

# Curriculum Vitae et Studiorum

Nicola De Nitti

## Contents

<b>1 Education</b>	<b>2</b>
<b>2 Scientific Positions</b>	<b>2</b>
<b>3 Participation in research projects and grants</b>	<b>3</b>
<b>4 Invited research visits to universities or scientific institutes</b>	<b>3</b>
<b>5 Scientific events attended (selected list)</b>	<b>4</b>
5.1 Conferences, congresses, workshops, and summer/winter schools . . . . .	4
5.2 Advanced courses . . . . .	6
<b>6 Scientific production</b>	<b>6</b>
6.1 List of publications . . . . .	6
6.2 List of preprints . . . . .	7
<b>7 Scientific communications (selected list)</b>	<b>8</b>
7.1 Invited talks in scientific events . . . . .	8
7.2 Contributed talks or presentations in scientific events . . . . .	9
7.3 Invited seminars in universities or research institutes . . . . .	9
<b>8 Organization of scientific events</b>	<b>10</b>
8.1 Organization of conferences and workshops . . . . .	10
<b>9 Teaching experience</b>	<b>11</b>
9.1 Bachelor's courses . . . . .	11
9.2 Master's courses . . . . .	11
<b>10 Mentoring of young mathematicians</b>	<b>12</b>
10.1 Internship students (Bachelor and Master's level) . . . . .	12
10.2 Bachelor and Master's theses . . . . .	12
<b>11 Editorial activity</b>	<b>12</b>
<b>12 Public outreach and "third mission"</b>	<b>12</b>

Università degli Studi di Milano

Selezione pubblica per n. 1 posto di Ricercatore a tempo determinato in tenure track (RTT) per il settore concorsuale 01/A3 – Analisi Matematica, Probabilità e Statistica Matematica, settore scientifico-disciplinare MAT/05 – Analisi Matematica, presso il Dipartimento di Matematica Federico Enriques (avviso bando pubblicato sulla G.U. n. 97 del 22/12/2023). Codice concorso 5472.

## Personal and contact information

**Name:** Nicola.      **Surname:** De Nitti.

**Current position and affiliation:** Postdoc at École Polytechnique Fédérale de Lausanne, Institut de Mathématiques, Chaire d'Analyse Mathématique, Calcul des Variations et Équations aux Dérivées Partielles.

**Institutional address:** EPFL, SB MATH, MA B2 455 (Bâtiment MA), Station 8, 1015 Lausanne (Switzerland).

**E-mail address:** nicola.denitti@epfl.ch.

**Website:** <https://nicodenitti.com/>.

**Place and date of birth:** Bari (Italy); 29/11/1995.

**Citizenship:** Italian.      **Gender:** Male.

**Languages:** • Italian (mother tongue); • English ("Certificate in Advanced English", Council of Europe Level C1, awarded by University of Cambridge ESOL Examinations on 22/11/2013); • German (Level A1, awarded by the Sprachenzentrum der FAU Erlangen-Nürnberg in 07/2021).

## 1 Education

- **Friedrich-Alexander-Universität Erlangen-Nürnberg.** *Doctoratum Rerum Naturalium* (Ph.D. in Mathematics). *Summa cum laude*. 01/04/2020–24/07/2023.  
Advisor: Enrique Zuazua.  
Thesis: "Analysis, control, and singular limits for hyperbolic conservation laws".  
Equivalence in the Italian education system: The title has been recognized by the Italian authorities as equipollent to a "Dottorato di Ricerca in Scienze Matematiche" (Università degli Studi di Padova, rep. n. 5223/2023, prot. n. 0253323 of 15/12/2023) according to D. Lgs. 165/2001, art. 38, comma 3.2
- **Università degli Studi di Bari Aldo Moro.** *Laurea Magistrale in Matematica* (Master's Degree in Mathematics). 110/110 *cum laude*. 20/03/2018–26/03/2020.  
Advisors: Stefano Bianchini (SISSA), Giuseppe Maria Coclite, and Luciano Lopez.  
Thesis: "Differentiability properties of the flow associated to a rough vector field".
- **Università degli Studi di Bari Aldo Moro.** *Laurea in Matematica* (Bachelor's Degree in Mathematics). 110/110 *cum laude*. 05/09/2014–16/03/2018.  
Advisors: Giuseppe Maria Coclite and Mario Michele Coclite.  
Thesis: "Well-posedness of viscosity solutions for a class of partial integro-differential equations modelling pricing under uncertainty".
- **Liceo Classico Quinto Orazio Flacco (Bari, Italy).** *Diploma di Maturità Classica* (High School Diploma). 100/100 *cum laude*. 01/09/2009–05/07/2014.

## 2 Scientific Positions

- **École Polytechnique Fédérale de Lausanne (EPFL), Institut de Mathématiques.** Postdoc.  
Since 01/09/2023.  
Supervisor: Maria Colombo.
- **Friedrich-Alexander-Universität Erlangen-Nürnberg, Department of Mathematics.** Wissenschaftlicher Mitarbeiter (Scientific Assistant). 01/04/2020–31/08/2023.  
Supervisor: Enrique Zuazua.
- **Basque Center for Applied Mathematics (BCAM).** Internship. 27/02/2019–14/09/2019.  
Supervisors: Nicole Cusimano and Félix del Teso.
- **Scuola Internazionale Superiore di Studi Avanzati (SISSA).** Research training fellowship for undergraduate students. 17/09/2018–15/12/2018.  
Supervisor: Stefano Bianchini.
- **Institute of Science and Technology Austria (IST Austria).** Internship. 01/06/2018–31/08/2018.  
Supported by *ISTernship Summer Program 2018*, funded by The Austrian Agency for International Cooperation in Education & Research (OeAD-GmbH), Centre for International Cooperation and Mobility.  
Supervisor: Julian Fischer.

### 3 Participation in research projects and grants

1. **International Emerging Action 2024/2025.** Project *Control problems for applied nonlinear hyperbolic equations (CONPANHYE)*. Funded by the Centre National de la Recherche Scientifique (CNRS).  
Principal Investigators: Carlotta Donadello and Mauro Garavello.  
Role in the project: Member since 01/2024.
2. **2022 GNAMPA Grant.** Project *Approccio multiscala all'analisi di modelli di interazione (Multiscale approach to the analysis of interaction models)*. Funded by Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni (GNAMPA) of Istituto Nazionale di Alta Matematica "Francesco Severi" (INdAM).  
Principal Investigator: Gianluca Orlando.  
Role in the project: Member, 16/05/2022–31/05/2023.
3. **SFB Transregio 154.** Project *Mathematical modelling, simulation and optimization using the expample of gas networks*. Subproject C08: *Random Batch Methods for Optimal Control of Network Dynamics*. Funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation).  
Principal Investigators: Falk Hante and Enrique Zuazua.  
Role in the project: Associate Member since 11/2020.

### 4 Invited research visits to universities or scientific institutes

1. **University of Wisconsin–Madison.** 11/11/2023–20/11/2023.  
Host: Dallas Albritton.
2. **University of Chicago.** 08/11/2023–09/11/2023.  
Host: Luis Silvestre.
3. **Texas A&M University.** 06/11/2023–08/11/2023.  
Host: Minh-Binh Tran.
4. **University of Texas at Austin.** 30/10/2023–06/11/2023.  
Host: Alexis Vasseur.
5. **University of Dubrovnik.** 17/05/2023–24/05/2023.  
Host: Martin Lazar.
6. **Universidad Autonoma de Madrid.** 13/02/2023–17/02/2023.  
Host: Maria del Mar Gonzalez Noguera.
7. **Nanzan University, Nagoya.** 19/12/2022.  
Host: Noboru Sakamoto.
8. **Tohoku University.** 09/12/2022–16/12/2022.  
Host: Shigeru Sakaguchi.
9. **NTT Musashino R&D (Tokyo).** 08/12/2022.  
Host: Masato Wakayama.
10. **Westfälische Wilhelms-Universität Münster.** 05/09/2022–30/10/2022.  
Funded by the *Visiting Doctoral Researchers Programme 2022/23* of the Cluster of Excellence *Mathematics Münster: Dynamics–Geometry–Structure*.  
Hosts: André Schlichting and Christian Seis.
11. **Politecnico di Bari.** 18/07/2022–22/07/2022.  
Host: Giuseppe Maria Coclite.
12. **Gran Sasso Science Institute (GSSI).** 11/07/2022–15/07/2022.  
Hosts: Paolo Antonelli and Stefano Spirito.
13. **Universität Basel.** 16/06/2022–17/06/2022.  
Host: Gianluca Crippa.
14. **Westfälische Wilhelms-Universität Münster.** 09/05/2022–12/05/2022.  
Host: Christian Seis.
15. **Technische Universität Wien.** 14/03/2022–08/04/2022.  
Host: Elisa Davoli.
16. **Università de Franche-Comté, Laboratoire de Mathématiques.** 28/02/2022–11/03/2022.  
Host: Carlotta Donadello.

17. **Università de Tours, Institut Denis Poisson.** 21/02/2022–25/02/2022.  
Hosts: Boris Andreianov and Abraham Sylla.
18. **Politecnico di Bari.** 20/12/2021–21/01/2022.  
Host: Giuseppe Maria Coclite.
19. **Technischen Universität Darmstadt.** 15/11/2021–19/11/2021.  
Hosts: Jan Giesselmann and Nora Philippi.
20. **Università degli Studi di Pavia.** 20/09/2021–24/09/2021.  
Hosts: Stefano Lisini and Antonio Segatti.
21. **Istituto per le Applicazioni del Calcolo “Mauro Picone” (IAC-CNR).** 12/09/2021–17/09/2021.  
Hosts: Roberta Bianchini and Roberto Natalini.
22. **Politecnico di Bari.** 05/07/2021–20/07/2021.  
Host: Giuseppe Maria Coclite.
23. **Friedrich-Alexander-Universität Erlangen-Nürnberg.** 18/11/2019–22/11/2019.  
Host: Enrique Zuazua.
24. **Scuola Internazionale Superiore di Studi Avanzati (SISSA).** 01/08/2019–09/08/2019.  
Host: Stefano Bianchini.
25. **Universidad de Deusto, DeustoTech).** 13/06/2019–14/06/2019 and 09/09/2019–10/09/2019.  
Hosts: Umberto Biccari and Enrique Zuazua.
26. **Basque Center for Applied Mathematics (BCAM).** 27/02/2019–08/03/2019, 01/04/2019–05/04/2019, 06/05/2019–10/05/2019, 10/06/2019–14/06/2019, and 09/09/2019–14/09/2019.  
Hosts: Nicole Cusimano and Félix del Teso.
27. **Institute of Science and Technology Austria (IST Austria).** 09/12/2018–16/12/2018.  
Host: Julian Fischer.

## 5 Scientific events attended (selected list)

### 5.1 Conferences, congresses, workshops, and summer/winter schools

1. École Polytechnique Fédérale de Lausanne (EPFL) — *Bernoulli Workshop: Enjoying Probability and Fluids in Lausanne*, Lausanne (Switzerland), 18/09/2023–22/09/2023.
2. École Polytechnique Fédérale de Lausanne (EPFL) — *Summer school: Deterministic and random features of fluids*, Lausanne (Switzerland), 03/07/2023–07/07/2023.
3. Université de Tours, Institut Denis Poisson — *Workshop on Mathematical modeling, Analysis and Approximation of Vehicular and Pedestrian Dynamics*, Tours (France), 05/06/2023–08/06/2023.
4. Centre “Ettore Majorana” for Scientific Culture — *Erice 2023: Nonlinear Evolution PDEs and Fluid-dynamics*, Erice (Italy), 25/05/2023–31/05/2023.
5. Waseda University — *International Workshop on Multiphase Flows: Analysis, Modelling and Numerics*, Tokyo (Japan), 05/12/2022–09/12/2022.
6. Ulm University — *Summer School Horizons in non-linear PDEs*, Ulm (Germany), 26/09/2022–30/09/2022.
7. Westfälische Wilhelms-Universität Münster — *Summer School on Analysis and Applied Mathematics*, Münster (Germany), 12/09/2022–16/09/2022.
8. Centro de Ciencias De Benasque Pedro Pascual — *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Benasque (Spain), 21/08/2022–02/09/2022.
9. Università degli Studi di Bari Aldo Moro — *School-Workshop on Analysis, Control & Inverse Problems for Diffusive Systems with Application to Natural and Social Sciences*, Bari (Italy), 18/07/2022–22/07/2022.
10. University of L’Aquila — *12th Meeting on Nonlinear evolution PDEs, fluid dynamics and transport equations*, L’Aquila (Italy), 13/07/2022–15/07/2022.
11. Universidad de Santiago de Chile — *Workshop on Non-Linear Analysis and Control Theory in honor of Prof. Enrique Zuazua*, Online, 03/11/2021–05/11/2021.
12. Università degli Studi di Bari Aldo Moro — *Recent Developments in Mathematical Analysis (ReDiMA 2021)*, Bari (Italy) and online, 23/09/2021–24/09/2021.
13. Riemann International School of Mathematics (RISM) — *Riemann Prize Week*, Varese (Italy) and online, 20/09/2021–24/09/2021.

14. *INdAM Workshop on “Present Research Trends in Conservation Laws”*, Rome (Italy), 08/09/2021–10/09/2021.
15. Riemann International School of Mathematics (RISM) — *PDEs and continuum mechanics*, Varese (Italy), 21/07/2021–24/07/2021.
16. ShanghaiTech — *IMS Lecture Series on Regularity Theory for Quasilinear Equations*, Online, 01/05/2020–03/05/2020.
17. Politecnico di Bari — *Winter School on Mathematics for Engineering Applications*, Bari (Italy), 27/01/2020–31/01/2020.
18. Ulm University — *Winter school on Gradient Flows and Variational Methods in PDEs*, Ulm (Germany), 25/11/2019–29/11/2019.
19. Friedrich-Alexander-Universität Erlangen-Nürnberg — *IntComSin “Workshop on Numerical Analysis and Scientific Computing – on the occasion of Prof. Eberhard Bänsch’s 60th birthday”*, Erlangen (Germany), 22/11/2019–23/11/2019.
20. École Polytechnique, CNRS & LJLL, Technische Universität München — *Calculus of Variations and Applications in Trani*, Trani (Italy), 28/10/2019–31/10/2019.
21. Centro Internazionale Matematico Estivo (CIME) — *Geometric measure theory and applications: from geometric analysis to free boundary problems*, Cetraro (Italy), 02/09/2019–06/09/2019.
22. Centro de Ciencias De Benasque Pedro Pascual — *VIII Partial Differential Equations, Optimal Design and Numerics 2019*, Benasque (Spain), 18/08/2019–24/08/2019.
23. University of Basel — *GMT and PDEs in Basel. A young researchers meeting*, Basel (Switzerland), 08/07/2019–10/07/2019.
24. Centro Internazionale Matematico Estivo (CIME) — *Applied mathematical problems in geophysics* (CIME-EMS Summer School in Applied Mathematics), Cetraro (Italy), 01/07/2019–05/07/2019.
25. Università degli Studi di Bari Aldo Moro and Politecnico di Bari — *III One Day Workshop on Applied Mathematics*, Bari (Italy), 06/06/2019.
26. Basque Center for Applied Mathematics (BCAM) — *Bilbao Workshop on Theoretical Fluid Dynamics*, Bilbao (Spain), 27/02/2019.
27. University of Padova — *Winter school on FLUID DYNAMICS, DISPERSIVE equations and QUANTUM fluids*, Bressanone (Italy), 17/12/2018–21/12/2018.
28. Università degli Studi di Catania — *MAR: Metric Analysis & Regularity*, Catania (Italy), 24/09/2018–28/09/2018.
29. Erwin Schrödinger International Institute for Mathematics and Physics (ESI) — *New trends in the variational modeling of failure phenomena*, Vienna, 20/08/2018–24/08/2018.
30. University of Vienna — *The Fourth Annual Workshop on Mathematics in Medicine: Mathematical Models in Cancer*, Vienna (Austria), 20/07/2018–21/07/2018.
31. Scuola Internazionale Superiore di Studi Avanzati (SISSA) and Università degli Studi di Trieste — *Junior Quantum Days 2018*, Trieste (Italy), 11/05/2018.
32. Università degli Studi di Bari Aldo Moro — *XMaths Workshop 2017*, Bari (Italy), 20/12/2017–21/12/2017.
33. Università degli Studi di Bari Aldo Moro and Politecnico di Bari — *One Day Workshop on Applied Mathematics*, Bari (Italy), 08/06/2017.
34. Università degli Studi di Bari Aldo Moro — *EDP e dintorni*. Fifth meeting around PDE, Bari (Italy), 19/12/2019.
35. Università degli Studi di Bari Aldo Moro — *Advances and Challenges in Nonlinear Analysis... and Beyond! On the occasion of Vieri Benci’s 70<sup>th</sup> birthday*, Bari (Italy), 24/09/2019–27/09/2019.
36. Università degli Studi di Bari Aldo Moro — *Giornata INdAM 2019*, Bari (Italy), 03/06/2019.
37. Università degli Studi di Bari Aldo Moro — *PDE in Bari*. Celebrating the 60<sup>th</sup> Birthday of Enrico Jannelli, Bari (Italy), 01/02/2018–02/02/2018.
38. Università degli Studi di Bari Aldo Moro — *EDP e dintorni*. Third meeting around PDE, Bari (Italy), 18/12/2017.
39. Università degli Studi di Bari Aldo Moro — *INdAM Intensive Period on “Contemporary Research in Elliptic PDEs and Related Topics”*: Conference, Bari (Italy), 30/05/2017–31/05/2017.

40. Politecnico di Bari — *Seminars on Analysis and Geometry*, Bari (Italy), 22/02/2017.
41. Instituto Superior Técnico de Lisboa — *Novos Talentos em Matemática* National Meeting, Lisbon (Portugal), 09/07/2016.
42. Instituto Superior Técnico de Lisboa — *Novos Talentos em Matemática Summer School: Partial Differential Equations*, Lisbon, 04/07/2016–08/07/2016.
43. Institute of Mathematics of Eötvös Loránd University — 3<sup>rd</sup> Annual Summer School in Mathematics: *The Legacy of Paul Erdős*, Budapest (Hungary), 08/06/2015–15/06/2015.
44. Jacobs University Bremen — 5<sup>th</sup> Annual *Modern Mathematics: International Summer School for Students*, Bremen (Germany), 04/07/2015–14/07/2015.
45. École Normale Supérieure de Lyon — 4<sup>th</sup> Annual *Modern Mathematics: International Summer School for Students*, Lyon (France), 20/08/2014–29/08/2014.

## 5.2 Advanced courses

1. Tianyuan Mathematical Center and Jilin University — *Control, Machine Learning and Numerics*, short summer course held by Enrique Zuazua, Online, 09/07/2021–26/07/2021.
2. Basque Center for Applied Mathematics (BCAM) — *Discrete martingales and applications to analysis*, mini-course held by Jose Gonzales Llorente, Bilbao (Spain), 03/04/2019–04/04/2019.
3. Scuola Internazionale Superiore di Studi Avanzati (SISSA) — *BV functions* (part I), course held by Gianni Dal Maso for the Ph.D. program in Mathematics, Trieste (Italy), 10/2018–12/2018.
4. Scuola Internazionale Superiore di Studi Avanzati (SISSA) — *Free boundary problems*, course held by Guido De Philippis for the Ph.D. program in Mathematics, Trieste (Italy), 10/2018–11/2018; final grade: 30/30 *cum laude*.
5. Erwin Schrödinger International Institute for Mathematics and Physics (ESI) — *Introduction to kinetic theory: the Boltzmann equation*, special course held by Francis Filbet, Vienna (Austria), 30/07/2018–03/08/2018.
6. Politecnico di Bari — *Mathematical problems in kinetic theory*, intensive course held by Mario Pulvirenti, Bari (Italy), 09/05/2018–13/05/2018.
7. Università degli Studi di Bari Aldo Moro — *Evolution problems*, course held by Silvia Romanelli and Jerome Arthur Goldstein for the Ph.D. degree program in Mathematics, Bari (Italy), 04/2019–06/2019.
8. Università degli Studi di Bari Aldo Moro — *Differential equations of fractional order*, course held by Roberto Garrappa for the Ph.D. degree program in Mathematics, Bari (Italy), 03/2019–05/2019.
9. Università degli Studi di Bari Aldo Moro — *Dissipative hyperbolic PDEs*, course held by Marcello D’Abbicco for the Ph.D. degree program in Mathematics, Bari (Italy), 11/2017–01/2018.
10. Università degli Studi di Bari Aldo Moro — *Elements of variational methods with applications to the study of geodesics*, course held by Anna Maria Candela for the Ph.D. degree program in Mathematics, Bari (Italy), 11/2018–01/2019; 7 ECTS, final grade: 30/30 *cum laude*.
11. Università degli Studi di Bari Aldo Moro — *INdAM Intensive Period* on “Contemporary Research in Elliptic PDEs and Related Topics”, Bari (Italy), 03/2017–06/2017; 7 ECTS, final grade: 30/30 *cum laude*.
12. Università degli Studi di Bari Aldo Moro — *Partial differential equations (on scalar hyperbolic conservation laws)*, course held by Giuseppe Maria Coclite for the Ph.D. degree program in Mathematics (XXXII Cycle), Bari (Italy), 11/2016–12/2016; 7 ECTS, final grade: 30/30 *cum laude*.

## 6 Scientific production

### 6.1 List of publications

- [P1] Nicola De Nitti and Julian Fischer. Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation. *Communications in Partial Differential Equations* 47, No. 7, 1394–1434 (2022). DOI: <https://doi.org/10.1080/03605302.2022.2056702>.
- [P2] Stefano Bianchini and Nicola De Nitti. Differentiability in measure of the flow associated with a nearly incompressible BV vector field. *Archive for Rational Mechanics and Analysis* 246, No. 2–3, 659–734 (2022). DOI: <https://doi.org/10.1007/s00205-022-01820-1>.

- [P3] Alexandre Bayen, Jean-Michel Coron, Nicola De Nitti, Alexander Keimer, and Lukas Pflug. Boundary controllability and asymptotic stabilization of a nonlocal traffic flow model. *Vietnam Journal of Mathematics* 9, No. 3, 957–985 (2021). DOI: <https://doi.org/10.1007/s10013-021-00506-7>.
- [P4] Giuseppe Maria Coclite, Nicola De Nitti, Alexander Keimer, and Lukas Pflug. Singular limits with vanishing viscosity for nonlocal conservation laws. *Nonlinear Analysis* 211, Article ID 112370, 12 p. (2021). DOI: <https://doi.org/10.1016/j.na.2021.112370>.
- [P5] Giuseppe Maria Coclite, Jean-Michel Coron, Nicola De Nitti, Alexander Keimer, and Lukas Pflug. A general result on the approximation of local conservation laws by nonlocal conservation laws: The singular limit problem for exponential kernels. *Annales de l'Institut Henri Poincaré C, Analyse Non Linéaire* 40, No. 5, 1205–1223 (2023). DOI: <https://doi.org/10.4171/aihpc/58>.
- [P6] Giuseppe Maria Coclite, Nicola De Nitti, Alexander Keimer, and Lukas Pflug. On existence and uniqueness of weak solutions to nonlocal conservation laws with BV kernels. *Zeitschrift für Angewandte Mathematik und Physik* 73, No. 6, Paper No. 241, 10 p. (2022). DOI: <https://doi.org/10.1007/s00033-022-01766-0>.
- [P7] Giuseppe Maria Coclite, Nicola De Nitti, Mauro Garavello, and Francesca Marcellini. Vanishing viscosity for a  $2 \times 2$  system modeling congested vehicular traffic. *Networks & Heterogeneous Media* 16, No. 3, 413–426 (2021). DOI: <https://doi.org/10.3934/nhm.2021011>.
- [P8] Nicola De Nitti, Francis Hounkpe, and Simon Schulz. On Liouville-type theorems for the 2D stationary MHD equations. *Nonlinearity* 35, No. 2, 870–888 (2022). DOI: <https://doi.org/10.1088/1361-6544/ac3f8b>.
- [P9] Nicola De Nitti and Enrique Zuazua. On the controllability of entropy solutions of scalar conservation laws at a junction via Lyapunov methods. *Vietnam Journal of Mathematics* 51, 71–88 (2023). DOI: <https://doi.org/10.1007/s10013-022-00598-9>.
- [P10] Nicola De Nitti and Tobias König. Critical functions and blow-up asymptotics for the fractional Brezis–Nirenberg problem in low dimension. *Calculus of Variations and Partial Differential Equations* 62, No. 4, Paper No. 114, 52 p. (2023). DOI: <https://doi.org/10.1007/s00526-023-02446-1>.
- [P11] Nicola De Nitti and Tobias König. Stability with explicit constants of the critical points of the fractional Sobolev inequality and applications to fast diffusion. *Journal of Functional Analysis* 285, No. 9, Article ID 110093, 30 p. (2023). DOI: <https://doi.org/10.1016/j.jfa.2023.110093>.
- [P12] Nicola De Nitti and Roman Taranets. Interface propagation properties for a nonlocal thin-film equation. *SIAM Journal on Mathematical Analysis* 56, No. 1, 173–196 (2024). DOI: <https://doi.org/10.1137/22M1510297>.
- [P13] Giuseppe Maria Coclite, Nicola De Nitti, Alexander Keimer, Lukas Pflug, and Enrique Zuazua. Long-time convergence of a nonlocal Burgers’ equation towards the local N-wave. *Nonlinearity* 36, No. 11, 5998–6019 (2023). DOI: <https://doi.org/10.1088/1361-6544/acf01d>.
- [P14] Nicola De Nitti and Sidy Moctar Djitte. Fractional Hardy–Rellich inequalities via integration by parts. Accepted for publication in *Nonlinear Analysis* (2023).
- [P15] Dallas Albritton and Nicola De Nitti. Sharp bounds on enstrophy growth for viscous scalar conservation laws. *Nonlinearity* 36, No. 12, 7142–7148 (2023). DOI: <https://doi.org/10.1088/1361-6544/ad073f>.

## 6.2 List of preprints

- [Pre1] Jon Asier Bárcena-Petisco, Marcio Cavalcante, Giuseppe Maria Coclite, Nicola De Nitti, and Enrique Zuazua. Control of hyperbolic and parabolic equations on networks and singular limits. *Submitted* (2023). Preprint available at <https://cvgmt.sns.it/paper/5139/>.
- [Pre2] Nicola De Nitti and Shigeru Sakaguchi. The stationary critical points of the fractional heat flow. *Submitted* (2022). Preprint available at <https://cvgmt.sns.it/paper/5578/>.
- [Pre3] Timothée Crin-Barat, Nicola De Nitti, and Enrique Zuazua. On the decay of one-dimensional locally and partially dissipated hyperbolic systems. *Submitted* (2022). Preprint available at <https://arxiv.org/abs/2206.00555>.
- [Pre4] Nicola De Nitti and Florian Schweiger. Scaling limits for fractional polyharmonic Gaussian fields. *Submitted* (2023). Preprint available at <https://cvgmt.sns.it/paper/5892/>.
- [Pre5] Giuseppe Maria Coclite, Maria Colombo, Gianluca Crippa, Nicola De Nitti, Alexander Keimer, Elio Marconi, Lukas Pflug, and Laura Valentina Spinolo. Oleĭnik-type estimates for nonlocal conservation laws and applications to the nonlocal-to-local limit. *Submitted* (2023). Preprint available at <https://cvgmt.sns.it/paper/5963/>.

- [Pre6] Nicola De Nitti and Shigeru Sakaguchi. Symmetry results for some overdetermined obstacle problems. *Submitted* (2023). Preprint available at <https://arxiv.org/abs/2306.12124>.
- [Pre7] Giuseppe Maria Coclite, Nicola De Nitti, Carlotta Donadello, and Florian Peru. Inverse design and boundary controllability for the chromatography system. *Submitted* (2023). Preprint available at <https://hal.science/hal-04164795/>.
- [Pre8] Giuseppe Maria Coclite, Nicola De Nitti, Francesco Maddalena, Gianluca Orlando, and Enrique Zuazua. Exponential convergence to steady-states for trajectories of a damped dynamical system modelling adhesive strings. *Submitted* (2023). Preprint available at <https://arxiv.org/abs/2311.05295>.

## 7 Scientific communications (selected list)

### 7.1 Invited talks in scientific events

1. Università degli Studi di Bari Aldo Moro — *XMaths Workshop 2023*, Bari (Italy), 20/12/2023–21/12/2023. At the invitation of the organizing committee: talk on “Exponential convergence to steady-states for trajectories of a damped dynamical system modelling adhesive strings”.
2. Riemann International School of Mathematics (RISM) — *RISM Summer School: Exotic solutions and well-posedness in PDEs and ODEs*, Varese (Italy), 10/07/2023–12/07/2023. At the invitation of the scientific organizers: talk on “Regularization phenomena and long-time behavior for nonlocal conservation laws”.
3. Centre International de Rencontres Mathématiques (CIRM) — Workshop “Modelling, analysis and numerical methods of complex dynamics”, Marseille (France), 21/06/2023–23/06/2023. At the invitation of the scientific organizers: talk on “Long-time behavior for scalar conservation laws: old and new”.
4. Universidad de León — *VI Congreso de Jovenes Investigadores de la RSME 2023*, León (Spain), 06/02/2023–10/02/2023. At the invitation of the organizers of the minisymposium *Avances Recientes en Teoría de Control*: talk on “Control of advection-diffusion equations on networks and singular limits”.
5. Fraunhofer Institute for Industrial Mathematics (Kaiserslautern) — *CA18232 Heating up networks – Analysis meets applications workshop*, Kaiserslautern (Germany), 04/10/2022–07/10/2022. At the invitation of the organizers: talk on “Control of advection-diffusion equations on networks and singular limits”.
6. Centro de Ciencias De Benasque Pedro Pascual — *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Benasque (Spain), 21/08/2022–02/09/2022. At the invitation of the scientific organizers: talk on “Weak regularity property of the flow generated by a BV vector field”.
7. Centro de Ciencias De Benasque Pedro Pascual — *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Benasque (Spain), 21/08/2022–02/09/2022. At the invitation of the scientific organizers: talk on “Blow-up asymptotics for the fractional Brézis-Nirenberg problem in low dimension”.
8. Centro de Ciencias De Benasque Pedro Pascual — *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Benasque (Spain), 21/08/2022–02/09/2022. At the invitation of the scientific organizers: talk on “Liouville theorems for the 2D steady MHD system”.
9. Centro de Ciencias De Benasque Pedro Pascual — *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Benasque (Spain), 21/08/2022–02/09/2022. At the invitation of Umberto Biccari and Sebastian Zamorano (coordinators of the thematic session on “Control, inverse problems and beyond”): talk on “Existence, weak-strong uniqueness, and long-time behavior for fractional cross-diffusion systems in a bounded domain”.
10. Centro de Ciencias De Benasque Pedro Pascual — *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Benasque (Spain), 21/08/2022–02/09/2022. At the invitation of the coordinators of the CA18232 MAT-DYN-NET special session: talk on “Control of advection-diffusion equations on networks and singular limits”.
11. *SIAM Conference on Analysis of Partial Differential Equations (PD22)*, Online, 14/03/2022–18/03/2022. At the invitation of the organizing committee of the minisymposium *Nonlocal Conservation Laws*: talk on “Boundary controllability and stabilization for a class of nonlocal conservation laws”.
12. Università degli Studi di Bari Aldo Moro — *XMaths Workshop 2021*, Bari (Italy), 21/12/2021–22/12/2021. At the invitation of the organizing committee: talk on “Nonlocal-to-local singular limits for conservations laws”.
13. INdAM Workshop on “Present Research Trends in Conservation Laws”, Rome (Italy), 08/09/2021–10/09/2021. At the invitation of Rinaldo M. Colombo (scientific committee): talk on “Nonlocal to local singular limits for conservation laws”.



14. Centro de Ciencias De Benasque Pedro Pascual — *VIII Partial Differential Equations, Optimal Design and Numerics 2019*, Benasque (Spain), 18/08/2019–30/08/2019. At the invitation of Enrique Zuazua (scientific organizer of the workshop): talk on “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation”.
15. Centro de Ciencias De Benasque Pedro Pascual — *VIII Partial Differential Equations, Optimal Design and Numerics 2019*, Benasque (Spain), 18/08/2019–30/08/2019. At the invitation of Umberto Biccari and Sebastián Zamorano (coordinators of the thematic session on “Nonlocal PDE and control”): talk on “Well-posedness and approximation schemes for nonlocal boundary-value problems”.

## 7.2 Contributed talks or presentations in scientific events

1. Université de Tours — “Workshop on Mathematical modeling, Analysis and Approximation of Vehicular and Pedestrian Dynamics”. Contributed short talk and poster presentation on “Regularization phenomena and long-time behavior for nonlocal conservation laws”. Tours (France), 05/06/2023–8/06/2023.
2. Ulm University — Summer School “Horizons in non-linear PDEs”. Contributed talk on “Nonlocal regularizations of conservation laws”. Ulm (Germany), 26/09/2022–30/09/2022.
3. Ulm University — “Liouville theorems for the 2D steady MHD equations” (based on a joint work with F. Hounkpe and S. Schulz). September 26, 2022. Presentation given in occasion of the Posters Session of the Summer School “Horizons in non-linear PDEs”, Ulm (Germany), 26/09/2022–30/09/2022.
4. Riemann International School of Mathematics (RISM) — “The singular limit of nonlocal conservation laws to local conservation laws”. Presentation given in occasion of the Poster Session of the congress on “PDEs and continuum mechanics” Varese (Italy), 21/07/2021–24/07/2021.
5. Ulm University — Winter School on “Gradient Flows and Variational Methods in PDEs”. Contributed talk on “Differentiability properties of the flow associated with a nearly incompressible BV vector field”. Ulm (Germany), 25/11/2019–29/11/2019.
6. Ulm University — “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation” (based on a joint work with J. Fischer). November 25, 2019. Presentation given in occasion of the Posters Session of the Winter School on “Gradient Flows and Variational Methods in PDEs”, Ulm (Germany), 25/11/2019–29/11/2019.
7. École Polytechnique, CNRS & LJLL, Technische Universität München — “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation”. 30/10/2019. Presentation given in occasion of the Posters Session of the workshop *Calculus of Variations and Applications in Trani*, Trani (Italy), 28–31 October, 2019.
8. IST Austria — “Waiting time phenomenon for the thin-film equation: sharp criteria in terms of the mass of the initial data”. Klosterneuburg (Austria), 22/08/2018. Presentation given in occasion of the *ISTerns’ Posters Session* 2018.

## 7.3 Invited seminars in universities or research institutes

1. University of Wisconsin–Madison — “Scalar conservation laws modeling supply-chains under constraints”. Madison (USA), 13/11/2023. Seminar given at the invitation of Dallas Albritton.
2. University of Chicago — “Regularization phenomena and long-time behavior for nonlocal conservation laws”. Chicago (USA), 09/11/2023. Seminar given at the invitation of Luis Silvestre.
3. University of Texas at Austin — “Regularization phenomena and long-time behavior for nonlocal conservation laws”. Austin (USA), 01/11/2023. Seminar given at the invitation of Alexis Vasseur.
4. Politecnico di Bari — “Regularization phenomena and long-time behavior for nonlocal conservation laws”. Bari (Italy), 09/03/2023. Seminar given at the invitation of Giuseppe Maria Coclite.
5. Universität Graz — “Nonlocal regularizations of scalar conservation laws”. Online, 26/01/2023. Seminar given at the invitation of Kristian Bredies and Silvio Franzon.
6. Nanzan University — “Nonlocal regularizations of conservation laws”. Nagoya (Japan), 19/11/2022. Seminar given at the invitation of Noboru Sakamoto.
7. NTT Musashino R&D — “Control of advection-diffusion equations on networks and singular limits”. Tokyo (Japan), 08/12/2022. Seminar given at the invitation of Masato Wakayama.
8. Westfälische Wilhelms-Universität Münster — “Nonlocal regularizations of conservation laws”. Münster (Germany), 11/05/2022. Seminar given at the invitation of Christian Seis.

9. Technische Universität Wien & Universität Wien — “Nonlocal regularizations of conservation laws”. Wien (Austria), 17/03/2022. Seminar given at the invitation of Elisa Davoli.
10. Università de Franche-Comté — “Control of advection-diffusion equations on networks and singular limits”. Besançon (France), 10/03/2022. Seminar given at the invitation of Carlotta Donadello.
11. Università de Tours — “Control of advection-diffusion equations on networks and singular limits”. Tours (France), 24/02/2022. Seminar given at the invitation of Abraham Sylla.
12. Politecnico di Bari — “Control of advection-diffusion equations on networks and singular limits”. Bari (Italy), 14/01/2022. Seminar given at the invitation of Giuseppe Maria Coclite.
13. Technischen Universität Darmstadt — “Control of advection-diffusion equations on networks and singular limits”. Darmstadt (Germany), 16/11/2021. Seminar given at the invitation of Jan Giesselmann.
14. Università degli Studi di Pavia — “Control of advection-diffusion equations on networks and singular limits”. Pavia (Italy), 11/05/2021. Seminar given at the invitation of Stefano Lisini and Antonio Segatti.
15. Politecnico di Bari — “Differentiability in measure of the flow associated to a nearly incompressible BV vector field”. Bari (Italy), 26/12/2020. Seminar given at the invitation of Giuseppe Maria Coclite.
16. Friedrich-Alexander-Universität Erlangen-Nürnberg — “Interface evolution and mixing phenomena in liquids”. Erlangen (Germany), 20/11/2019. Seminar given at the invitation of Enrique Zuazua.
17. Universidad de Deusto (DeustoTech) — “Differentiability properties of the flow associated with rough vector fields”. Bilbao (Spain), 13/09/2019. Seminar given at the invitation of Umberto Biccari.
18. Basque Center for Applied Mathematics (BCAM) — “Well-posedness and approximation schemes for nonlocal boundary-value problems”. Bilbao (Spain), 10/09/2019. Seminar given at the invitation of Daniel Eceizabarrena.
19. International Mathematical Summer Center (CIME), Cetraro (Italy) — “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation”. Cetraro (Italy), 03/07/2019. Seminar given in the framework of the CIME-EMS Summer School in Applied Mathematics on “Applied Mathematical Problems in Geophysics” at the invitation of Vincenzo Vespri (scientific organizer of the event).
20. IST Austria — “Waiting time phenomenon for the thin-film equation: sharp criteria in terms of the mass of the initial data”. Klosterneuburg (Austria), 06/09/2018. Seminar given at the invitation of Julian Fischer.
21. Università degli Studi di Bari Aldo Moro — “Well-posedness of viscosity solutions for a class of partial integro-differential equations modeling pricing under uncertainty”. Bari (Italy), 05/06/2017. Seminar given in the framework of the *INdAM Intensive Period* on “Contemporary Research in Elliptic PDEs and Related Topics” at the invitation of Enrico Valdinoci.

## 8 Organization of scientific events

### 8.1 Organization of conferences and workshops

1. Organization and fundraising (together with Alessandro Coclite, Giuseppe Fanizza, Giorgio Martalò, Gianluca Orlando, and Sabrina Pellegrino) for the “One-day Workshop on Applied Mathematics 2024” at the Polytechnic University of Bari, Bari (Italy), 30/05/2024.
2. Organization of the seminar series of the Chair for Dynamics, Control, Machine Learning and Numerics at the Friedrich-Alexander-Universität Erlangen-Nürnberg for the Winter Semester 2022/23 and Summer Semester 2023.
3. Organization (together with Timothée Crin-Barat) of thematic sessions on “Linear, nonlinear, and nonlocal transport phenomena” in the framework of the *IX Partial Differential Equations, Optimal Design and Numerics 2022* at the Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.
4. Organization (together with Maria del Mar Gonzales and Marco Fontelos) of thematic sessions on “Variational methods” in the framework of the *IX Partial Differential Equations, Optimal Design and Numerics 2022* at the Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.
5. Organization (together with Konstantin Zerulla) of thematic sessions on “Stabilization, regularity, and discretizations in wave phenomena and fluids” in the framework of the *IX Partial Differential Equations, Optimal Design and Numerics 2022* at the Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.

6. Organization (together with Borjan Geshkovski and Debayan Maity) of a thematic session on “Perspectives in free boundary problems” in the framework of the *VIII Partial Differential Equations, Optimal Design and Numerics 2019* at the Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 18/08/2019–30/08/2019.

## 9 Teaching experience

### 9.1 Bachelor’s courses

1. École Polytechnique Fédérale de Lausanne: Academic year 2023/24 (summer semester).  
Course: “Analysis IV” (Bachelor’s Degree in Mathematics).  
Role: Teaching assistant for Maria Colombo.  
Teaching load: 2 weekly hours of exercise classes.
2. Università degli Studi di Bari Aldo Moro: Academic year 2018/2019.  
Course: “Analisi Matematica 1” (Bachelor’s Degree in Mathematics).  
Role: Tutoring for Silvia Romanelli and Sandra Lucente.  
Teaching load: 250 hours of exercise classes and individual tutoring.

### 9.2 Master’s courses

1. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2022/2023 (summer semester).  
Course: “Scalar Conservation Laws” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer (supervised by Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 0.5 weekly hours of exercise classes.
2. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2022/2023 (summer semester).  
Course: “Wave Phenomena” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer (supervised by Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 0.5 weekly hours of exercise classes.
3. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2022/2023 (winter semester).  
Course: “Mathematical Modeling in the Life Sciences” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer (supervised by Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 0.5 weekly hours of exercise classes.
4. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2022/2023 (winter semester).  
Course: “Transport Phenomena” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer (supervised by Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 0.5 weekly hours of exercise classes.
5. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2021/2022 (summer semester).  
Course: “Scalar Conservation Laws” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer (supervised by Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 0.5 weekly hours of exercise classes.
6. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2021/2022 (summer semester).  
Course: “Modeling and Analysis in Continuum Mechanics 2” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer (supervised by Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 0.5 weekly hours of exercise classes.
7. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2021/2022 (winter semester).  
Course: “Transport Phenomena” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer (supervised by Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 0.5 weekly hours of exercise classes.
8. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2021/2022 (winter semester).  
Course: “Modeling and Analysis in Continuum Mechanics 1” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer, together with Enrique Zuazua.  
Teaching load: 2 weekly hours of lectures + 1 weekly hour of exercise classes.
9. Friedrich-Alexander-Universität Erlangen-Nürnberg: Academic year 2020/2021 (summer semester).  
Course: “Modeling and Analysis in Continuum Mechanics 2” (Master’s Degree in Computational and Applied Mathematics).

Role: Teaching assistant for Enrique Zuazua.  
Teaching load: 1 weekly hour of exercise classes.

10. Friedrich-Alexander-Universität Erlangen-Nürnberg, Academic year 2020/2021 (winter semester).  
Course: “Modeling and Analysis in Continuum Mechanics 1” (Master’s Degree in Computational and Applied Mathematics).  
Role: Lecturer, together with Enrique Zuazua).  
Teaching load: 2 weekly hours of lectures + 1 weekly hour of exercise classes.
11. Friedrich-Alexander-Universität Erlangen-Nürnberg, Academic year 2019/2020 (summer semester).  
Course: “Partial Differential Equation, Control, and Numerics” (Master’s Degree in Computational and Applied Mathematics)  
Role: Teaching assistant of Enrique Zuazua.  
Teaching load: 1 weekly hour of exercise classes.

## 10 Mentoring of young mathematicians

### 10.1 Internship students (Bachelor and Master’s level)

1. Theïlo Terrisse. Internship at Friedrich-Alexander-Universität Erlangen-Nürnberg, in collaboration with École des Ponts ParisTech: 09/01/2023–07/07/2023. Co-supervised with Enrique Zuazua.  
Topic: “Hamilton–Jacobi–Bellman equations and reinforcement learning”.
2. Arselane Hadj Slimane. Internship at Friedrich-Alexander-Universität Erlangen-Nürnberg, in collaboration with ENS Paris-Saclay: 14/04/2023–30/07/2023. Co-supervised with Enrique Zuazua.  
Topic: “Neural ODEs for interpolation and transport”.
3. Mathieu Grondin. Master’s semester project at EPFL: 09/2023–12/2023. Co-supervised with Maria Colombo.  
Topic: “Exact boundary controllability of incompressible inviscid fluids”.

### 10.2 Bachelor and Master’s theses

1. Vaibhav Uppal. Master’s thesis at Friedrich-Alexander-Universität Erlangen-Nürnberg (since 08/2023). Co-supervised with Enrique Zuazua.  
Topic: “Machine learning and control methods for personalized pricing problems”.

## 11 Editorial activity

- Referee reports or opinions for the following international scientific journals:  
“Journal de Mathématiques Pures et Appliquées” (JMPA); “Journal of Differential Equations” (JDE); “Journal of Functional Analysis” (JFA); “Nonlinearity”; “Nonlinear Analysis”; “Mathematical Control and Related Fields” (MCRF); “Zeitschrift für Angewandte Mathematik und Physik” (ZAMP); “Networks & Heterogeneous Media” (NHM); “Journal of Mathematical Analysis and Applications” (JMAA); “Communications on Pure and Applied Analysis” (CPAA); “Springer INdAM Series”; “Journal of Dynamical and Control Systems” (JCDS); “Mathematics and Mechanics of Complex Systems” (MEMOCS); “Complex Analysis and Operator Theory” (CAOT).
- Reviewer (#160889) for MathSciNet (since 11/2021).

## 12 Public outreach and “third mission”

1. *Lange Nacht der Wissenschaften 2022* (Friedrich-Alexander-Universität Erlangen-Nürnberg) — Contribution on behalf of the Department of Mathematics (in collaboration with the team of the Chair for Dynamics, Control, Machine Learning and Numerics), Erlangen (Germany), 21/05/2022.
2. *European Research Night 2019* (Università degli Studi di Bari Aldo Moro) — Contribution on behalf of the Department of Mathematics (in collaboration with M. Cappelletti Montano, V. Crismale, G. Dileo, D. Iacono, S. Milella, and L. Selicato), Bari (Italy), 27/09/2019.
3. *Open Campus 2019* (orientation day for the scientific departments of Università degli Studi di Bari Aldo Moro) — Contribution on behalf of the Department of Mathematics. Bari (Italy), 20/02/2019.

4. *European Research Night 2017* (Università degli Studi di Bari Aldo Moro) — Organization of an exhibition on “PDEs: Modeling, Analysis, and Numerical Simulations” (in collaboration with M. Gallo, A. Ninno, B. Piergianni, N. M. Schiavone, and C. Sportelli), Bari (Italy), 29/09/2017.