Curriculum Vitae et Studiorum

Anna Abbatiello

Position

March 15, 2019 – March 14, 2021: *Post-doc*, Institute of Mathematics, Technische Universität Berlin, Germany. Advisor: Eduard Feireisl.

Education

November 1, 2015 – December 21, 2018: PhD in Mathematics, Physics and Applications, *Doctor Europaeus*, Dipartimento di Matematica e Fisica, Università degli Studi della Campania "Luigi Vanvitelli", Caserta, Italy, with final evaluation excellent, defending the thesis "*On the analysis of selected problems related to incompressible non-Newtonian fluids*", directed by Francesca Crispo, and by Josef Málek during the stays at Charles University in Prague. The thesis was reviewed by Dominic Breit and Eduard Feireisl, for the title Doctor Europaeus.

December 1, 2012 – March 30, 2015: Master Degree in Mathematics, Università degli Studi della Campania "Luigi Vanvitelli", Caserta, Italy, with final mark 110/110 cum laude, defending the thesis "*Electrorheological Fluids: existence and regularity of the solution to the boundary value problem*" (in italian), directed by Francesca Crispo.

November 1, 2009 – November 23, 2012: Bachelor Degree in Mathematics, Università degli Studi della Campania "Luigi Vanvitelli", Caserta, Italy, with final mark 110/110 cum laude, defending the thesis "*Riesz spaces*" (in italian), directed by Emma D'Aniello.

September, 2004 – July, 2009: High School Diploma: Liceo Scientifico, "A.M. De Liguori", Sant' Agata de' Goti (Benevento), with final mark 100/100 cum laude.

Publications

1. A. Abbatiello, F. Crispo, P. Maremonti, *Electrorheological Fluids: ill posedness of uniqueness backward in time*, Nonlinear Anal., **170** (2018), 47–69.
   DOI: [10.1016/j.na.2017.12.014](10.1016/j.na.2017.12.014)

2. A. Abbatiello, F. Crispo, P. Maremonti, *Corrigendum to "Electrorheological fluids: ill posedness of uniqueness backward in time" [Nonlinear Anal. 170 (2018) 47–69]*, Nonlinear Anal. **179** (2019), 383–384.
DOI: 10.1016/j.na.2018.10.005

3. A. Abbatiello, M. Bulíček, P. Kaplický, *On the existence of classical solution to the steady flows of generalized Newtonian fluid with concentration dependent power-law index*, J. Math. Fluid Mech. **21** (2019), no. 1 (art.15).
DOI: 10.1007/s00021-019-0415-8

4. A. Abbatiello, T. Los, J. Málek, O. Souček, *On three-dimensional flows of pore pressure activated Bingham fluids*, Math. Models Methods Appl. Sci. **29** no. 11 (2019), 2089–2125. DOI: 10.1142/S0218202519500416

5. A. Abbatiello, P. Maremonti, *Existence of regular time-periodic solution to shear-thinning fluids*, J. Math. Fluid Mech. **21** (2019), no. 2, (art. 29).
DOI: 10.1007/s00021-019-0435-4

6. A. Abbatiello, E. Feireisl, *On a class of generalized solutions to equations describing incompressible viscous fluids*, Ann. Mat. Pur. Appl. (4) **199** (2020) no. 3, 1183–1195. DOI: 10.1007/s10231-019-00917-x

7. A. Abbatiello, E. Feireisl, A. Novotný, *Generalized solutions to models of compressible viscous fluids*, Discrete Contin. Dyn. Syst. Ser. - A **41** no. 1, (2021), 1–28. DOI: 10.3934/dcds.2020345

8. A. Abbatiello, M. Bulíček, T. Los, J. Málek, O. Souček, *On unsteady flows of pore pressure-activated granular materials*, Z. Angew. Math. Phys. **72** (2021).
DOI: 10.1007/s00033-020-01424-3

9. A. Abbatiello, *Time-periodic weak solutions to incompressible generalized Newtonian fluids*, accepted in J. Math. Fluid Mech. (2021).

10. A. Abbatiello, E. Feireisl, *On strong continuity of weak solutions to the compressible Euler system*, accepted in J. Nonlinear Sci. (2021).

11. A. Abbatiello, M. Bulíček, E. Maringová, *On the dynamic slip boundary condition for Navier-Stokes-like problems*, submitted (preprint available, arXiv: 2009.09057).

12. A. Abbatiello, E. Feireisl, *On the motion of a compressible viscous fluid driven by time periodic inflow/outflow boundary conditions*, submitted (preprint available, arXiv: 2101.07553).

Research Interests

Questions of existence, well-posedness and regularity in bounded and exterior domains for models describing the steady and evolutionary flows of non-Newtonian

fluids. Questions of well-posedness for the Euler system. Analysis of systems of partial differential equations describing chemically reacting mixtures. Qualitative properties for compressible and incompressible viscous flows governed by the Navier-Stokes system and its generalization.

Formative and Research Stay in International Institutions

- April 4 – 26, 2016. Invited Visiting PhD Student at Gran Sasso Science Institute (GSSI), INFN Center for Advanced Studies. L'Aquila, Italy. Guest of Pierangelo Marcati.

    - Course attended:

        From viscous to inviscid fluid flows, Eduard Feireisl (Institute of Mathematics, Czech Academy of Sciences).

- February 18 – June 2, 2017. Visiting PhD Student at Charles University, Faculty of Mathematics and Physics, School of Mathematics. Prague, Czech Republic, under the supervision of Josef Málek.

    - Regular and intense courses attended:

        Mechanics and thermomechanics of non-Newtonian fluids , Josef Málek, with the final exam evaluated A.

        Nonlinear partial differential equations, Miroslav Bulíček.

    - Research Seminars attended:

        Seminar on Modeling of materials – theory, model reduction and efficient numerical methods.

        Seminar on PDEs.

        Seminar on Continuum Mechanics.

- October 1, 2017 - March 20, 2018. Visiting PhD Student at Charles University, Faculty of Mathematics and Physics, School of Mathematics. Prague, Czech Republic, under the supervision of Josef Málek.

    - Regular and intense courses attended:

        Theory of mixtures, J. Málek and O. Souček, with the final exam evaluated A.

        Mathematical Methods in Mechanics of non-Newtonian Fluids, J. Málek, with the final exam evaluated A.

        Qualitative Properties of Weak Solutions to Partial Differential Equations, Miroslav Bulíček.

        From the Boltzmann equation to hydrodynamic models, Nicola Zamponi (Vienna University of Technology), with the final exam evaluated A.

    - Research Seminars attended:

Seminar on Modeling of materials – theory, model reduction and efficient numerical methods.

Seminar on PDEs.

– Research activities:

A problem of regularity for a class of generalized Newtonian fluids with concentration dependent power-law index under the supervision of Miroslav Bulíček. A joint work with Miroslav Bulíček and Petr Kaplický.

Analysis of three-dimensional flows of pore pressure activated Bingham fluids. A joint work with Tomáš Los, Josef Málek and Ondrej Souček.

- November 11–17, 2018. Invited at Charles University, Faculty of Mathematics and Physics, School of Mathematics. Prague, Czech Republic. Guest of Miroslav Bulíček.

- November 4–8, 2019. Invited at Université de Toulon, France. Guest of Antonín Novotný.

- January 13 – 17, 2020. Institute of Mathematics of Czech Academy of Sciences, Prague, Czech Republic. Guest of Eduard Feireisl.

Invited Talks at Conferences

February 5 – 7, 2018. *Equazioni alle Derivate Parziali nella Dinamica dei Fluidi (PDEs in Fluid Dynamics)*, Centro di Ricerca Matematica Ennio De Giorgi, Pisa, Italy. (In Italian).

August 26–30, 2019. *Berlin–Prague Meeting 2019*. Technische Universität Berlin, Germany.

November 7 – 8, 2019. *Toulon – Berlin Meeting 2019*. Université de Toulon, Toulon, France.

January 15 – 16, 2020. *Prague – Berlin Meeting 2020*. Institute of Mathematics of Czech Academy of Sciences, Prague, Czech Republic.

November 23 – 27, 2020. *Multiscale Models for Complex Fluids: Modeling and Analysis (Online)*. Banff International Research Station, Canada. Organizers: Miroslav Bulíček, Agnieszka Świerczewska-Gwiazda.

Invited Talks in Seminars

January 30, 2018. Charles University, Faculty of Mathematics and Physics, School of Mathematics. Prague, Czech Republic. Organizer: Josef Málek.

April 30, 2019. Technische Universität Berlin, Institut für Mathematik, Berlin, Germany. Organizer: Etienne Emmrich.

December 9, 2019. Technische Universität Berlin, Institut für Mathematik, Berlin, Germany. Organizer: Etienne Emmrich.

May 18, 2020. Technische Universität Berlin, Institut für Mathematik, Berlin, Germany. (Webinar meeting.) Organizer: Etienne Emmrich.

June 8, 2020. Würzburg University, Würzburg, Germany. (Webinar meeting.) Organizer: Christian Klingenberg.

Workshops Participation by Invitation

October 26 – 30, 2020. *Vorticity, Rotation and Symmetry (V) – Global Results and Nonlocal Phenomena.* (Online Conference.) Centre International de Rencontres Mathématiques, Luminy (Marseille), France.

Contributed Talks at International Conferences

September 5 – 17, 2016. GNFM (INdAM) – *XLI Summer School on Mathematical Physics.* Ravello (SA), Italy.

November 29 – Dec 2, 2016. *The 13th Japanese-German International Workshop on Mathematical Fluid Dynamics.* Darmstadt, Germany.

June 12 – 16, 2017. WASCOM 2017, *XIX International Conference on Waves and Stability in Continuous Media.* Bologna, Italy.

May 2 – 5, 2018. *Regularity theory for elliptic and parabolic systems and problems in continuum mechanics.* Telč, Czech Republic.

October 4 – 6, 2018. *Scientific Meeting of the Italian National Group for the Mathematical Physics* (GNFM-INdAM). Montecatini Terme, Italy. (In Italian).

May 26 – 31, 2019. *EMS School in Applied Mathematics* (ESSAM). Mathematical Aspects of Fluid Flows. Kácov, Czech Republic.

June 17 – 21, 2019. Fondazione CIME Roberto Conti. *Progress in Mathematical Fluid Dynamics*. Cetraro (CS), Italy.

September 2 – 7, 2019. GNFM (INdAM) – *XLIV Summer School on Mathematical Physics.* Ravello (SA), Italy.

September 9 – 13, 2019. *PDE 2019: Partial Differential Equations in Fluids and Solids.* Weierstrass Institute Berlin, Germany.

November 25 – 29, 2019. *Gradient Flows and Variational Methods in PDEs.* Ulm Universität, Germany.

Formative Activity: Schools, Workshops and Conferences attended

- November 4 – 6, 2015. *2nd Conference on Recent Trends in Nonlinear Phenomena*, Napoli.

- February 8 – 12, 2016. School and Workshop, *PDEs and Applications*, Napoli.

- July 17 – 29, 2016. Summer School SMI. *Existence and regularity for the Plateau problem.*
    - *Basic tools of Geometric Measure Theory*, Luigi Ambrosio (Scuola Normale Superiore in Pisa).
    - *The theory of currents*, Camillo De Lellis (University of Zurich).

  Cortona, Italy. Seminar activities with final evaluation A.

- September 5 – 17, 2016. GNFM (INdAM) – XLI Summer School on Mathematical Physics.
    - *Mathematical Neuroscience*, Bard Ermentrout (University of Pittsburgh).
    - *Modelling tumour growth and spread*, Luigi Preziosi (Politecnico di Torino).
    - *Diffusion equations and entropy inequalities*, Giuseppe Toscani (Università di Pavia).
    - *Introduction to the Mathematical theory of diffusion via PDEs*, Juan Luis Vazquez (Universidad Autonoma de Madrid).

Ravello (Salerno), Italy. Seminar activities in the afternoon session.

- May 28 – June 2, 2017. EMS School in Applied Mathematics (ESSAM). Mathematical Aspects of Fluid Flows.
  - *Stochastic Navier-Stokes equations*, Dominic Breit (Heriot-Watt University Edinburgh).
  - *Concepts of generalized solutions in incompressible Fluid Mechanics*, Yann Brenier (Ecole Polytechnique).
  - *Quantitative regularity estimates for compressible fluids*, Pierre-Emmanuel Jabin (University of Maryland).
  - *Diffuse Interface Modelling for Two-Phase Flow*, Christian Rohde (Universität Stuttgart).

  Kácov, Czech Republic.

- September 4 – 8, 2017. Fondazione CIME Roberto Conti, Session 2017. Mathematical Analysis of the Navier-Stokes Equations: Foundations and Overview of Basic Open Problems.
  - *Analysis of basic problems in liquid-solid interaction*, Giovanni Paolo Galdi (University of Pittsburgh).
  - *Analysis of Incompressible Viscous Fluid Flow: an Approach by Maximal Lp-Regularity*, Matthias Hieber (TU Darmstadt).
  - *Method of the Besov space and its applications to the strong solutions of the Navier-Stokes equations*, Hideo Kozono (Waseda University).
  - *Partial regularity for the 3D Navier Stokes equations and applications*, James Robinson (University Warwick).

  Cetraro (CS), Italy.

- December 18 – 20, 2017. Prague Compressible Meeting, Institute of Mathematics of the Czech Academy of Sciences. Prague, Czech Republic.

- June 4 – 8, 2018. Intensive Program on Fluids and Waves: Minicourses.
  - *Mathematical approach for different description of simple fluids*, Claude Bardos (University of Paris).
  - *Spatial intermittency of the regions of intense vorticity and the Navier-Stokes regularity problem*, Zoran Grujic (University of Virginia).
  - *Towards complex/structured fluids*, Josef Málek (Charles University).

  Gran Sasso Science Institute, L'Aquila, Italy.

- March 18 – 21, 2019. *Interfaces and Instabilities in Fluid Dynamics*, Hausdorff Research Institute for Mathematics, Bonn, Germany.

- May 26 – 31, 2019. EMS School in Applied Mathematics (ESSAM). Mathematical Aspects of Fluid Flows.
    - *Asymptotic modelling of multiscale processes in the atmosphere*, Rupert Kleine (Freie Universität Berlin).
    - *Back and forth from quantum many particle systems to nonlinear PDE, and applications to kinetic equations*, Natasa Pavlovic (The University of Texas at Austin).
    - *Intermittent weak solutions of the Navier-Stokes equations*, Vlad Vicol (New York University).
    - *Conserved quantities and regularity in fluid dynamics*, Emil Wiedemann (Universität Ulm).

    Kácov, Czech Republic.

- June 17 – 21, 2019. Fondazione CIME Roberto Conti, Session 2019. Progress in Mathematical Fluid Dynamics.
    - *Wild weak solutions to equations arising in hydrodynamics*, Tristan Buckmaster (Princeton University).
    - *Fluid-structure interaction in biological fluids*, Suncica Canic (UC Berkeley).
    - *Regularity and singularity in hydrodynamical evolution equations*, Peter Constantin (Univ. Princeton).
    - *Regularity and blow up in active scalars*, Alexander Kiselev (Duke University).

    Cetraro (CS), Italy.

- September 2 – 7, 2019. GNFM (INdAM) – XLIV Summer School on Mathematical Physics.
    - *Nekhoroshev theory and its applications: exponential estimates, chaos indicators and diffusion*, Massimiliano Guzzo, (Università di Padova).
    - *Non-stationary Navier-Stokes equations: weak solutions and an introduction to related problems*, Paolo Maremonti, (Università della Campania).

    Ravello (SA), Italy.

- November 25 – 29, 2019. Gradient Flows and Variational Methods in PDEs.
    - *A Variational Approach for Evolution Problems*, Verena Bögelein (University of Salzburg).

- *Gradient Flows and Variational Methods for Fluid Motions*, Yann Brenier (ENS Paris).
- *Approximation and Regularity for Abstract Gradient Flows*, Ralph Chill (TU Dresden).
- *Optimal Mixing in Incompressible Flows and Irregular Transport*, Anna Mazzucato (Penn State).

Ulm Universität, Germany.

Scientific Projects and Subscriptions

Member of the Gruppo Nazionale per la Fisica Matematica (GNFM) of the Istituto Nazionale di Alta Matematica "F. Severi" (INdAM) since 2016.

Progetto Giovani 2017, project of GNFM – INdAM. Member of the team, 2017 – 2018. Team advisor: Francesca Crispo.

Einstein Foundation, Berlin. Member of the team, March 2019 – March 2021. Team advisor: Eduard Feireisl.

Referee for Scientific Journals

Mathematical Models and Methods in Applied Sciences; Mathematics and Mechanics of Solids.

Teaching Activity

2018. Teaching assistant for 2 lectures, *Mathematical Methods in Mechanics of non-Newtonian Fluids*. Charles University, Faculty of Mathematics and Physics, School of Mathematics. Prague, Czech Republic.

2018. Tutor for Mathematics, Bachelor's Course in Pharmacy, Dipartimento di Scienze e Tecnologie Ambientali, Biologiche e Farmaceutiche, Università degli Studi della Campania "Luigi Vanvitelli", Caserta, Italy.

2016 – 2017. Tutor for Analysis 1, Bachelor's Course in Physics, Dipartimento di Matematica e Fisica, Seconda Università degli Studi di Napoli,Caserta, Italy.

2015 – 2016. Tutor for Mathematics, Bachelor's Course in Pharmacy, Dipartimento di Scienze e Tecnologie Ambientali, Biologiche e Farmaceutiche, Seconda Università degli Studi di Napoli, Caserta, Italy.

2012 – 2013. Tutor for Analysis 2, Bachelor's Course in Mathematics, Dipartimento di Matematica e Fisica, Seconda Università degli Studi di Napoli, Caserta, Italy.

2012 – 2013. Tutor for Analysis 1, Bachelor's course in Civil Engineering, Facoltà di Ingegneria, Seconda Università degli Studi di Napoli, Aversa, Italy.

Posters on invitation

May 8 – 12, 2017. Vorticity, Rotation and Symmetry (IV) – Complex Fluids and the Issue of Regularity. CIRM, Luminy, France.

September 10 – 14, 2018. Nonlinear Analysis and PDEs in Caserta. Università della Campania "Luigi Vanvitelli", Caserta, Italy.

References

List of persons (in alphabetical order) who can give reference about me and my qualification

- Prof. Miroslav Bulíček, Mathematical Institute of Charles University, Faculty of Mathematics and Physics, Sokolovská 83, 186 75 Praha 8, Czech Republic. Email: mbul8060@karlin.mff.cuni.cz

- Prof. Francesca Crispo, Dipartimento di Matematica e Fisica, Università degli Studi della Campania, Viale A. Lincoln 5, 81100 Caserta, Italy. E-mail: francesca.crispo@unicampania.it

- Prof. Eduard Feireisl, Institute of Mathematics of the Academy of Sciences of Czech Republic, Žitná 25 CZ - 115 67 Praha 1, Czech Republic. Email: feireisl@math.cas.cz

- Prof. Josef Málek, Mathematical Institute of Charles University, Faculty of Mathematics and Physics, Sokolovská 83, 186 75 Praha 8, Czech Republic. Email: malek@karlin.mff.cuni.cz

Bibliographic Identifier

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Autorizzo il trattamento dei dati personali contenuti nel presente curriculum vitae ai sensi del D.Lgs. 196/2003 "Codice in materia di protezione dei dati personali".

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8 Marzo 2021   Anna Abbatiello