

Dr. Paolo Antonelli

Gran Sasso Science Institute

Settore concorsuale e scientifico disciplinare

01/A3 - Mat/05

Abilitazione Scientifica Nazionale

Abilitazione ottenuta al settore concorsuale 01/A3 - I fascia - 2018 Quinto quadrimestre (validità abilitazione: dal 09/11/2020 al 09/11/2029).

Current Position

Associate Professor at Gran Sasso Science Institute, L'Aquila, since June 2020.

Employment History

June 2017 - May 2020 “Ricercatore a tempo determinato RTD/B” (Assistant Professor, tenured position) at Gran Sasso Science Institute, L'Aquila, since June 2017.

November 2013 - May 2017 “Ricercatore a tempo determinato presso ente di ricerca” (Assistant Professor, not tenured position) at Gran Sasso Science Institute, L'Aquila.

November 2012 - October 2013: Junior Visiting Position at Centro di Ricerca Matematica Ennio De Giorgi, Scuola Normale Superiore, Pisa.

June 2012 - October 2012: Post-Doc position at CEREMADE, Université de Paris-Dauphine, funded by the CBDif ANR project (main investigators: François Bolley, Jean Dolbeault, Clément Mouhot).

Oct 2008 - May 2012: Research Associate, Department of Applied Mathematics and Theoretical Physics, University of Cambridge.

Education

Ph.D. in Mathematics, University of L'Aquila, defended on December 17, 2008. Title of the thesis "On the finite energy weak solutions to a system in Quantum Fluid Dynamics", advisor Prof. Pierangelo Marcati, scientific committee composed by: S. Albeverio (University of Bonn), P. Marcati (University of L'Aquila), P. Markowich (University of Cambridge).

M.S. in Mathematics, University of L'Aquila, October 10, 2005. Title of the thesis "Global well-posedness and scattering for the energy-critical nonlinear Schrödinger equation in \mathbb{R}^3 ", advisor Prof. Pierangelo Marcati (final degree: 110/110 cum Laude)

B.A. in Mathematics, University of L'Aquila in 13th October, 2003. Title of the thesis "Formation of singularities for a nonlinear wave equation" (in italian), advisor Prof. Damiano Foschi (final degree: 110/110 cum Laude)

Publications

1. P. Antonelli, S. Spirito, *Global existence of weak solutions to the Navier-Stokes-Korteweg equations*, to appear Ann. I.H.P. Anal. Non Lin., archived as <https://arxiv.org/abs/1903.02441>
2. P. Antonelli, P. Marcati, R. Scandone, *Global well-posedness for the non-linear Maxwell-Schrödinger system*, to appear Ann. Sc. Norm. Super. Cl. Sci., doi:10.2422/2036-2145.202010_033, archived as <https://arxiv.org/abs/1910.05297>
3. P. Antonelli, G. Cianfarani Carnevale, C. Lattanzio, S. Spirito, *Relaxation limit from the quantum Navier-Stokes equations to the quantum drift-diffusion equation*, J. Nonlinear Sci. **31**, no. 5 (2021), Paper No. 71.
4. P. Antonelli, L.E. Hientzsch, S. Spirito, *Global existence of finite energy weak solutions to the quantum Navier-Stokes equations with non-trivial far-field behavior*, J. Differ. Equ. **290** (2021), 147–177.
5. P. Antonelli, P. Marcati, H. Zheng, *Genuine hydrodynamic analysis to the 1-D QHD system: existence, dispersion and stability*, Comm. Math. Phys. **383** (2021), no. 3, 2113–2161.
6. P. Antonelli, *Remarks on the derivation of finite energy weak solutions to the QHD system*, Proc. Amer. Math. Soc. **149** (2021), no. 5, 1985–1997.
7. P. Antonelli, L.E. Hientzsch, P. Marcati, *On the low Mach number limit for quantum Navier-Stokes equations*, SIAM J. Math. Anal. **52** (2020), no. 6, 6105–6139.
8. P. Antonelli, R. Obermeyer, P. Markowich, J. Sierra, C. Sparber, *On a dissipative Gross-Pitaevskii-type model for exciton-polariton condensates*, Nonlinearity **32**, no. 11 (2019), 4317.
9. P. Antonelli, *Remarks on the derivation of finite energy weak solutions to the QHD system*, Proc. AMS, <https://doi.org/10.1090/proc/14502>.
10. P. Antonelli, S. Spirito, *On the compactness of weak solutions to the Navier-Stokes-Korteweg equations for capillary fluids*, Nonlin. Anal. **187** (2019), 110–124.
11. P. Antonelli, J. Arbutich, C. Sparber, *Regularizing nonlinear Schrödinger equations through partial off-axis variations*, SIAM J. Math. Anal. **51**, no. 1 (2019), 110–130.
12. P. Antonelli, P. Marcati, H. Zheng, *Stability for the quadratic derivative nonlinear Schrödinger equation and applications to the Korteweg-Kirchhoff type Euler equations for quantum hydrodynamics*, Nonlin. Anal. **186** (2019), 209–218.
13. P. Antonelli, L.E. Hientzsch, P. Marcati, H. Zheng *On some results for quantum hydrodynamical models*, Mathematical Analysis in Fluid and Gas Dynamics, Proceeding RIMS Kôkyûroku **2070** (2018), 107–129.
14. P. Antonelli, A. Michelangeli, R. Scandone, *Global, finite energy, weak solutions for the NLS with rough, time-dependent magnetic potentials*, R. Z. Angew. Math. Phys. (2018) 69:46, <https://doi.org/10.1007/s00033-018-0938-5>.
15. P. Antonelli, S. Spirito, *On the compactness of finite energy weak solutions to the quantum Navier-Stokes equations*, J. Hyp. Diff. Equ. **15**, no. 1 (2018), 133–147.
16. P. Antonelli, L. Forcella, *The electrostatic limit for the 3D Zakharov system*, Nonlin. Anal. **163** (2017), 19–33.
17. P. Antonelli, P. Marcati, *A model of synchronization over quantum networks*, J. Phys. A: Math. Theor. **50**, no. 31 (2017), 315101.
18. P. Antonelli, S.-Y. Ha, D. Kim, P. Marcati, *The Wigner-Lohe model for quantum synchronization and its emergent dynamics*, Net. Heter. Media **12**, no. 3 (2017), 403–416.
19. P. Antonelli, M. D'Amico, P. Marcati, *Nonlinear Maxwell-Schrodinger system and quantum magneto-hydrodynamics in 3D*, Comm. Math. Sci. **15**, no. 2 (2017), 451–479.

20. P. Antonelli, S. Spirito, *Global Existence of Finite Energy Weak Solutions of Quantum Navier-Stokes Equations*, Arch. Rat. Mech. Anal. **225**, no. 3 (2017), 1161–1199.
21. P. Antonelli, P. Marcati, *Quantum Hydrodynamics with nonlinear interactions*, DCDS-S **9**, no.1 (2016), 1–13.
22. P. Antonelli, P. Marcati, *Some Results on systems for Quantum Fluids*, Contemporary Mathematics **666** (2016), 41–54.
23. P. Antonelli, P. Marcati, *Finite Energy Global Solutions to a Two-Fluid Model Arising in Superfluidity*, Bulletin of the Institute of Mathematics Academia Sinica **10**, no. 3 (2015), 349–373.
24. P. Antonelli, A. Athanassoulis, Z. Huang, P. Markowich, *Numerical simulations of X-rays Free Electron Lasers (XFEL)*, Multiscale Modeling and Simulation SIAM **12**, no. 4 (2014), 1607–1621.
25. P. Antonelli, R. Carles, J. Drumond Silva, *Scattering for nonlinear Schrödinger equation under partial harmonic confinement*, Comm. in Math. Phys. **334**, no. 1 (2015), 367–396.
26. P. Antonelli, R. Carles, C. Sparber, *On nonlinear Schrödinger type equations with nonlinear damping*, Int. Math. Res. Not. 2015 (2015), 740–762.
27. P. Antonelli, R. M. Weishäupl, *Asymptotic behavior of nonlinear Schroedinger Systems with Linear Coupling*, J. Hyper. Differential Equations **11**, 159 (2014).
28. P. Antonelli, A. Athanassoulis, H. Hajaiej, P. Markowich, *On the XFEL Schrödinger Equation: Highly Oscillatory Magnetic Potentials and Time Averaging*, Archive for Rational Mechanics and Analysis **211** (2014), no. 3, 711–732
29. P. Antonelli, J.-C. Saut, C. Sparber, *Well-posedness results for a class of nonlinear Schrödinger equations with a time dependent dispersion*, Adv. Diff. Equ. **18** (2013), no. 1-2, 49–68.
30. P. Antonelli, D. Marahrens, C. Sparber, *On the Cauchy Problem for nonlinear Schrödinger equations with angular momentum rotation term*, DCDS-A **32** (2012), n. 3, 703–715.
31. P. Antonelli, P. Marcati, *The Quantum Hydrodynamics system in two space dimensions*, Archive for Rational Mechanics and Analysis **203** (2012), 499–527.
32. P. Antonelli, C. Sparber, *Existence of solitary waves in dipolar quantum gases*, Physica D **240** (2011), issues 4–5, 426–431.
33. P. Antonelli, C. Sparber, *Global well-posedness for cubic NLS with nonlinear damping*, Comm. PDEs **35** (2010), no 12, 2310–2328.
34. P. Antonelli, P. Marcati, *On the finite energy weak solutions to a system in Quantum Fluid Dynamics*, Comm. Math. Phys. **287** (2009), no 2, 657–686.

Proceedings

35. P. Antonelli, P. Marcati, *On the Finite Energy Weak Solutions to a System in Quantum Fluid Dynamics*, Proceedings of Symposia in Applied Mathematics, Volume **67.2**, 2009.
36. P. Antonelli, P. Marcati, *Finite Energy Weak Solutions to the Quantum Hydrodynamics System*, "Nonlinear Conservation Laws and Applications" IMA Volume **153** in Mathematics and its Applications, Springer, 2011.

Preprints

- i. P. Antonelli, P. Marcati, H. Zheng, *An intrinsically hydrodynamic approach to multidimensional QHD systems*, submitted, archived as <https://arxiv.org/abs/1912.05448>

Teaching experience

Dec 2019: Ph.D. course on “Introduction to nonlinear dispersive equations”, GSSI.

Nov - Dec 2018: Ph.D. course on “Introduction to harmonic analysis and dispersive equations”, GSSI

Nov – Dec 2017: Ph.D. course on "Dispersive Equations", Gran Sasso Science Institute.

November 2016: Ph.D. course on "Dispersive Equations", Gran Sasso Science Institute.

March 2015: Ph.D. course "Harmonic Analysis and Dispersive PDEs", Gran Sasso Science Institute.

November - December 2013: Ph.D. course "Harmonic Analysis and Schrödinger Equations", held at Gran Sasso Science Institute.

May 7 - May 14, 2010; tutorials on "Nonlinear Schrödinger equations with applications" during the EU - IP LLP 2010 MathNanoSci Intensive Program.

March, 2007; Complementary lectures for the graduate course “Harmonic Analysis with Applications to Dispersive Equation”, University of L’Aquila.

November, 2007 ; Complementary lectures for the master course “Functional Analysis”, University of L’Aquila.

2006 ; Teaching Assistant for the courses "Mathematical Analysis II" and "Ordinary Differential Equations", University of L’Aquila

Courses during Schools

An introduction to the mathematical theory of quantum fluids during the “Winter School on fluid dynamics, dispersive equations and quantum fluids”, December 17-21, 2018, <https://events.math.unipd.it/fludydiqua/>.

September 10 - September 17, 2009; short course "Introduction to the Mathematical Theory of Schrödinger Equations", EU - IP LLP 2009 MathNanoSci Intensive Program.

Student Tutoring

June 2019 - current: supervision of Boris Shakarov, Ph.D. student in Mathematics at GSSI. Topics of thesis: nonlinear Schrödinger equations with nonlinear damping.

Nov 2015 - Oct 2019: co-supervision (jointly with Pierangelo Marcati) of Hao Zheng, Ph.D. student in Mathematics at Gran Sasso Science Institute, title of the thesis: “A genuine hydrodynamic approach to QHD: existence, dispersion and stability”.

Nov 2015 - Oct 2019: co-supervision (jointly with Pierangelo Marcati) of Lars Eric Hientzsch, Ph.D. student in Mathematics at Gran Sasso Science Institute, title of the thesis: “Nonlinear Schrödinger equations and quantum fluids non-vanishing at infinity: incompressible limit and quantum vortices”.

Nov 2013 - Sep 2017: co-supervision (jointly with Pierangelo Marcati) of Michele D’Amico, Ph.D. student in Mathematics at Gran Sasso Science Institute, title of the thesis: “Fundamental solutions and smoothness in Schrödinger problems with applications to quantum fluids”.

Nov 2013 - Jul 2014: co-supervision (jointly with Pierangelo Marcati) of Luigi Forcella for his master thesis at University of L’Aquila, title of the thesis: “On the Zakharov System”.

Fellowships, grants and awards

Coordinator of the Italian research project “Esistenza, limiti singolari e comportamento asintotico per equazioni Eulero/Navier-Stokes-Korteweg” (english: Existence, singular limits and asymptotic behavior of Euler/Navier-Stokes-Korteweg equations), funded by the Italian research institute INdAM, for one year (March 2019 -

September 2020). Total research fund: € 4.500.

Recipient of the FFABR (Fondo per il finanziamento delle attività base di ricerca) Italian grant, total research fund: € 3.000.

Participant (as researcher) to the Italian research project "Modelli fluido-dinamici con applicazioni alla fisica, alla biologia e alle scienze sociali" (Fluid dynamical models with applications to physics, biology and social sciences), funded by the Italian research institute INdAM, for one year (2015–2016), PI: Simone Fagioli. Total research fund: € 1.600.

Coordinator of the Italian research project "Analisi e stabilità per modelli di equazioni alle derivate parziali nella Matematica applicata" (Analysis and stability for PDEs models in Applied Mathematics), funded by the Italian research institute INdAM, for one year (2014–2015). Total research fund: € 8.000.

Participant of the Italian research network (PRIN) prot. 015YCY3A_003, national coordinator S. Bianchini, local (L'Aquila) coordinator P. Marcati.

SISSA grant to participate to the whole intensive trimester on "Nonlinear Hyperbolic PDEs, Dispersive and Transport Equations: Analysis and Control", held at Trieste from May 16 until July 22, 2012 (lodging expenses).

Participant of the Italian research network (PRIN) prot. 2012L5WXHJ_00, national coordinator S. Bianchini, local (L'Aquila) coordinator P. Marcati.

Visiting Scholar beginning November 14, 2010 through November 24, 2010 at the Mathematics Department of the Massachusetts Institute of Technology, invited by prof. Gigliola Staffilani.

Participant of the Italian research network (PRIN) prot. 20094CLZHC_004, national coordinator S. Bianchini, coordinator of the local (L'Aquila) unit P. Marcati.

My post doctoral period in Cambridge from October 2008 until May 2012 was funded by the King Abdullah University of Science and Technology (KAUST), Award No. KUK-I1-007-43 (PI: Peter Markowich).

Erwin Schrödinger Institute financial support for participating at the summer school on July 20-31 2008 (covering of living expenses).

Clay Mathematics Institute grant for participating at the Summer School in Zurich, June 23, July 18 (lodging funding).

Centre de Recerca Matemàtica grant for participating at the Schools "Topics in PDEs and applications 2008", Granada, April 7-11 2008 and Barcelona, May 5-9 2008.

Wolfgang Pauli Institute grant for participating at the working group on "The quantum drift diffusion equation and similar PDEs: gradient flow structure and entropy methods" and "Optimal transport structures, gradient flows and entropy methods for applied PDEs", held at the WPI, Wien, on June and September 2007.

SISSA-ISAS grant for attending the course "Dissipative mechanisms in systems of conservation laws" held by prof. Denis Serre at SISSA (Trieste) on January 8-11, 2007.

CIME Foundation grant for participating at the Summer Course in Cetraro, September 11-17 2006.

INdAM Award for M.S. degree for students in Mathematics.

Financial support from European Network HYKE for participating at the Summer School and Workshop NLW-HYKE at the ESI, Wien on July 7-14 2004 (covering of living and travel expenses).

INdAM (Istituto Nazionale di Alta Matematica F. Severi - Rome) Fellowship for undergraduate students in Mathematics, for the academic years 2000–2001, 2001–2002 and 2002–2003. The fellowship awards the best 50 Mathematics students in Italy.

Meeting Organization

Co-organizer of the "Gran Sasso Quantum Meetings @GSSI: from Many Particle Systems to Quantum Fluids", held at GSSI Nov 28 - Dec 1, 2018, <https://indico.gssi.it/event/3/>.

Co-organizer of the “Intensive Program on Fluids and Waves”, to be held at GSSI May 22 – June 15, 2018, <https://tinyurl.com/FluidsAndWaves>.

Co-organizer of the MSRI-INdAM Summer School “*Nonlinear dispersive PDE, quantum many particle systems and the world between*”, Cortona (Italy), July 17–28, 2017, <http://gssi.it/summer-graduate-school/>.

Organizer of the special session “*Dispersive effects in nonlinear PDEs*”, during the 11th AIMS conference on Dynamical Systems, Differential Equations and Applications, July 1–5, 2015, <http://aimsciences.org/AIMS-Conference/conf-reg2016/ss/changeApp12.php?ssid=69>.

Co-organizer of the Italian Conference “*IperGSSI2015: 16th Italian Meeting on Hyperbolic Equations*”, L’Aquila October 22–24, 2015.

Co-organizer of the School “*Transport, Microscales and Fluids*”, held at GSSI on June 9–14, 2014, <http://bit.ly/VtiX0ut>.

Co-organizer of the School “*Nonlinear waves and Dispersive PDEs*”, held at GSSI on June 16–20, 2014, <http://bit.ly/1rGBlgt>

Other services to the University and Community - present and past

Member of the Quality Assurance Unit Committee at GSSI

Member of the Joint Teacher-Student Committee at GSSI

Member of the thesis defense committee for Thoa Thieu (GSSI), December 3, 2020.

Member of the thesis defense committee for Anna Paola Todino (GSSI), January 24, 2019.

Member of the thesis defense committee for Elena di Iorio (GSSI), October 5, 2018.

Member of the thesis defense committee for Thinh Nguyen (GSSI), June 5, 2018.

Member of the GSSI Governing Board for the Mathematics Division.

Member of the Board of Professors of the Mathematics Ph.D. program of GSSI.

Member of the Ph.D. recruiting committee for the area of Mathematics in Natural, Social and Life Sciences, years 2017-present.

Member of the Ph.D. recruiting committee at GSSI for the GSSI Math – IIT joint scholarship for the academic year 2016/2017.

Member of committee for master course fellowships at Università de L’Aquila (fellowships funded by GSSI).

Member of GNAMPA (INdAM) research group from 2008 until 2018.

Organizer of the joint GSSI-Univaq PDEs internal seminars series from October 2014.

Long term visits, participation to intensive programs

Invitation to Université Savoie Mont Blanc, January 13–18, 2020, invited by prof. Didier Bresch.

Invitation to King Abdullah University of Science and Technology (KAUST), October 19–23, 2014, invited by prof. Peter Markowich.

Invitation to King Abdullah University of Science and Technology (KAUST), May 01–08, 2013, invited by prof. Peter Markowich.

Intensive trimester “HCDTE: Nonlinear Hyperbolic PDEs, Dispersive and Transport Equations: Analysis and Control”, SISSA (Trieste, Italy), May 16 - July 22, 2011, www.hcdte.it.

Visiting Scholar at Massachusetts Institute of Technology, November 14–24, 2010, invited by prof. Gigliola Staffilani.

Intensive research trimester "Control of partial differential equations and applications", October 1 – December 18, 2010, Institut Henri Poincaré, Paris. I participated only from October 3 to 29.

Participation to the intensive period "Quantum and Kinetic Transport: Analysis, Computations and New Applications", March 9 – June 12, 2009, Institute for Pure and Applied Mathematics, Los Angeles. I participated from May 8 to June 12, 2009.

Participation to the long term research program "Optimal transportation structures, gradient flows and entropy methods for applied PDEs", June-September 2007, WPI Vienna.

Plenary Talks

Finite energy analysis for some hydrodynamic systems arising in the description of quantum fluids during the conference "Mathematical Challenges in Quantum Mechanics", February 8–13, 2016, Bressanone (Italy), <http://www.mcqm.cond-math.it/>.

Invited talks

The Cauchy problem for the Quantum Hydrodynamics system for large initial data in the space of energy during the workshop "Optimal transportation structures, gradient flows and entropy methods for applied PDE's", WPI, Wien, September 24–26, 2007.

Invited talk during the culminating workshop in Lake Arrowhead for the IPAM program in kinetic equations, with title "Global well-posedness for cubic NLS with nonlinear damping", June 7–12, 2009.

Invited talk *Global well-posedness for cubic NLS with nonlinear damping* at the Workshop "Eight Meeting on Hyperbolic Conservation Laws and Fluid Dynamics: Recent Results and Research Perspectives", September 2–4, 2010.

Invited talk *On global solutions to some systems in Quantum Fluid Dynamics* at the Université de Sciences et Technologies Lille1, October 21, 2010.

Invited talk during the Analysis Seminars Series at the University of Illinois, Chicago *On finite energy weak solutions to some models in quantum fluid dynamics*, November 9, 2010.

Invited talk at the Analysis Seminar at the Department of Mathematics of the Massachusetts Institute of Technology *Global Wellposedness of Cubic NLS with nonlinear damping*, November 23, 2010.

Invited talk during the workshop "PDE models for Quantum Fluids" at the Newton Institute, Cambridge, with title *Scattering and asymptotic completeness to the Schrödinger equation with critical Nonlinear and Hartree potentials*, December 16, 2010.

Invited seminar for the OXPDE Seminar Series with title "Analysis of Global Weak Solutions for a class of Hydrodynamical Systems describing Quantum Fluids", January 19, 2012, University of Oxford.

Invited talk *Sur des solutions faibles globales pour une classe des systèmes d'Hydrodynamique Quantique* (On global weak solutions for a class of systems in Quantum Hydrodynamics), at the Université de Sciences et Technologies Lille1, February 2, 2012.

Scattering for nonlinear Schrödinger equations with partially confining potential during the workshop "Modified dispersion for dispersive equations and systems", WPI, Wien, September 23–27 2013.

Analysis of finite energy weak solutions for a class of systems in Quantum Hydrodynamics during the School "Around vortices: from continuum to quantum mechanics", IMPA, Rio De Janeiro, March 12–21, 2014.

On a class of nonlinear Schrödinger equations with nonlinear damping, during the workshop "Scaling Limits and Effective Theories in Classical and Quantum Mechanics" held at the Erwin Schrödinger Institute, Vienna, September 22–26, 2014.

On a class of nonlinear Schrödinger equations with nonlinear damping, AMCS Seminar, KAUST (King Abdullah University of Science and Technology), October 22, 2014.

On a class of nonlinear Schrödinger equations with nonlinear damping, SISSA, Trieste, "Analysis, Math-Phys and Quantum" seminar series, November 11, 2014.

On a class of nonlinear Schrödinger equations with nonlinear damping, during the mini-workshop "KAM and dispersive methods in Hamiltonian PDEs", December 1–5, 2014, Milano.

Global existence results for some systems in quantum fluid dynamics, during the workshop "Colloquium bisontin sur les EDPs dispersives et problèmes liés", January 26–28, 2015, Besançon.

Analysis of finite energy weak solutions for some systems in quantum fluid dynamics, Mathematical Physics seminars series, Dipartimento di Matematica at Università "La Sapienza", Rome, May 20, 2015.

Quantum Hydrodynamic Systems and applications to superfluidity at finite temperatures, Applied Maths Seminar series, Mathematics Department of the University of Leicester, October 1st, 2015.

Finite energy weak solutions to the Quantum Hydrodynamics System, ANM seminar series, Department of Engineering Mathematics of the University of Bristol, October 2nd, 2015.

On some existence and stability results for a class of Navier-Stokes-Korteweg system, during the conference "IperGSSI2015: 16th Italian Meeting on Hyperbolic Equations", L'Aquila, October 22–24, 2015.

Finite Energy Weak Solutions of the Quantum Navier-Stokes equations - part II, invited talk given at the special session "Junior session on nonlinear hyperbolic equations and related topics" (organizers: F. Cavalletti and L. Spinolo), during the 11th AIMS conference on Dynamical Systems, Differential Equations and Applications, July 1–5, 2015.

On some results related to a class of quantum hydrodynamical systems with applications to superfluidity at finite temperatures, during the workshop "Vortex dynamics and related topics in fluid and quantum dynamics", Alghero (Italy), July 18–22, 2016.

Global existence results for finite energy weak solutions to a class of Quantum Hydrodynamic systems, during the RIMS Workshop "Mathematical Analysis in Fluid and Gas Dynamics", RIMS, Kyoto University, July 5–7, 2017.

Invited speaker at "IPERPA2019: XVIII Italian Meeting on Hyperbolic Equations", Palermo May 15–17, 2019, <https://iperpa2019.wordpress.com/>

Invited talk to the workshop "Recent Progress and Challenge in Quantum and Kinetic Problems", Sep 30 – Oct 4, 2019, Institute for Mathematical Sciences, National University of Singapore, <https://nus.edu/2VXWFW5>.

Invited talk for the "BZ Seminars in Analysis" series at the University of Basel, <https://bit.ly/2BPAnPr>. Title of the talk: "The Cauchy problem for the quantum hydrodynamics system and the stability of weak solutions", Nov 15, 2019.

"On the quantum Navier-Stokes system with non-trivial far-field: existence of finite energy weak solutions and low Mach number limit", Lothar-Collatz-Kolloquium for Applied Mathematics, University of Hamburg, January 30, 2020, <https://bit.ly/31Yy33s>.

Contributed talks

The Cauchy problem for the Quantum Hydrodynamics system for large initial data in the space of energy during the workshop "Fifth Meeting on Hyperbolic Conservation Laws: Recent Results and Research perspectives", SISSA, Trieste, June 21–22, 2007.

The Cauchy problem for the Quantum Hydrodynamics system for large initial data in the space of energy during the workshop "Hyperbolic partial differential equations and related applications", Pisa, November 27–29, 2007.

The Cauchy problem for the Quantum Hydrodynamics system for large initial data in the space of energy during the SMI summer school "Partial Differential Equations", July 15–27, 2007, Cortona.

Contributed talk during the workshop "HYP2008: 12th International Conference on Hyperbolic Problems: Theory, Numerics, Applications", June 9–13, 2008, with title *On the Finite Weak Solutions to a System in Quantum Fluid Dynamics*.

Invited talk *Global well-posedness for cubic NLS with nonlinear damping* at the Workshop "Eight Meeting on Hyperbolic Conservation Laws and Fluid Dynamics: Recent Results and Research Perspectives", September 2–4, 2010.

Contributed talk during the workshop "Mathematical Methods in Quantum Mechanics", February 14–19, 2011, Bressanone (Italy), with title *Scattering and asymptotic completeness to the Schrödinger equation with critical Nonlinear and Hartree potentials*.

Contributed talk in the workshop "Tenth meeting on Hyperbolic Conservation Laws: Recent results and Research Perspectives", L'Aquila, July 11–12, 2013, with title "Large Rabi frequency Asymptotics for a two-component Bose-Einstein condensate".

On nonlinear Schrödinger-type equations with nonlinear damping given during the workshop "IperMiB2013: 15th Italian Meeting on Hyperbolic Equations", University of Milano-Bicocca, Milan, September 11–13, 2013.

On a class of nonlinear Schrödinger equations with nonlinear damping, AMCS Seminar, KAUST (King Abdullah University of Science and Technology), October 22, 2014.

Analysis of finite energy weak solutions for some systems in quantum fluid dynamics, part of the "Nonlinear analysis and Hamiltonian systems" special session, organized by Michela Procesi during the XXth conference of the Italian Mathematical Union (UMI), Siena, September 7–12, 2015.

On the quantum Navier-Stokes system with non-trivial far-field: existence of finite energy weak solutions and low Mach number limit, during the workshop "Dispersive equations of Math Physics", Pisa, February 6–8, 2020.

Participation to Workshops, Summer Schools

Summer School and Workshop NLW-HYKE: "NonLinear Wave Equations", July 7-14 2004, Wien (Erwin Schrödinger Institute). Main lecturers: Sigmund Selberg (Trondheim) and Markus Keel (Princeton)

Workshop "Iperpisa 2004 - 11th Meeting on Hyperbolic Equations", October 20-22 2004, Pisa

School and Workshop "Mathematical Methods in Quantum Mechanics", Brixen (Italy), February 21-26 2005. Main lecturers: Mario Pulvirenti (Rome, "La Sapienza"), Giorgio Velo (Bologna), Jakob Yngvason (Wien)

A-HYKE3 "Around Hyperbolic and Kinetic Equations 3 - Third annual meeting of the HYKE network", April 13-15 2005, Rome

Workshop INdAM "Third Trilateral Meeting Australia-Taiwan-Italia", January 16-20 2006, Rome

Workshop INdAM "Matematica nei Materiali" (Mathematics in Materials) April 3-7 2006, Rome. Main lecturers: Wienan E (Princeton), Richard James (Minnesota), Pierre-Louis Lions (Collège de France), Felix Otto (Bonn), Giuseppe Marucci (Napoli)

Workshop "Boltzmann equations and Fluidodynamical Limits", SISSA-ISAS, Trieste, Italy, June 12-17 2006. Main Lecturers: Laure Saint-Raymond, Cedric Villani

Workshop INdAM "Equazioni alle derivate parziali non lineari e applicazioni" (Nonlinear PDEs and Applications), Cortona, Italy, June 18-24 2006

SMI Summer Course in Mathematics "Geometrical Approach to Free Boundary Problems", held by L.A. Caffarelli, S. Salsa, July 2-23 2006, Cortona, Italy

Summer School "Multiscale Modelling and Applications", Cargese, Corsica, France, August 7-12 2006. Main courses held by: Bjorn Engquist (Austin), David Lannes (Bordeaux), Mary Pugh (Toronto), Dietmar Kroner (Freiburg), Carsten Carstensen (Berlin)

Summer Course "Quantum transport: modelling, analysis and asymptotics", Cetraro, Cosenza, Italy, September 11-17 2006. Main lecturers: Grégoire Allaire, Anton Arnold, Pierre Degond, Thomas Y. Hou

Second School and Workshop "Mathematical Methods in Quantum Mechanics", Bressanone (Italy), February, 26 - March 3, 2007. Main Lecturers: Laslo Erdős (Munich), Herbert Spohn (Munich)/Michael Griesemer (Stuttgart), Reinhard Werner (Braunschweig)

INdAM International Workshop on Nonlinear Hyperbolic Problems - a perspective view on conservation laws, Rome, May 28th - June 1st, 2007. Short courses held by Stefano Bianchini (SISSA), Bjorn Engquist (Austin), Guy Métivier (Bordeaux)

Working group on "The quantum drift diffusion equation and similar PDE's: gradient flow structure and entropy methods", WPI, Wien, June 11-22, 2007. Main lecturers: Giuseppe Savaré (Pavia), Ansgar Jüngel (Wien)

"Fifth Meeting on Hyperbolic Conservation Laws: Recent Results and Research perspectives", SISSA-ISAS, Trieste, June 21-22, 2007

SMI Summer Course in Mathematics "Partial Differential Equations", held by C. Dafermos, P. D'Ancona, Cortona, July 15-27 2007

Workshop on "Nonlinear Hyperbolic Equations and Related Topics", CRM Ennio de Giorgi, Pisa, September 3-7, 2007

Summerschool and Workshop "Optimal transportation structures, gradient flows and entropy methods for applied PDE's", WPI, Wien, September 10-26, 2007. Lecturers: Yann Brenier (Nice), Alessio Figalli (SNS Pisa, ENS Lyons), Adrien Blanchet (Lille), Marco Di Francesco (L'Aquila), Juan Luis Vazquez (Madrid), Giuseppe Toscani (Pavia)

Workshop "Hyperbolic partial differential equations and related applications", Pisa, 27-29 novembre 2007

School "Topics in PDEs and applications 2008", Granada, April 7-11 2008. Main Courses held by Luigi Ambrosio (SNS, Pisa), Louis Caffarelli (Austin), François Golse (Ecole Polytechnique), Pierre-Louis Lions (Collège de France), Horng-Tzer Yau (Harvard)

School "Topics in PDEs and applications 2008", Centro de Recerca Matemàtica, Barcelona, May 5-9 2008. Main Courses by H. Berestycki (EHESS, Paris), H. Brezis (Rutgers and Technion), C. Kenig (Chicago), R.V. Kohn (Courant Institute), G. Tian (Princeton)

International workshop "HYP2008: 12th International Conference on Hyperbolic Problems: Theory, Numerics, Applications", University of Maryland, College Park, June 9-13 2008

Clay Mathematics Institute 2008 Summer School on "Evolution Equations", June 23-July 18, ETH, Zurich. Main courses held by Jared Wunsch/Rafe Mazzeo, Gigliola Staffilani/Pierre Raphaël, Igor Rodnianski/Mihalis Dafermos, Benjamin Schlein, Monica Visan, Michael Struwe

Summer School on "Current Topics in Mathematical Physics", ESI, Wien, July 20-31 2008. Lecturers of mini-courses: Laszlo Erdős (Munich), Volkjan Jaksic (Montreal), Elliott Lieb (Princeton), Bruno Nachtergaele (UC Davis), Igor Rodnianski (Princeton), Manfred Salmhofer (Leipzig), Herbert Spohn (TU Munich)

IPAM intensive period on "Quantum and Kinetic Transport: Analysis, Computations, and New Applications", Los Angeles, March 9 - June 12, 2009

Conference "Control of PDEs (GDRE CONEDP project)", held in CIRM (Marseille), January 25-29 2010

CIME Summer Course "Control of Partial Differential Equations" held in Cetraro (Italy), July 19-23 2010

Workshop "Eight Meeting on Hyperbolic Conservation Laws and Fluid Dynamics: Recent Results and Research Perspectives" held in Trieste, SISSA (Italy), on 2-4 September 2010.

Trimester "Control of partial differential equations and applications", held at Institute Henri Poincaré, Paris, October 1 - December 18, 2010. I participated only from October 3 to 29.

Workshop "PDE models for quantum fluids", Isaac Newton Institute for Mathematical Sciences, Cambridge, December 13 - 17, 2010. I was invited to give a talk.

Fourth School and Workshop "Mathematical Methods in Quantum Mechanics", Bressanone (Italy), February 14 - 19, 2011.

Intensive trimester at SISSA "HCDTE: Nonlinear Hyperbolic PDEs, Dispersive and Transport Equations: Analysis and Control", SISSA (Italy), May 16 - July 22, 2011, www.hcdte.it.

International Workshop "HYP2012: 14th International Conference on Hyperbolic Problems: Theory, Numerics, Applications", Università di Padova (Italy), June 25-29, 2012.

"Tenth meeting on Hyperbolic Conservation Laws: recent results and research perspectives", University of L'Aquila, July 11–12, 2013.

Workshop "IperMiB2013: 15th Italian Meeting on Hyperbolic Equations", University of Milano-Bicocca, Milan, September 11–13, 2013.

Workshop "Dispersive PDEs: Models and Dynamics", Pisa, September 18–20, 2013.

Workshop on "Modified dispersion for dispersive equations and systems", Wolfgang Pauli Institute, Vienna, September 23–27, 2013.

School "Around vortices: from continuum to quantum mechanics", Instituto Nacional de Matemática Pura e Aplicada (IMPA), Rio De Janeiro, March 12–21, 2014.

Workshop "Scaling Limits and Effective Theories in Classical and Quantum Mechanics", ESI, Vienna, September 22–26, 2014.

CIME Summer School "Mathematical Thermodynamics of complex fluids", Cetraro June 29 – July 3, 2015, <http://php.math.unifi.it/users/cime/Courses/2015/course.php?codice=20153>.

Summer School "Transport, fluids and mixing", Levico July 19–24, 2015, <http://www.science.unitn.it/cirm/TFM2015.html>.

Referee activity for international journals

Communication in Mathematical Physics

Communications in Mathematical Sciences

Multiscale Modeling and Simulation

Journal of Mathematical Physics

Asymptotic Analysis

Nonlinear Analysis Series A: Theory, Methods & Applications

Zeitschrift für Angewandte Mathematik und Physik

Discrete and Continuum Dynamical Systems A

Forum Mathematicum

Communications on Pure and Applied Analysis

Nonlinearity

Applied Mathematics and Computation

Language skills

My mother language is Italian, and I can fluently speak and understand English, French and Spanish.