Tech, Department of Mathematics, March 29–April 3, 2009, Blacksburg (VA, U.S.).

ix) American Institute of Mathematics, Palo Alto (CA, U.S.) April 6–10, 2009

x) University Rennes 1, UFR Mathématiques, May 18–29, 2009, Rennes (France).

xi) Instituto de Ciencia Matemáticas, Nov 21–27, 2010, Madrid (Spain).

xii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, March 15–26, 2013, Freiburg (Germany).

xiii) Albert-Ludwigs Universität, Abteilung für Angewandte Mathematik, Erasmus professor July 1–5, 2018, Freiburg (Germany).

xiv) Computer, Electrical and Mathematical Sci. and Eng. Dept., King Abdullah University of Science and Technology KAUST, visiting professor, Jan-May, 2023, Thuwal (Saudi Arabia).

Invited talks (organized by year)

1995

- Conference *Equadiff95* (Dep. de Matemática, Faculdade de Ciências, Lisbon, July 24–29, 1995). Talk: "On the breakdown of the smooth solutions to the Euler equations."

1997

- Conference *Modeling of smart materials and optimal shape design* (Pisa, Dip. di Matematica "L. Tonelli," April 17–18, 1997). Talk: "On electro-viscous fluids."

1998

- Conference *Delft meeting on functional analysis and nonlinear partial differential equations* (Delft, Technical University TUDelft, The Netherlands, May 23–28, 1998). Talk: "A remark on 3-D Navier-Stokes equations."

- Conference *Deterministic and stochastic fluid mechanics* (Torino, Dept. of Math., September 10–11, 1998). Talk on: "Some results on the long-time behavior of Navier-Stokes equations."

1999

- Conference *IPERRoma99* (Roma, C.N.R.-National Research Council, October 25–27, 1999). Talk: "2D quasi-geostrophic equation, 3D Euler equations and related questions."

2001

- Dip. di Matematica, Università di Milano, *Applied Math Seminar* (February 2001), Talk: "New results regarding the Navier-Stokes equations"

- Dept. of Mech. Eng., Pittsburgh University, U.S.A. (February 2001), a couple of 1 hour-seminars on: "Mathematical modeling of turbulent flows."

- Dept. of Math., Pittsburgh University U.S.A., *Applied Math Seminar* (March 2001), Talk: "Numerical methods for advection-diffusion equations."

- Conference *Contemporary Challenges in Applied Fluid Mechanics*, (Capo Miseno, May 31–June 5, 2001). Talk: "On the existence of strong solutions for a Large Eddy Simulation model."

- Dept. of Aerospace Eng., Università di Pisa (July 2001), Talk: "Problems and methods in Large Eddy Simulation."

- Conference *Nonlinear hyperbolic equations, their applications to hydrodynamics, dynamical systems*, (Torino, October 1–4, 2001). Talk: "The role of the vorticity field for incompressible flows."

2002

- Dept. of Pure and Appl. Math., Università di L'Aquila (March 2002), Talk: "Analytical and geometric results for the Navier-Stokes equations."

- *Workshop on Hyperbolic Equations*, (Venezia, April 11–12, 2002). Talk: "On the Euler equations and the motion of a vortex filament."

- Conference *AMIF 2002-Applied Math for Industrial Flows, Third International Conference (April 17-20, 2002 Lisbon-Portugal).* Talk: "Some Analytical results regarding the Rational Large Eddy Simulation model."

- Dep. de Matemática, Instituto Superior Técnico, *Seminar on Applied Math and Numerical Analysis* (April 2002), Talk: "On the filtration through porous media: G-convergence and domain decomposition methods."

- Conference *Advances on Nonlinear PDEs*, (June 5-8, 2002 L'Aquila). Talk: "Space filtered Navier-Stokes equations for turbulent flows: mathematical modeling and analytical results."

- Dept. of Math. MOX-Politecnico di Milano (June 2002), Talk: "On the evolution of the vorticity in turbulent flows and small scale structures"

2003

- Dept. of Math, Pittsburgh University U.S.A., Applied Math- Seminar (February 2003), Talk: "Domain decomposition methods for the coupling of the Stokes equations and the porous media equations"

- Dept. of Math, Pittsburgh University U.S.A., Weekly Colloquium (February 2003), "New results and open problems in the mathematical theory of viscous incompressible flows." Colloquium.
- Dept. of Math, Pittsburgh University U.S.A., Computational Math Seminar (February's 2003), Talk:"On the slip with linear friction boundary conditions for the Navier-Stokes equations."
- Dept. of Mechanical Engineering, Pittsburgh University U.S.A., FFF Fluid Mechanics Seminar (February 2003), Talk: "Some results for the Rational Large Eddy Simulation Model"
- Dept. of Math, Virginia Polytechnic Institute and State University (February 2003), Talk: "On the vorticity seeding method: control and generation of vorticity on the boundary." Colloquium.
- Dept. of Mech. Eng., Pittsburgh University U.S.A., (February 2003), Talk: "Formation and evolution of coherent small dimensional patterns in incompressible fluids."
- Dip di Matematica "L.Tonelli," Università degli Studi di Pisa (March 2003), Talk: "Open problems for the Navier-Stokes equations"
- Conference *International Workshop on Nonlinear Partial Differential Equations. Celebration of the* 60^{th} *birthday of Hugo Beirão da Veiga* (Funchal, Portugal, June 25–28, 2003). Talk: "On Taylor–Green vortices." Main Speaker.
- Conference *Workshop on Navier-Stokes equations. Celebration of the* 70^{th} *birthday of Vsevolod A. Solonnikov* (Paderborn, Germany July 18, 2003). Talk: "On the space-time regularity of the $C(0,T;L^3)$ mild solutions to the Navier-Stokes equations."

2004

- Dept. of Math., Università di Ferrara (January 2004), 1 hour seminar on: "On the motion of an incompressible fluid equipped with non-standard boundary conditions."
- Dept. of Math., Magdeburg (Germany, May 2004), Talk: "On the unsteady Navier-Stokes equations under Navier type boundary conditions."
- Dept. of Math., Università di Brescia (May 2004). Talk: "New results on the motion of a line vortex."
- Conference *"P.D.E. in Mathematical Physics", in memory of Olga A. Ladyzhenskaya* (Levico T. ITALY, Oct. 24-30, 2004). Talk: "On commutation errors in the space filtered Navier-Stokes equations". Main Speaker.

2005

- Dept. of Math., Freiburg University (Germany, May 2005). Talk: "Introduction to commutation errors in LES." Colloquium.
- Dept. of Appl. Math., Freiburg University (Germany, May 2005) three-lectures on: "Introduction and perspectives in filtering for nonlinear equations".
- School on Mathematical Theory in Fluid Mechanics, Paseky (Czech Republic, June 25–July 1, 2005), Short communication: "On very-weak solutions to the Navier-Stokes equations".

2006

- CMAF, Lisbon University (March 2006): "On the global evolution of vortex filaments, blobs, and small loops in 3D ideal flows.
- Dep. de Matematica, University of Èvora (Portugal) (April 2006) Talk: "On the regularity of solutions to the 3D Navier-Stokes equations."

- *Workshop Mathematical analysis on fluid mechanics.* Dept. of Math., Universidad Autónoma de Madrid (October 2006): Talk:"Small structures in 3d ideal flows."

2007

- *Meeting on honor of V.A. Solonnikov*, Pisa, (March 28-29, 2007) Talk: "Optimal estimates of Euler schemes for shear-dependent flows."
- *International Conference in Mathematical Fluid Mechanics*, Estoril (Portugal, May 21–25, 2007) Talk: "Statistical Theories of p-fluids." Main Speaker.
- *Joint Meeting DMV/UMI*, Perugia, (June 18–25, 2007.) Talk: "On the Boundary Commutation Error Term in the Numerical Simulation of Turbulent Flows."
- *ICIAM07* Zurich, (Switzerland July 16–20, 2007) Talk: "Recent advances in the discretization of flows with shear dependent viscosities."
- Meeting on conservation laws and continuum mechanics Pisa, (November 28–30, 2007) Talk: "On the geometry of solutions of the Navier-Stokes equations."

2008

- Dep. de Matematicas, IMAFF - CSIC, Madrid (Spain, April 2008) Talk: On the existence of strong solutions for fluids with shear dependent viscosities.
- Dip. of Matematica "L.Tonelli," Università degli Studi di Pisa (March 2008), Talk: "Navier-Stokes equations and regularity."
- Conference *Vorticity, Rotation and Symmetry Stabilizing and Destabilizing Fluid Motion*, CIRM Luminy (France, May 19–23, 2008) Talk: vorticity and regularity for the Navier-Stokes equations. Main speaker.
- Conference *Navier-Stokes equations. Classical and generalized models* (Centro De Giorgi, Pisa, September 21–28 2008.) Talk: Some geometric constraints and the problem of global regularity for the Navier-Stokes equations.

2009

- Conference, *Journées SCASEN : Méthodes mathématiques en mécanique des fluides* (Université Lyon 1, Lyon France, January 20-22 2009.) Talk: "Lower bounds for the Navier-Stokes equations." Main speaker.
- Dept. of Math, Virginia Polytechnic Institute and State University (April 2009), Talk: "On the existence of weak, strong and very-weak solutions. From the Poisson problem to the Stokes equations." Colloquium.
- Conference, *2009 AMS Spring Southeastern Section Meeting Raleigh* (NC, April 4-5, 2009) Talk:"Analysis of an anisotropic scale similarity LES model."
- University Rennes 1, UFR Mathématiques (May 2009) Talk: "On time dependent solution of the Navier-Stokes equations in pipes and applications to one of Leray's problems."
- Conference, *SIAM conference on Mathematical & Computational Issues in the Geosciences, Leipzig* (June 15-18, 2009), Talk: "Analysis of a scale similarity LES model designed for certain stratified flows."
- Conference, *Mathematical Physics and PDEs"* - (Levico, Sept. 6-11, 2009) Talk: "Convergence of approximate deconvolution models to the filtered Navier-Stokes Equations." Main speaker.

- Conference, *QLES2009, Quality and Reliability of Large-Eddy Simulations II.* (Pisa, Sept. 9-11, 2009) Talk "On the analysis of some LES models based on approximate deconvolution and scale similarity."
- Workshop, *LES in Italy.* (Pisa, Sept 12, 2009) Talk: "LES for the Boussinesq equations."
- Dept. of Applied Math. "G. Sansone", Univ. of Firenze, (Nov. 26, 2009) Talk: "On the Space filtered Navier-Stokes equations."

2010

- Workshop *Hyperbolic Conservation Laws and Fluid Dynamics* (Parma, Feb. 15–19, 2010) Talk: "On the inviscid limit for the Navier-Stokes equations with slip boundary conditions." (Main speaker)
- Conference MDF2010 (Rennes, France June 21–24, 2010) Talk: "On the vanishing viscosity limit for the 3D Navier-Stokes equations under slip boundary conditions in general domains" (Main speaker)
- International Summer School on Mathematical Fluid Dynamics (Levico, June 27-July 2, 2010) Talk: "On almost periodic flow in pipes" (Short communication)
- Conference PDEFM2010 (Warwick, UK, July 4–9, 2010) Talk: "On the vanishing viscosity limit for the 3D Navier-Stokes equations in bounded domains" (Main speaker).
- Centre for Nonlinear PDE, Oxford University, (Oct. 2010) Talk: "On averaged equations for turbulent flows."
- Calculus of Variations, Singular Integrals and Incompressible flows, Instituto de Ciencias Matemática (Madrid, Spain, Nov. 2010) Talk: "Fully developed flows in pipes and applications." (Main Speaker).

2011

- Dept. of Math. Univ. of L'Aquila, (Mar. 24, 2011) Talk: "Approximate deconvolution and related models for the Navier-Stokes equations."
- Dept. of Math., Freiburg University (Germany, May 18, 2011). Talk: "On averaged equations for turbulent flows, with applications to Magnetohydrodynamics," SFB Colloquium.
- Universitat Politècnica de Catalunya. Barcelona (Spain, June 9, 2011). Talk: "On the Boussinesq equation."
- Nonlinear Hyperbolic PDEs, Dispersive and Transport Equations, SISSA/ISAS (July 13, 2011). Talk: "Some results on the Boussinesq equations."
- Conference PDE in Mathematical Physics and their Numerical Approximation (Levico, Sept. 4-9, 2011). Talk: "Optimal error estimates for fluid with shear-dependent viscosities."

2012

- Connections Between Regularized and Large-Eddy Simulation Methods for Turbulence, (Banff, Canada, May 13–18, 2012). Talk: "LES and volcanic eruptions."
- Dept. of Math., Univ of Warwick (UK, June 7, 2012). Talk: "An elementary proof of uniqueness of the particle trajectories for solutions of a class of 2D shear-thinning non-Newtonian fluids."
- HYP2012, 14th Intl. Conf. on Hyperbolic Problems: Theory, Numerics, Applications (Padova, June 25–29, 2012). Talk "On the long-time behavior of 2D dissipative Euler equations."
- 6^{th} European Congress of Mathematics. Mini-symposium on 2D Euler equations (Krakow, July 3–7, 2012). Talk: "On the attractors for 2D Euler equations with dissipation."

- International Winter School on Mathematical Fluid Dynamics (Levico Terme, Dec. 16–21, 2012). Talk: "Pulsatile viscous flows in elliptical vessels and annuli, with application to blood and cerebrospinal fluid flow."

2013

- Ercoftac Workshop Direct and Large-Eddy Simulation 9 (Dresden, Germany, April 3–5, 2013). Talk: "Direct numerical simulation of a compressible multiphase flow through the fast Eulerian approach."
- Dept. of Math., Freiburg University (Germany, Apr 23, 2013). Talk: "Attractors for the 2D Euler equations."
- Math. Institute, Basel (Switzerland, Apr. 24, 2013) Talk: "Uniqueness of particle trajectories for incompressible fluids."
- SIAM conference on Mathematical & Computational Issues in the Geosciences, Padova (June 17-20, 2013), Talk: "On the transport of particles in oceanic flows: Modeling, theory and Experiments."
- Conference: Mathematics and Geosciences: Global and Local Perspectives ICMAT, Madrid (Spain, Nov. 4-8, 2013), Talk: "On the Large Eddy Simulation of some multiphase problems in geophysics."
- University Rennes 1, UFR Mathématiques (Dec 2013) Talk: "When mathematicians go climbing .... a volcano." Colloquium.

2014

- Recent Advances in PDEs and Applications (Levico Terme, Feb. 17–21, 2014). Talk: "On suitable weak solutions to the Navier-Stokes equations."
- Dep. of Math. Pisa (April 9, 2014), PDE seminar. Talk: "On the existence of almost periodic solutions for two non standard problems."
- Fluid Dynamics and Electromagnetism: Theory and Numerical Approximation (Levico Terme, June 3-6, 2014). Talk:"On the regularity of solutions of some Boundary Values Problems arising in fluid mechanics."
- Transport, microscales, and fluids @GSSI L'Aquila (L'Aquila, June 9-14, 2014) Talk: "Recent advances in the analysis of multiphase compressible flows"
- Classical Problems and New Trends in Mathematical Fluid Dynamics (Ferrara, Sep 2014) Talk: "On suitable weak solutions"

2015

- *Meeting on honor of L. Nirenberg* (Pisa, June 19 2015) Talk:"Compressible Navier-Stokes equations and applications to volcanology"
- Dept. of Math., Freiburg University (Germany, Jul 5, 2015). Talk: "On the regularity for the Stokes system: old, very old, and rather new"
- Dept. of Math. Darmstadt (Germany, Oct 20 2015). Talk in the International Research Training group "Almost periodic solutions to some problems in fluid mechanics."
- Dept. of Math. Darmstadt (Germany, Oct 21 2015). Talk: "On averaged equations for turbulent flows," Mathematisches Kolloquium.

2016

- University Rennes 1, UFR Mathématiques (Feb 2016) Talk: The Stokes problem: something (not new) about something certainly old.
- Fall Western Sectional Meeting (Denver, CO, October 8-9, 2016) Talk: "On the local energy inequality for the Navier-Stokes equations."
- Freiburg-Pisa Workshop in Math. Analysis (Pisa, October, 21–23, 2016) Talk: "On the energy inequality for viscous fluids"

2017

- Ercoftac Workshop Direct and Large-Eddy Simulation 11 (Pisa, May, 29–31, 2017). Talk: "Large Eddy Simulation Reduced Order Modeling: A Numerical Investigation Of Spatial Filtering"
- Conference IperPV2017 XVII Italian Meeting on Hyperbolic Equations (Pavia, Sep. 6–8, 2017). Talk: "Entropy or physically-relevant solutions in incompressible fluids" (Main Speaker)
- Heriot-Watt Univ. (Edinburgh, Nov. 10, 2017). Talk: "On the regularity for nonlinear systems of the p-Stokes type"
- Mini-Workshop on Singular Variational Problems (Freiburg Germany, Nov, 19, 2017). Talk: "Time averages and Reynolds equations for dissipative equations."

2018

- Conference: Partial Differential equations in fluid mechanics (Pisa, Feb. 5–7, 2018). Talk: "On the Reynolds equations, with applications to ensemble averages."
- New York Univ. Abu Dhabi (Abu Dhabi EAU, April 9, 2018) Talk: "When mathematicians go ...close to a volcano."
- Conference Recent Advances in Nonlinear Analysis (Levico Terme, May 28–30, 2018). Talk: "Classical solutions of the divergence and curl equation with Dirichlet condition."
- Conference Workshop on Mathematical fine structures in fluid dynamics (L'Aquila, June 11-15, 2018) "On the energy conservation for viscous fluids."

2019

- Conference: Elsevier - JMAA Conference on Nonlinear Analysis (AGH, Krakow, Poland, Oct 11-12, 2019) "Turbulent flows as generalized Kelvin-Voigt materials: modeling by non-uniformly elliptic and pseudo-parabolic equations."
- Conference: LIASFMA China-Italy Conference on Partial Differential Equations and Their Applications (Fudan Univ Shanghai, PRC, Dec 9–13, 2019) "On the energy equality and inequality for the 3D Navier-Stokes."

2021

- Conference Analysis Day - on the occasion of the retirement of Professor Reinhard Farwig (Darmstadt June 18, 2021) "Natural second-order regularity for parabolic systems."
- Conference: PDEs and continuum mechanics (RI$\int$M, Varese, July 21-23, 2021) "Boundary regularity for elliptic/parabolic systems."
- Workshop "TURB1D 2021" (Santander Spain, Nov. 2–3, 2021) "On the unsteady rotational Smagorinsky (Baldwin-Lomax) model"

2022

- International Conference on Nonlinear Differential Equations and Applications (Évora, Portugal Jul. 3–6, 2022) "Pseudo monotone operators and the unsteady rotational Smagorinsky model"

2023

- Computer, Electrical and Mathematical Sci. and Eng. Dept., (KAUST, Saudi Arabia, Feb. 7, 2023) Talk: "On the Mathematics of turbulent flows"
- New York Univ. Abu Dhabi (Abu Dhabi EAU, April 25, 2023) Talk: "On rotational eddy viscosity models"
- Computer, Electrical and Mathematical Sci. and Eng. Dept., (KAUST, Saudi Arabia, May 9, 2023) Colloquium: "On some nonlinear elliptic/parabolic systems arising in mechanics and turbulence"
- Conference: meeting on nonlinear evolution pdes, fluid dynamics and transport equations (Erice, May 25–31, 2023) Talk: "Eddy viscosity models based on vorticity".
- Politecnico di Milano (Milan, Jun 29, 2023) Talk: "Energy conservation or anomalous dissipation for incompressible fluids".
- Università di Firenze (Firenze, Dec. 6, 2023) Meeting: MathAnalysis@UniFIPISI V, Talk: "Energy conservation for incompressible viscous fluids".

2024

- Mathematical Institute, Oxford (Oxford UK, May 6, 2024) Talk: "On Galerkin approximations of the 2D Euler equations".
- Wave Dynamics and Fluid Structure Interactions, (Como May 27-31 2024). Talk: "Fourier-Galerkin approximation of the solutions of the 2D Euler equations with bounded vorticity".
- AMS UMI joint meeting (Palermo, July 23-26, 2024). Talk: "Boundary layers equations with an eddy viscosity vanishing at the boundary."
- Nonlinear Partial Differential Equations in Freiburg (Freiburg Germany, Oct. 2-4, 2024) Talk: "Geometrical criteria and "regular" solutions to the Navier-Stokes equations."

2025

- Fluids@PoliMi (Jan 8-10, 2025) Talk: "Absence of anomalous dissipation for weak solutions of the Maxwell-Stefan system."

Theses

1. *On the global existence for the solutions to the equations of ideal fluids (Italian)* (degree thesis) 86 pp., 1995, University of Pisa/Scuola Normale Superiore, directed by Prof. H. Beirão da Veiga
2. *Some topics in fluid mechanics*, Ph.D. Thesis; Pubblicazione del Dipartimento di Matematica "L. Tonelli" dell'Università di Pisa, **2.362.1230** (2000), vi+129pp. An italian summary appears in Boll. Unione Mat. Ital. Sez. A Mat. Soc. Cult. (8) **III-A** (2000), 271–274.

Books

- Luigi C. Berselli, *Three-Dimensional Navier-Stokes Equations for Turbulence*, Mathematics in Science and Engineering. Academic Press, London, [2021], ©2021. xiii+313 pp. ISBN: 978-0-12-821954-6 MR 4284207 link

- Luigi C. Berselli, Traian Iliescu, and William J. Layton *Mathematics of Large Eddy Simulation of Turbulent Flows,* pp. xviii+348, (2006), ISBN 3-540-26316-0 Springer series in Scientific Computation. MR 2185509 (2006h:76071) Publisher link

Research papers (in reverse chronological order)

114. Luigi C. Berselli and Alex Kaltenbach, *Convergence analysis for a finite element approximation of the unsteady $p(\cdot,\cdot)$-Navier–Stokes equations*, to appear in Numer. Math., arXiv, 2024 2402.16606

113. Luigi C. Berselli and Alex Kaltenbach, and Michael Růžička, *Energy conservation for weak solutions of incompressible Newtonian fluid equations in Hölder spaces with Dirichlet boundary conditions in the half-space*, Math. Ann., 2024 doi:10.1007/s00208-024-03065-7

112. Luigi C. Berselli, Stefanos Georgiadis and Athanasios E. Tzavaras, *Absence of anomalous dissipation for weak solutions of the Maxwell-Stefan system*, to appear in Nonlinearity, arXiv, 2024, 2407.10134

111. Luigi C. Berselli and Alex Kaltenbach, *Error analysis for a finite element approximation of the steady $p(\cdot)$-Navier–Stokes equations*, to appear in IMA J. Numer. Anal. doi:10.1093/imanum/drae082

110. Luigi C. Berselli, Elisabetta Chiodaroli, and Rossano Sannipoli, *Energy conservation for 3D Euler and Navier-Stokes equations in a bounded domain. Applications to Beltrami flows*, J. Nonlinear Sci., **35**: 10 (2025) doi:10.1007/s00332-024-10102-x,

109. Luigi C. Berselli and Rossano Sannipoli, *Velocity-vorticity geometric constraints for the energy conservation of 3D ideal incompressible fluids*, J. Geom. Anal. **34**, 259 (2024). doi:10.1007/s12220-024-01704-8

108. Luigi C. Berselli and Stefano Spirito, *Fourier-Galerkin approximation of the 2D Euler equations*, J. Hyperbolic Differ. Equ. to appear. 2024 doi:10.1142/S0219891624400010

107. Chérif Amrouche, Luigi C. Berselli, François Legeais, Guillaume Leloup, and Roger Lewandowski, *Singular boundary condition for a degenerated turbulent toy model*, 2023. hal-04143082v3, to appear in Pure Appl. Funct. Anal. (2024)

106. Luigi C. Berselli, *On a Rotational Smagorinsky Model for Turbulent Fluids: An Overview of Recent Results in the Steady and Unsteady Cases.* In: Beirão da Veiga, H., Minhós, F., Van Goethem, N., Sanchez Rodrigues, L. (eds) Nonlinear Differential Equations and Applications. pp 27–46 PICNDEA 2022. CIM Series in Mathematical Sciences, vol 7. Springer, Cham. doi:10.1007/978-3-031-53740-0_2

105. Luigi C. Berselli and Stefanos Georgiadis, *Three results on the Energy conservation for the 3D Euler equations*, NoDEA Nonlinear Differential Equations Appl. 31:33 (2024) doi:10.1007/s00030-024-00924-9

104. Luigi C. Berselli, François Legeais, and Roger Lewandowski, *Surface boundary layers through a scalar equation with an eddy viscosity vanishing at the ground*, ESAIM Math. Model. Numer. Anal. **58**, 489–513 (2024) doi:10.1051/m2an/2024009

103. Luigi C. Berselli, *Energy conservation for weak solutions of incompressible fluid equations: the Hölder case and connections with Onsager's conjecture*, J. Differential Equations **368**, 350–375 (2023). doi:10.1016/j.jde.2023.06.002

102. Luigi C. Berselli, *On the vorticity direction and the regularity of 3D Navier-Stokes equations*, Nonlinearity **36** 4303–4313 (2023) doi:10.1088/1361-6544/ace096

101. Luigi C. Berselli, Alex Kaltenbach, Roger Lewandowski, and Michael Růžička, *On the existence of weak solutions for a family of unsteady rotational Smagorinsky models*, Pure Appl. Funct. Anal. **8**, 83–102 (2023). link

100. Luigi C. Berselli, *Remarks on the "Onsager singularity theorem" for Leray-Hopf weak solutions: the Hölder continuous case*, Mathematics **11**, (4) 1062 (2023) doi:10.3390/math11041062

99. Luigi C. Berselli and Stefano Spirito, *Convergence of second-order in time numerical discretizations for the evolution Navier-Stokes equations*, Adv. Contin. Discrete Models (2022) 65

doi:10.1186/s13662-022-03736-2

98. Luigi C. Berselli and Michael Růžička, *Natural second order regularity for systems in the case* $1 < p \leq 2$ *using the A-approximation*, 3–37 (2022) In Carapau, F., Vaidya, A. (eds) Recent Advances in Mechanics and Fluid-Structure Interaction with Applications. Advances in Mathematical Fluid Mechanics. Birkhäuser, Cham. doi:10.1007/978-3-031-14324-3_1

97. Luigi C. Berselli, and Michael Růžička, *Natural second-order regularity for parabolic systems with stress tensor with* (p, δ)*-structure and depending only on the symmetric gradient*, Calc. Var. Partial Differential Equations. **61**, 137 (2022) doi:10.1007/s00526-022-02247-y

96. Luigi C. Berselli and Michael Růžička, *Space-time discretization for nonlinear parabolic systems with p-structure*, IMA J. Numer. Anal. **42** (2022) 260–299 doi:10.1093/imanum/draa079

95. Mohamed Abdelwahed, Luigi C. Berselli and Nejmeddine Chorfi, *On the uniqueness for weak solutions of steady double-phase fluids* Adv. Nonlinear Anal. **11** (2022) 454–468. doi:10.1515/anona-2020-0196

94. Luigi C. Berselli, Alex Kaltenbach, and Michael Růžička, *Analysis of fully discrete, quasi non-conforming approximations of evolution equations and applications*, Math. Models Methods Appl. Sci. **31** (2021) 2297–2343 doi:10.1142/S0218202521500494

93. Luigi C. Berselli and Michael Růžička, *Optimal error estimate for a space-time discretization for incompressible generalized Newtonian fluids: The Dirichlet problem*, SN Partial Differ. Equ. Appl. **2** (2021) 59 doi:10.1007/s42985-021-00082-y

92. Luigi C. Berselli and Elisabetta Chiodaroli, *Remarks On the energy equality for the 3D Navier–Stokes equations*, In: Bodnár T., Galdi G.P., Nečasová Š. (eds) Waves in Flows (2021), pp 91-107. Advances in Mathematical Fluid Mechanics. Birkhäuser, Cham. doi:10.1007/978-3-030-68144-9_3

91. Luigi C. Berselli and Stefano Spirito, *On the existence of Leray-Hopf Weak Solutions to the Navier-Stokes equations*, Fluids (2021), 6(1), 42 doi:10.3390/fluids1010000

90. Luigi C. Berselli, Roger Lewandowski, and Dinh Duong Nguyen, *Rotational forms of Large Eddy Simulation turbulence models: modeling and mathematical theory*, Chin. Ann. Math. Ser. B **42** (2021) 17–40 doi:10.1007/s11401-021-0001-2

89. Luigi C. Berselli and Dominic Breit, *On the existence of weak solutions for the steady Baldwin-Lomax model and generalizations*, J. Math Anal. Appl. **501** (2021), 124643 doi:10.1016/j.jmaa.2020.124633

88. Luigi C. Berselli, Argus A. Dunca, Roger Lewandowski, and Dinh Duong Nguyen, *Modeling Error of α-Models of Turbulence on a Two-Dimensional Torus*, Discrete Contin. Dynam. Systems Series B **22** (2020), 4613–4643 doi:10.3934/dcdsb.2020305

87. Luigi C. Berselli and Placido Longo, *Classical solutions of the divergence equation with Dini-continuous datum*, J. Math. Fluid Mech. **22**, 26 (2020) doi:10.1007/s00021-020-0488-4

86. Nejmeddine Chorfi, Mohamed Abdelwahed, and Luigi C. Berselli *On the analysis of a geometrically selective turbulence model*, Adv. Nonlinear Anal. **9** (2020) 1402–1419 doi:10.1515/anona-2020-0057.

85. Cherif Amrouche, Luigi C. Berselli, Roger Lewandowski, and Dinh Duong Nguyen, *Turbulent flows as generalized Kelvin-Voigt materials: modeling and analysis*, Nonlinear Anal. **196** (2020) 111790 doi:10.1016/j.na.2020.111790

84. Luigi C. Berselli and Michael Růžička, *On the regularity of solution to the time-dependent p-Stokes system*, Opuscula Math. **40** (2020) 49–69 doi:10.7494/OpMath.2020.40.1.49

83. Luigi C. Berselli and Elisabetta Chiodaroli, *On the energy equality for the 3D Navier–Stokes equations*, Nonlinear Anal.**192** (2020) 111704, 24 pp doi:10.1016/j.na.2019.111704

82. Luigi C. Berselli and Michael Růžička, *Global regularity for systems with p-structure depending on the symmetric gradient*, Adv. Nonlinear Anal. **9** (2020) 176–192. doi:10.1515/anona-2018-0090

81. Luigi C. Berselli and Roger Lewandowski, *On the Reynolds time-averaged equations and the long-time behavior of Leray-Hopf weak solutions, with applications to ensemble averages*, Nonlinearity **32** (2019) 4579–4608 doi:10.1088/1361-6544/ab32bc

80. Luigi C. Berselli, Simone Fagioli, and Stefano Spirito, *Suitable weak solutions of the Navier-Stokes equations constructed by a space-time numerical discretization*, J. Math. Pures Appl. (9) **125** (2019) 189–208. doi:10.1016/j.matpur.2018.09.004

79. Luigi C. Berselli, Traian Iliescu, Birgul Koc, and Roger Lewandowski, *Long-Time Reynolds Averaging of Reduced Order Models for Fluid Flows: Preliminary Results*, Math. in Engineering, **2** (2019) 1–25. doi:10.3934/mine.2020001

78. Vieri Benci, Luigi C. Berselli, and Carlo R. Grisanti, *The Caccioppoli Ultrafunctions*, Adv. Nonlinear Anal. (2019) 8(1): 946–978. doi:10.1515/anona-2017-0225

77. Luigi C. Berselli and Davide Catania, *A note on the Euler–Voigt System in a 3D Bounded Domain: Propagation of Singularities and Absence of the Boundary Layer*, AIMS Mathematics, **4(1)** (2019) 1–11. doi:10.3934/Math.2019.1.1

76. Luigi C. Berselli, David Wells, Traian Iliescu, and Xuping Xie, *Large Eddy Simulation Reduced Order Models*, pp.151–157 in Direct and Large-Eddy Simulation XI. Springer Verlag. ERCOFTAC Series, Vol. 25 M. V. Salvetti *et al.* (Eds.) 2019 XXV, 551 p. 390 illus. ISBN 978-3-030-04915-7, doi:10.1007/978-3-030-04915-7_21

75. Luigi C. Berselli and Placido Longo, *Classical solutions for the system curl $v = g$, with vanishing Dirichlet boundary conditions*, Discrete Contin. Dynam. Systems Series S. **12** (2019) 215–229 doi:10.3934/dcdss.2019015

74. Luigi C. Berselli and Roger Lewandowski, *On the Bardina's model in the whole space*, 2018 J. Math. Fluid Mech. **20** (2018) 1335–1351. doi:10.1007/s00021-018-0369-2

73. Luigi C. Berselli and Stefano Spirito, *On the convergence of a fully discrete scheme of LES type to physically relevant solutions of the incompressible Navier-Stokes*, (2018) Z. Angew. Math. Phys. **69** 61 doi:10.1007/s00033-018-0955-4

72. Luigi C. Berselli, *Weak solutions constructed by semi-discretization are suitable: the case of slip boundary conditions*, Int. J. Numer. Anal. Model. **15** (2018) 479–481.

71. Luigi C. Berselli and Stefano Spirito, *On the construction of suitable weak solutions to the 3D Navier–Stokes equations in a bounded domain by an artificial compressibility*, Commun. Cont. Math. **20** (2018) 1650064 (16 pages). MR 3714830 doi:10.1142/S0219199716500644

70. Luigi C. Berselli and Michael Růžička, *Global regularity properties of steady shear thinning flows*, J. Math Anal. Appl. **450** (2017) 839–871. MR 3639077 doi:10.1016/j.jmaa.2017.01.016

69. Luigi C. Berselli and Stefano Spirito, *Suitable weak solutions to the 3D Navier-Stokes equations are constructed with the Voigt approximation*, J. Differential Equations, **262** (2017) 3285–3316. MR 3584893 doi:10.1016/j.jde.2016.11.027

68. Matteo Cerminara, Tomaso Esposti Ongaro, and Luigi C. Berselli, *ASHEE: a compressible, equilibrium-Eulerian model for volcanic ash plumes,* Geosci. Model Dev. **9** (2016) 697–730. doi:10.5194/gmd-9-697-2016

67. Luigi C. Berselli and Stefano Spirito, *Weak solutions to the Navier-Stokes equations constructed by semi-discretization are suitable*, in Recent Advances in Partial Differential Equations and Applications, 85–97, Contemp. Math., 666 Amer. Math. Soc., Providence, RI, 2016. MR 3537460 doi:10.1090/conm/666/13243

66. Luigi C. Berselli, Tae-Yeon Kim, and Leo G. Rebholz, *Analysis of a Reduced-Order Approximate Deconvolution Model and its interpretation as a NS-Voigt regularization,* Discrete Contin. Dynam. Systems Series B **21** (2016) 1027–1050. MR 3483551 doi:10.3934/dcdsb.2016.21.1027

65. Luigi C. Berselli, Dominic Breit, and Lars Diening, *Convergence Analysis for a Finite Element Approximation of a Steady Model for Electrorheological Fluids,* Numer. Math. **132** (2016) 657–689. MR 3474486 doi:10.1007/s00211-015-0735-4

64. Luigi C. Berselli and Carlo R. Grisanti, *On the regularity up to the boundary for certain nonlinear elliptic equations,* Discrete Contin. Dynam. Systems Series S. **9** (2016) 51–71. MR 3461647 doi:10.3934/dcdss.2016.9.53

63. Luigi C. Berselli and Davide Catania, *On the Boussinesq equations with anisotropic filter in a vertical pipe*, Dyn. Partial Differ. Equ. **12** (2015), 177–192. MR 3361247 doi:10.4310/DPDE.2015.v12.n2.a5

62. Luigi C. Berselli and Davide Catania, *On the well-posedness of the Boussinesq equations with anisotropic filter for turbulent flows*, ZAA-Z. Anal. Anwend. **34** 2015, 61–83. MR 3300958 doi:10.4171/ZAA/1529

61. Luigi C. Berselli and Jishan Fan, *Logarithmic and improved regularity criteria a for the 3D nematic liquid crystals models, Boussinesq system, and MHD equations in a bounded domain*, Commun. Pure Appl. Anal. **14** (2015), 637–655. MR 3311748 doi:10.3934/cpaa.2015.14.637

60. Luigi C. Berselli, Matteo Cerminara, and Traian Iliescu *Disperse two-phase flows, with applications to geophysical problems*, Pure Appl. Geophys. **172** (2015), 181–196. doi:10.1007/s00024-014-0889-5

59. Luigi C. Berselli and Luca Bisconti, *On the Existence of Almost-Periodic Solutions for the 2D Dissipative Euler Equations*, Rev. Mat. Iberoam. **31** (2015), 267–290. MR 3320840 doi:10.4171/RMI/833

58. Luigi C. Berselli, Lars Diening, and Michael Růžička, *Optimal error estimate for semi-implicit space-time discretization for the equations describing incompressible generalized Newtonian fluids*, IMA J. Numer. Anal. **35** (2015), 680–697. MR 3335220 doi:10.1093/imanum/dru008

57. Matteo Cerminara, Luigi C. Berselli, Tomaso Esposti Ongaro, and Maria Vittoria Salvetti, *Direct numerical simulation of a compressible multiphase flow through the Eulerian approach*, pp. 639–645 in Direct and Large-Eddy Simulation IX. Springer Verlag. ERCOFTAC Series, Vol. 20 J. Fröhlich, H. Kuerten, B.J. Geurts, V. Armenio (Eds.) 2015, XX, 700 p. 401 illus. ISBN 978-3-319-14447-4 978-3-319-14447-4

56. Luigi C. Berselli, *A note on strong solutions to the Stokes system*, Acta Appl. Math. **134** (2014), 123–131. MR 327368 doi:10.1007/s10440-014-9873-4

55. Luigi C. Berselli, Diego Cordoba, and Rafael Granero-Belinchon, *Local solvability and turning for the inhomogeneous Muskat problem*, Interfaces Free Boundaries **16** (2014), 175–213. MR 3231970 doi:10.4171/IFB/317

54. Luigi C. Berselli, Barbara Mazzolai, Francesca Guerra, and Edoardo Sinibaldi, *Pulsatile Viscous Flows in Elliptical Vessels and Annuli: Solution to the Inverse Problem, with Application to Blood and Cerebrospinal Fluid Flow*, SIAM J. Appl. Math. **74** (2014) 40–59. MR 3151393 doi:10.1137/120903385

53. Luigi C. Berselli, *Some results on the two-dimensional dissipative Euler equations*, pp. 325–332, Hyperbolic Problems: Theory, Numerics, Applications. (2014) F. Ancona, A. Bressan, P. Marcati, A. Marson Eds. (Proceedings of the International Conference HYP2012), AIMS Appl. Math. Vol. 8, ISBN-13: 978-1-60133-017-8 http://aimsciences.org/books/am/AMVol8.html

52. Stefano Spirito and Luigi C. Berselli, *On inviscid limits for the Navier-Stokes equations with slip boundary conditions involving the vorticity*, pp. 967–974, Hyperbolic Problems: Theory, Numerics, Applications. (2014) F. Ancona, A. Bressan, P. Marcati, A. Marson Eds. (Proceedings of the International Conference HYP2012), AIMS Appl. Math. Vol. 8, ISBN-13: 978-1-60133-017-8 http://aimsciences.org/books/am/AMVol8.html

51. Luigi C. Berselli and Stefano Spirito, *An elementary approach to inviscid limits for the 3D Navier-Stokes equations with slip boundary conditions and applications to the 3D Boussinesq equations*, NoDEA Nonlinear Differential Equations Appl. **21** (2014), 149–166 MR 3180880 doi:10.1007/s00030-013-0242-1

50. Luigi C. Berselli and Luca Bisconti, *An elementary proof of uniqueness of the particle trajectories for solutions of a class of 2D shear-thinning non-Newtonian fluids*, Nonlinearity, **26** (2013), 1031–1047 MR 3040594 doi:10.1088/0951-7715/26/4/1031

49. Luigi C. Berselli, Davide Catania, and Roger Lewandowski, *Convergence of approximate deconvolution models to the mean Magnetohydrodynamics Equations: Analysis of two models*, J. Math. Anal Appl. **401** (2013) 864–880. MR 3018034 doi:10.1016/j.jmaa.2012.12.051

48. Luigi C. Berselli, Piero Miloro, Arianna Menciassi, and Edoardo Sinibaldi, *Exact solution to the inverse Womersley problem for pulsatile flows in cylindrical vessels, with application to magnetic particle targeting*, Appl. Math. Comput. **219** (2013) 5717–5729 MR 3009524 doi:10.1016/j.amc.2012.11.071

47. Luigi C. Berselli, Davide Catania, and Roger Lewandowski, *Existence and convergence of an MHD approximate deconvolution model*, ESAIM Proc. **39** (2013) 25–31. MR 3074160 doi:10.1051/proc/201339004

46. Luigi C. Berselli and Stefano Spirito, *On the vanishing viscosity limit for the Navier-Stokes equations under slip boundary conditions in general domains,* Comm. Math. Phys. **316** (2012) 171–198. MR 2989457 doi:10.1007/s00220-012-1581-1

45. Luigi C. Berselli, *Towards fluid equations by Approximate Deconvolution Models*, in Mathematical Aspects of Fluid Mechanics, 1–22, London Math. Soc. Lecture Note Ser. (402), Cambridge Univ. Press, Cambridge, 2012, MR 3050289 ISBN:9781107609259

44. Luigi C. Berselli and Marco Romito, *On Leray's problem for almost periodic flows,* J. Math. Sci. Univ. Tokyo **19** (2012) 69–130. MR 2977342 Journal link

43. Ludmilla Belenki, Luigi C. Berselli, Lars Diening, and Michael Růžička, *On the finite element approximation of the p-Stokes problem*, SIAM J. Numer. Anal. **50** (2012) 373–397. MR 2914267 doi:10.1137/10080436X

42. Luigi C. Berselli and Roger Lewandowski, *Convergence of approximate deconvolution models to the mean Navier-Stokes Equations*, Ann. Inst. H. Poincaré Anal. Non Linéaire, **29** (2012) 171–198. MR 2901193 doi:10.1016/j.anihpc.2011.10.001

41. Luigi C. Berselli, *Analysis of a Large Eddy Simulation model based on anisotropic filtering*, J. Math. Anal. Appl. **386** (2012) 149–170. MR 2834874 (2012g:76089) doi:10.1016/j.jmaa.2011.07.044

40. Luigi C. Berselli and Luca Bisconti, *On the structural stability of the Euler-Voigt and Navier-Stokes Voigt models*, Nonlinear Anal., **75** (2012) 117–130. MR 2846786 doi:10.1016/j.na.2011.08.011

39. Luigi C. Berselli and Stefano Spirito, *A remark on the Euler equations in dimension two* (Proceedings of the "Intensive Research Month on Hyperbolic Conservation Laws and Fluid Dynamics" Parma, Italy, February 1 - 28, 2010) Riv. Mat. Univ Parma (8), **3** (2012), 1–23. MR 2976418 Journal link

38. Luigi C. Berselli and Stefano Spirito, *On the Boussinesq system: regularity criteria and singular limits*, Methods Appl. Anal. **18** (2011) 391–416. MR 2965984 doi:10.4310/MAA.2011.v18.n4.a3

37. Luigi C. Berselli, Paul F. Fischer, Traian Iliescu, and Tamay Özgökmen, *Horizontal Large Eddy Simulation of Stratified Mixing in a Lock-Exchange System*, J. Sci. Comput. **49** (2011) 3-20 MR 2831668 doi:10.1007/s10915-011-9464-8

36. Luigi C. Berselli, Paul F. Fischer, Traian Iliescu, and Tamay Özgökmen, *Horizontal Approximate Deconvolution for Stratified Flows: Analysis and Computations.* In Quality and reliability of large-eddy simulations II, 399-410, ERCOFTAC Series vol. 16, Berlin, Springer, 2011. doi:10.1007/978-94-007-0231-8_36

35. Luigi C. Berselli, *Some results on the Navier-Stokes equations with Navier boundary conditions*, Riv. Mat. Univ Parma (8) **1** 2010, 1–75. (Special volume with the proceedings of the "Seventh meeting on hyperbolic conservation laws and fluid dynamics: recent results and research perspectives," SISSA, Trieste Aug. 31, Sep. 4, 2009) MR 2761078 (2012d:35267)

34. Luigi C. Berselli, *An elementary approach to the 3D Navier-Stokes equations with Navier boundary conditions: Existence and uniqueness of various classes of solutions in the flat boundary case.* Discrete Contin. Dynam. Systems Series S. **3** (2010), 199–219. MR 2610559, doi:10.3934/dcdss.2010.3.199

33. Luigi C. Berselli, Lars Diening, and Michael Růžička, *Existence of strong solutions for incompressible fluids with shear dependent viscosities.* J. Math. Fluid Mech. **12** (2010) 101–132. MR 2602916, doi:10.1007/s00021-008-0277-y

32. Luigi C.Berselli and Franco Flandoli, *On a Stochastic Approach to Eddy Viscosity Models for Turbulent Flows.* In Advances in Mathematical Fluid Mechanics, 55–81 Springer Berlin, 2010. MR 2665025 (2011e:35413) doi:10.1007/978-3-642-04068-9_5

31. Luigi C. Berselli, *Some criteria concerning the vorticity and the problem of global regularity for the 3D Navier-Stokes equations.* Ann. Univ. Ferrara Sez. VII Sci. Mat. **55** (2009), 209–224. MR 2563656, doi:10.1007/s11565-009-0076-2

30. Luigi C. Berselli, *Some geometric constraints and the problem of global regularity for the Navier-Stokes equations.* Nonlinearity **22** (2009), 2561–2581. MR 2539768, doi:10.1088/0951-7715/22/10/013

29. Luigi C. Berselli and Diego Còrdoba, *On the regularity of the solutions to the 3D Navier-Stokes equations: a remark on the role of the helicity.* C. R. Acad. Sci. Paris, Ser I, **347** (2009), 613–618. MR 2532916, doi:10.1016/j.crma.2009.02.003

28. Luigi C. Berselli, Lars Diening, and Michael Růžička, *Optimal error estimates for a semi-implicit Euler scheme for incompressible fluids with shear dependent viscosities.* SIAM J. Numer. Anal. **47** (2009), 2177–2202. MR 2519599, doi:10.1137/080720024

27. Luigi C. Berselli, *On the $W^{2,q}$-regularity of incompressible fluids with shear-dependent viscosities: The shear thinning case.* J. Math. Fluid Mech **11** (2009), 171–185. MR 2516130, doi:10.1007/s00021-008-0254-5

26. Hugo Beirão da Veiga and Luigi C. Berselli, *Navier-Stokes equations: Green matrices, vorticity direction, and regularity up to the boundary,* J. Differential Equations **246** (2009) 597-628. MR 2468730, doi:10.1016/j.jde.2008.02.043

25. Luigi C. Berselli, Carlo R. Grisanti, and Volker John, *Analysis of commutation errors for functions with low regularity,* J. Comput. Appl. Math. **206** (2007), 1027–1045. MR 2333730 (2009e:76094) doi:10.1016/j.cam.2006.09.011

24. David Barbato, Luigi C. Berselli, and Carlo R. Grisanti, *Analytical and numerical results for the Rational Large Eddy Simulation model,* J. Math. Fluid Mech. **9** (2007), 44–74. MR 2305825 (2009b:76080) doi:10.1007/s00021-006-0191-0.

23. Luigi C. Berselli and Massimiliano Gubinelli, *On the global evolution of vortex filaments, blobs, and small loops in 3D ideal flows,* Comm. Math. Phys. **269** (2007), 693–713. MR 2276358 (2007m:76027) doi:10.1007/s00220-006-0142-x.

22. Luigi C. Berselli and Volker John, *Asymptotic behavior of commutation errors and the divergence of the Reynolds stress tensor near the wall in the turbulent channel flow,* Math. Meth. Appl. Sci., **29** (2006) 1709-1719. MR 2248564(2008a:76071) doi:10.1002/mma.750

21. Luigi C. Berselli and Marco Romito, *On the existence and uniqueness of weak solutions for a vorticity seeding model,* SIAM J. Math. Anal. **37** (2006), 1780–1799. MR 2213394 (2007a:35115) doi:10.1137/04061249X.

20. Luigi C. Berselli, *On the Large Eddy Simulation of the Taylor-Green vortex*, J. Math. Fluid Mech. **7** (2005) S164–S191. MR 2192847 (2006j:76072) doi:10.1007/s00021-005-0152-z

19. Luigi C. Berselli and Paolo Guasoni, *Some problems of shape optimization arising in stationary fluid motion,* Adv. Math. Sci. Appl., **14** (2004) no. 1, 279–293. MR 2083629 (2005d:49059) Journal link

18. Luigi C. Berselli and Giovanni P. Galdi, *On the space-time regularity of $C(0,T;L^n)$-very weak solutions to the Navier-Stokes equations,* Nonlinear Anal. **58** (2004), no. 5-6, 703–717. MR 2078742 (2006b:35254) doi:10.1016/j.na.2005.05.034 Corrigendum: *ibidem* **63** (2005), 642.

17. Luigi C. Berselli and Carlo R. Grisanti, *On the consistency of the Rational Large Eddy Simulation model,* Comput. Vis. Sci. **6** (2004), 75–82. MR 2061268 (2005e:76055) doi:10.1007/s00791-003-0111-2

16. Luigi C. Berselli and Renato Manfrin, *On a theorem by Sohr for the Navier-Stokes equations,* J. Evol. Equ. **4** (2004), no. 1, 193–211. MR 2059302 (2005b:35216) doi:10.1007/s00028-003-1135-2

15. Luigi C. Berselli and Traian Iliescu, *A Higher Order Subfilter-Scale Model for Large Eddy Simulation,* J. Comput. Appl. Math. **159** (2003) 411-430. MR 2005969 (2004f:76076) doi:10.1016/S0377-0427(03)00544-2

14. Luigi C. Berselli, *Vanishing viscosity limit and long-time behavior for 2D quasi-geostrophic equations,* Indiana Univ. Math. J. **51** (2002), no. 4, 905–930. MR 1947863 (2005c:35237) doi:10.1512/iumj.2002.51.2075

13. Luigi C. Berselli and Hakima Bessaih, *Some results for the line vortex equation,* Nonlinearity **15** (2002), no. 6, 1729–1746. MR 1938468 (2003m:76028) doi:10.1088/0951-7715/15/6/301

12. Luigi C. Berselli, *A note on regularity of weak solutions of the Navier-Stokes equations in* $\boldsymbol{R}^n$*,* Japan. J. Math. (N.S.) **28** (2002), no. 1, 51–60. MR 1933477 (2003i:35223) Journal link doi:10.4099/math1924.28.51

11. Luigi C. Berselli, Giovanni P. Galdi, Traian Iliescu, and William J. Layton, *Mathematical analysis for the rational large eddy simulation model,* Math. Models Methods Appl. Sci. **12** (2002), no. 8, 1131–1152. MR 1924604 (2003k:76077) doi:10.1142/S0218202502002057

10. Luigi C. Berselli, *On a regularity criterion for the solutions to the 3D Navier-Stokes equations,* Differential Integral Equations **15** (2002), no. 9, 1129–1137. MR 1919765 (2003e:35249) Permanent link

9. Luigi C. Berselli and Giovanni P. Galdi, *Regularity criteria involving the pressure for the weak solutions to the Navier-Stokes equations*, Proc. Amer. Math. Soc. **130** (2002), no. 12, 3585–3595 (electronic). MR 1920038 (2003e:35240) doi:10.1090/S0002-9939-02-06697-2

8. Hugo Beirão da Veiga and Luigi C. Berselli, *On the regularizing effect of the vorticity direction in incompressible viscous flows,* Differential Integral Equations **15** (2002), no. 3, 345–356. MR 1870646 (2002k:35248) Permanent link

7. Luigi C. Berselli and Renato Manfrin, *Linear perturbations of the Kirchhoff equation,* Comput. Appl. Math. **19** (2000), no. 2, 157–178. MR 1994873 (2004c:35276) Journal link

6. Luigi C. Berselli and Fausto Saleri, *New substructuring domain decomposition methods for advection-diffusion equations,* J. Comput. Appl. Math. **116** (2000), no. 2, 201–220. MR 1750917 (2001d:65120) doi:10.1016/S0377-0427(99)00317-9

5. Luigi C. Berselli and Jorge Ferreira, *On the magnetohydrodynamic type equations in a new class of non-cylindrical domains,* Boll. Unione Mat. Ital. Sez. B Artic. Ric. Mat. (8) **2** (1999), no. 2, 365–382. MR 1706576 (2000g:76109)

4. Luigi C. Berselli, *Sufficient conditions for the regularity of the solutions of the Navier-Stokes equations,* Math. Methods Appl. Sci. **22** (1999), no. 13, 1079–1085. MR 1706110 (2000f:35111) doi:10.1002/(SICI)1099-1476(19990910)22:13<1079::AID-MMA71>3.0.CO;2-4

3. Luigi C. Berselli and Franco Flandoli, *Remarks on determining projections for stochastic dissipative equations,* Discrete Contin. Dynam. Systems **5** (1999), no. 1, 197–214. MR 1664501 (99i:35184) doi:10.3934/dcds.1999.5.197

2. Luigi C. Berselli, *Remarks on the electrohydrodynamics equations in a domain with moving boundary,* Bol. Soc. Parana. Mat. (2) **18** (1998), no. 1-2, 87–105 (2000). MR 1769797 (2001k:76096)

1. Luigi C. Berselli and Giovanni Cimatti, *A theorem of existence for the equations of the Winslow's effect,* Riv. Mat. Univ. Parma (5) **6** (1997), 61–71 (1998). MR 1632711 (99d:76005) Journal link

OTHER PAPERS

1. Luigi C. Berselli and Michael Růžička, Preface of the volume: *Progress in Fluid Mechanics*, Lecture Notes in Mathematics 2272, 2020, ISBN 978-3-030-54898-8

2. Ana Alonso Rodriguez, Luigi C. Berselli, Alessando Morando, Paola. Trebeschi, Preface of the Special issue on "Fluid dynamics and electromagnetism: theory and numerical approximation". Discrete Contin. Dyn. Syst. Ser. S 9 (2016), no. 1, i

3. Adelia Sequeira, Joao Paulo Dias, Alberto Valli, Paolo Secchi, P.; Luigi C. Berselli, Francesca Crispo, Tributes to Hugo Beirão de Veiga. Recent advances in partial differential equations and applications, 1-22, Contemp. Math., 666, Amer. Math. Soc., Providence, RI, (2016).

4. Luigi C. Berselli, Intorno ad alcune questioni di meccanica dei fluidi, (Italian), Resumé of the Ph.D. Thesis, Boll. Unione Mat. Ital. Sez. A Mat. Soc. Cult. (8) III-A (2000), 271–274

TECHNICAL REPORTS

1. Luigi C. Berselli, Alex Kaltenbach, and Seungchan Ko, *Error analysis for a fully-discrete finite element approximation of the unsteady $p(\cdot,\cdot)$-Stokes equations*, arXiv 2025, 2501.00849

2. Luigi C. Berselli, Alessio Falocchi, and Rossano Sannipoli, *On a 3D Stokes eigenvalue problem under Navier slip-with-friction boundary conditions and applications to Navier-Stokes equations*, arXiv 2024, 2407.07496

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