

Università degli Studi di Milano

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# Curriculum Vitæ et Studiorum

Nicola De Nitti

## Contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>Education</b>   | <b>3</b>  |
| <b>2</b> | <b>Scientific positions</b>  | <b>3</b>  |
| 2.1      | Post-doctoral positions . . . . .  | 3         |
| 2.2      | Doctoral positions . . . . .   | 4         |
| 2.3      | Pre-doctoral positions . . . . .   | 4         |
| <b>3</b> | <b>Funded research projects and grants</b>                               | <b>4</b>  |
| 3.1      | Participation in funded research projects . . . . .                      | 4         |
| 3.2      | Awarded competitive mobility grants (sponsor/host) . . . . .             | 5         |
| 3.3      | Awarded competitive mobility grants (visitor) . . . . .                  | 5         |
| <b>4</b> | <b>Membership in professional associations and research networks</b>     | <b>5</b>  |
| <b>5</b> | <b>Scientific production</b>   | <b>6</b>  |
| 5.1      | Journal articles (peer-reviewed) . . . . .                               | 6         |
| 5.2      | Preprints . . . . .  | 8         |
| <b>6</b> | <b>Invited research visits to universities and scientific institutes</b> | <b>8</b>  |
| <b>7</b> | <b>Scientific communications</b>   | <b>10</b> |
| 7.1      | Invited talks in scientific events . . . . .                             | 10        |
| 7.2      | Contributed talks in scientific events . . . . .                         | 12        |
| 7.3      | Contributed poster presentations in scientific events . . . . .          | 13        |
| 7.4      | Invited seminars in universities and research institutes . . . . .       | 13        |

|           |   |           |
|-----------|---|-----------|
| <b>8</b>  | <b>Scientific events attended (selected list)</b>                       | <b>15</b> |
| 8.1       | Conferences, congresses, workshops, and summer/winter schools . . . . . | 15        |
| 8.2       | Advanced courses . . . . .  | 18        |
| <b>9</b>  | <b>Organization of scientific events</b>                                | <b>19</b> |
| 9.1       | Conferences, congresses, and workshops . . . . .                        | 19        |
| 9.2       | Mini-symposia and thematic sessions . . . . .                           | 19        |
| 9.3       | Seminar series . . . . .  | 19        |
| <b>10</b> | <b>Teaching activities</b>  | <b>19</b> |
| 10.1      | Bachelor's courses . . . . .  | 20        |
| 10.2      | Master's courses . . . . .  | 20        |
| <b>11</b> | <b>Student supervision</b>  | <b>22</b> |
| 11.1      | Internship supervision . . . . .  | 22        |
| 11.2      | Leadership in mathematics competitions . . . . .                        | 22        |
| <b>12</b> | <b>Editorial activity</b>   | <b>22</b> |
| 12.1      | Referee/reviewer activity . . . . .                                     | 22        |
| <b>13</b> | <b>Public outreach and "third mission"</b>                              | <b>23</b> |

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## 1 Education

- **Friedrich-Alexander-Universität Erlangen-Nürnberg.** *Doktor der Naturwissenschaften (Dr. rer. nat.)* [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: This 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 (classical studies)]. 100/100 *cum laude*. 01/09/2009–05/07/2014.

## 2 Scientific positions

### 2.1 Post-doctoral positions

- **EPFL (École Polytechnique Fédérale de Lausanne).** *Collaborateur Scientifique/Postdoc* [Postdoc]. Since 01/09/2023.

Supervisor: Maria Colombo.

## 2.2 Doctoral positions

- **Friedrich-Alexander-Universität Erlangen-Nürnberg.** *Wissenschaftlicher Mitarbeiter (TV-L E13, 100%)* [Scientific Assistant]. 01/04/2020–31/08/2023.  
Supervisor: Enrique Zuazua.

## 2.3 Pre-doctoral positions

- **BCAM (Basque Center for Applied Mathematics).** *Internship Awardee.* 27/02/2019–14/09/2019.  
Supervisors: Nicole Cusimano and Félix del Teso.
- **SISSA (Scuola Internazionale Superiore di Studi Avanzati).** *Undergraduate Research Training Fellowship Awardee.* 17/09/2018–15/12/2018.  
Supervisor: Stefano Bianchini.
- **ISTA (Institute of Science and Technology Austria).** *Internship Awardee.* 01/06/2018–31/08/2018.  
Supported by the *ISTernship Summer Program 2018*, funded by OeAD-GmbH (Österreichs Agentur für Bildung und Internationalisierung).  
Supervisor: Julian Fischer.

# 3 Funded research projects and grants

## 3.1 Participation in funded research projects

1. **TENSE: Irregular solutions of the Transport, Euler and Navier-Stokes Equations.** *ERC 2023–2028*, funded by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract no. MB22.00034.  
Principal Investigator: Maria Colombo.  
Role in the project: Member of the research team, since 01/09/2023.
2. **Control problems for applied nonlinear hyperbolic equations (CONPANHYE).** *International Emerging Action 2024/2025*, funded by the Centre National de la Recherche Scientifique (CNRS).  
Principal Investigators: Carlotta Donadello and Mauro Garavello.  
Role in the project: Member, 01/2024–12/2025.
3. **Control of multi-particle systems, mean-field limits, and applications to deep learning [Steuerung von Mehrteilchensystemen, Mean-Field Limits und Anwendungen für Deep Learning].** Project no. 530756074, supported by the Deutsche Forschungsgemeinschaft (DFG) and the National Research Foundation of Korea (NRF) within the *Südkorea-NRF-DFG-2023 Programme*.  
Principal Investigators: Dongnam Ko and Enrique Zuazua.  
Role in the project: Member, 2023–2024.
4. **Approccio multiscala all'analisi di modelli di interazione [Multiscale approach to the analysis of interaction models].** *2022 GNAMPA Grant*, funded by the Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni (GNAMPA) of the Istituto Nazionale di Alta Matematica "Francesco Severi" (INdAM).  
Principal Investigator: Gianluca Orlando.  
Role in the project: Member, 16/05/2022–31/05/2023.

5. **Uncertain data in control of PDE systems.** *Croatian–German bilateral project*, funded by the Croatian Science Foundation (HRZZ) and the Deutsche Forschungsgemeinschaft (DFG).  
Principal Investigators: Martin Gugat, Enrique Zuazua, and Martin Lazar.  
Role in the project: Member, 2022–2023.
6. **Control, Inversion and Numerics for Partial Differential Equations (CIN–PDE).** Project no. M-0548, funded by the National Natural Science Foundation of China (NSFC) and the Deutsche Forschungsgemeinschaft (DFG) within the *Sino–German Mobility Programme* of the Chinesisch–Deutsches Zentrum für Wissenschaftsförderung. Principal Investigators: Enrique Zuazua and Zhen Lei.  
Role in the project: Member, 2022–2025.
7. **SFB Transregio 154: Mathematical modelling, simulation and optimization using the example of gas networks [Mathematische Modellierung, Simulation und Optimierung am Beispiel von Gasnetzwerken].** Funded by the Deutsche Forschungsgemeinschaft (DFG).  
Principal Investigators: Falk Hante and Enrique Zuazua (sub-project C07: “Random batch methods for optimal control of network dynamics”).  
Role in the project: Associate Member, 11/2020–05/2026.

### 3.2 Awarded competitive mobility grants (sponsor/host)

1. **INdAM Visiting Professor Program 2024.** Funded by the Istituto Nazionale di Alta Matematica “Francesco Severi” (INdAM), CUP E53C23001670001.  
Host institution and dates of the visit: Politecnico di Bari, Dipartimento di Meccanica, Matematica e Management, 18/11/2024–29/11/2024 (upcoming).  
Sponsor: Nicola De Nitti.  
Visitor: Eliot Pacherie.

### 3.3 Awarded competitive mobility grants (visitor)

1. **Visiting Doctoral Researchers Programme 2022/23.** Funded by the Cluster of Excellence *Mathematics Münster: Dynamics–Geometry–Structure*.  
Host institution and dates of the visit: Universität Münster, 05/09/2022–30/10/2022.  
Sponsors: André Schlichting and Christian Seis.  
Visitor: Nicola De Nitti.

## 4 Membership in professional associations and research networks

1. **Istituto Nazionale di Alta Matematica “Francesco Severi” (INdAM).**  
Group: GNAMPA. Member since 2021.  
Research Unit: Politecnico di Bari, Dipartimento di Meccanica, Matematica e Management. Member since 2024.
2. **CA18232: Mathematical models for interacting dynamics on networks (MAT-DYN-NET).**  
Working groups: “Nonlinear problems” (WG2), “Variational methods on graphs and networks” (WG4), “Numerical methods and applications” (WG5). Member, 06/2022–03/04/2024.

3. **European Mathematical Society (EMS)**. Member since 2024.
4. **Society for Industrial and Applied Mathematics (SIAM)**. Member since 2024.
5. **European Society for Mathematical and Theoretical Biology (ESMTB)**. Member since 2024.

## 5 Scientific production

My main research interests lie in **applied analysis and partial differential equations**. More specifically, I have been working on the following topics: 1. hyperbolic conservation laws; 2. nonlinear waves; 3. transport with rough velocity fields; 4. fluid dynamics; 5. local and nonlocal (degenerate, higher-order) parabolic PDEs; 6. free boundary problems; 7. control and stabilization of PDEs; 8. calculus of variations; 9. variational and topological methods for the study of nonlinear (elliptic) problems; 10. mathematical methods in machine learning.

### 5.1 Journal articles (peer-reviewed)

- [J1] 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>.
- [J2] 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>.
- [J3] 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>.
- [J4] 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>.
- [J5] 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>.
- [J6] 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>.
- [J7] 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>.

- [J8] 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>.
- [J9] 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>.
- [J10] 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>.
- [J11] 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>.
- [J12] 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>.
- [J13] 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>.
- [J14] Nicola De Nitti and Sidy Moctar Djitte. Fractional Hardy–Rellich inequalities via integration by parts. *Nonlinear Analysis* 243, Article ID 113478, 12 p. (2024). DOI: <https://doi.org/10.1016/j.na.2023.113478>.
- [J15] 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>.
- [J16] 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. *Mathematical Models and Methods in Applied Sciences* 34, No. 8, 1445–1482 (2024). DOI: <https://doi.org/10.1142/S021820252450026X>.
- [J17] 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. *Mathematical Control and Related Fields* (2024). DOI: <https://doi.org/10.3934/mcrf.2024015>.
- [J18] 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. Accepted for publication in *Journal of Hyperbolic Differential Equations* (2024).
- [J19] Giuseppe Maria Coclite, Nicola De Nitti, Carlotta Donadello, and Florian Peru. Inverse design and boundary controllability for the chromatography system. Accepted for publication in *Milan Journal of Mathematics* (2024).

## 5.2 Preprints

- [Pre1] 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/>.
- [Pre2] 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>.
- [Pre3] Nicola De Nitti and Florian Schweiger. Scaling limits for fractional polyharmonic Gaussian fields. *Submitted* (2023). Preprint available at <https://cvgmt.sns.it/paper/5892/>.
- [Pre4] Nicola De Nitti and Shigeru Sakaguchi. Symmetry results for some overdetermined obstacle problems. *Submitted* (2023). Preprint available at <https://arxiv.org/abs/2306.12124>.
- [Pre5] Nicola De Nitti, Federico Glaudo, and Tobias König. Non-degeneracy, stability and symmetry for the fractional Caffarelli–Kohn–Nirenberg inequality. *Preprint* (2024). Preprint available at <https://arxiv.org/abs/2403.02303>.
- [Pre6] Nicola De Nitti, Denis Serre, and Enrique Zuazua. Pointwise constraints for scalar conservation laws with positive wave velocity. *Submitted* (2024). Preprint available at <https://cvgmt.sns.it/paper/6472/>.
- [Pre7] Nicola De Nitti, David Meyer, and Christian Seis. Optimal regularity for the 2D Euler equations in the Yudovich class. *Submitted* (2024). Preprint available at <https://arxiv.org/abs/2403.13691>.
- [Pre8] Nicola De Nitti, Stefano Lisini, Antonio Segatti, and Roman Taranets Existence and asymptotic behaviour of solutions for a multi-dimensional fractional thin-film equation. *Submitted* (2024). Preprint available at <https://arxiv.org/abs/2404.03633>.
- [Pre9] Giuseppe Maria Coclite and Nicola De Nitti. A note on the nonlocal regularization of a nonstrictly hyperbolic nonlinear system. *Submitted* (2024). Preprint available at <https://cvgmt.sns.it/paper/6554/>.
- [Pre10] Nicola De Nitti and Xavier Fernández-Real. Optimal transport of measures via autonomous vector fields. *Submitted* (2024). Preprint available at <https://arxiv.org/abs/2405.06503>.
- [Pre11] Nicola De Nitti and Eliot Pacherie. Nested discontinuous asymptotic profiles for the viscous Burgers equation with infinite mass. *Submitted* (2024). Preprint available at <https://arxiv.org/abs/2406.10874>.
- [Pre12] Giuseppe Maria Coclite, Nicola De Nitti, Mauro Garavello, and Francesca Marcellini. Feedback stabilization for entropy solutions of a  $2 \times 2$  hyperbolic system of conservation laws at a junction. *Submitted* (2024).

## 6 Invited research visits to universities and scientific institutes

1. **Politecnico di Bari.** 30/05/2024–31/05/2024.  
Host: Giuseppe Maria Coclite.



2. **Università degli Studi di Milano-Bicocca.** 12/05/2024–15/05/2024.  
Host: Mauro Garavello.
3. **Friedrich-Alexander-Universität Erlangen-Nürnberg.** 03/05/2024–06/05/2024.  
Host: Gunther Grün.
4. **CY Cergy Paris Université.** 29/04/2024–01/05/2024.  
Host: Eliot Pacherie.
5. **Università degli Studi di Milano-Bicocca.** 08/04/2024–09/04/2024.  
Host: Mauro Garavello.
6. **Université de Franche-Comté.** 04/04/2024–05/04/2024.  
Host: Carlotta Donadello.
7. **University of Oslo.** 19/03/2024–28/03/2024.  
Hosts: Ola Mæhlen and Ulrik Fjordholm.
8. **Université de Franche-Comté.** 12/02/2024–16/02/2024.  
Host: Carlotta Donadello.
9. **Universidad Autonoma de Madrid.** 28/01/2024–10/02/2024.  
Host: María del Mar González Nogueras.
10. **Université de Tours.** 22/01/2024–26/01/2024.  
Hosts: Boris Andreianov and Vincent Perrollaz.
11. **University of Wisconsin–Madison.** 11/11/2023–20/11/2023.  
Host: Dallas Albritton.
12. **University of Chicago.** 08/11/2023–09/11/2023.  
Host: Luis Silvestre.
13. **Texas A&M University.** 06/11/2023–08/11/2023.  
Host: Minh-Binh Tran.
14. **University of Texas at Austin.** 30/10/2023–06/11/2023.  
Host: Alexis Vasseur.
15. **University of Dubrovnik.** 17/05/2023–24/05/2023.  
Host: Martin Lazar.
16. **Universidad Autonoma de Madrid.** 13/02/2023–17/02/2023.  
Host: María del Mar González Nogueras.
17. **Nanzan University, Nagoya.** 19/12/2022.  
Host: Noboru Sakamoto.
18. **Tohoku University.** 09/12/2022–16/12/2022.  
Host: Shigeru Sakaguchi.
19. **NTT Musashino R&D (Tokyo).** 08/12/2022.  
Host: Masato Wakayama.
20. **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.
21. **Politecnico di Bari.** 18/07/2022–22/07/2022.  
Host: Giuseppe Maria Coclite.

22. **GSSI (Gran Sasso Science Institute).** 11/07/2022–15/07/2022.  
Hosts: Paolo Antonelli and Stefano Spirito.
23. **Universität Basel.** 16/06/2022–17/06/2022.  
Host: Gianluca Crippa.
24. **Universität Münster.** 09/05/2022–12/05/2022.  
Host: Christian Seis.
25. **Technische Universität Wien.** 14/03/2022–08/04/2022.  
Host: Elisa Davoli.
26. **Université de Franche-Comté.** 28/02/2022–11/03/2022.  
Host: Carlotta Donadello.
27. **Université de Tours.** 21/02/2022–25/02/2022.  
Hosts: Boris Andreianov and Abraham Sylla.
28. **Politecnico di Bari.** 20/12/2021–21/01/2022.  
Host: Giuseppe Maria Coclite.
29. **Technischen Universität Darmstadt.** 15/11/2021–19/11/2021.  
Hosts: Jan Giesselmann and Nora Philippi.
30. **Università degli Studi di Pavia.** 20/09/2021–24/09/2021.  
Hosts: Stefano Lisini and Antonio Segatti.
31. **Istituto per le Applicazioni del Calcolo “Mauro Picone” (IAC-CNR).** 12/09/2021–17/09/2021.  
Hosts: Roberta Bianchini and Roberto Natalini.
32. **Politecnico di Bari.** 05/07/2021–20/07/2021.  
Host: Giuseppe Maria Coclite.
33. **Friedrich-Alexander-Universität Erlangen-Nürnberg.** 18/11/2019–22/11/2019.  
Host: Enrique Zuazua.
34. **SISSA (Scuola Internazionale Superiore di Studi Avanzati).** 01/08/2019–09/08/2019.  
Host: Stefano Bianchini.
35. **Universidad de Deusto, DeustoTech.** 13/06/2019–14/06/2019 and 09/09/2019–10/09/2019.  
Hosts: Umberto Biccari and Enrique Zuazua.
36. **BCAM (Basque Center for Applied Mathematics).** 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.  
Funded by the BCAM *Internship Program*.  
Hosts: Nicole Cusimano and Félix del Teso.
37. **ISTA (Institute of Science and Technology Austria).** 09/12/2018–16/12/2018.  
Host: Julian Fischer.

## 7 Scientific communications

### 7.1 Invited talks in scientific events

1. *14th AIMS conference on Dynamical Systems and Differential Equations*, New York University Abu Dhabi, Abu Dhabi (Arab Emirates), 16/12/2024–20/12/2024. Invited

- talk in the special session “Controllability and Stabilization of Partial Differential Differential Equations” (**upcoming**).
2. Workshop *Nonlocal Modelling in Fluidmechanical Applications*, Universität Mannheim, Mannheim (Germany), 02/09/2024–04/09/2024. Invited talk on “Nonlocal regularizations of hyperbolic systems of conservation laws” (**upcoming**).
  3. *PDEs, Control and Deep Learning*, CIME (Centro Internazionale Matematico Estivo), Cetraro (Italy), 22/07/2024–26/07/2024. Invited talk on “Optimal transport of measures via autonomous vector fields” (**upcoming**).
  4. *European Congress of Mathematics*, Sevilla (Spain), 15/07/2024–19/07/2024. Invited talk on “Nonlocal regularizations of hyperbolic systems of conservation laws” in the mini-symposium *Nonlocal conservation laws and related topics*.
  5. *Multiscale and Nonlocal Problems in PDEs*, Università degli Studi di Palermo, Palermo (Italy), 20/06/2024–21/06/2024. Invited talk on “Sharp bounds on enstrophy growth for viscous scalar conservation laws”.
  6. *Second RISM Congress on PDEs and Continuum Mechanics*, RISM (Riemann International School of Mathematics), Varese (Italy), 10/04/2024–12/04/2024. Invited talk on “Optimal transport of measures via autonomous vector fields”.
  7. *XMaths Workshop 2023*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 20/12/2023–21/12/2023. Invited talk on “Exponential convergence to steady-states for trajectories of a damped dynamical system modelling adhesive strings”.
  8. *CIN-PDE 2023: Erlangen–Shanghai Workshop on Control, Inversion and Numerics for PDEs*, Erlangen (Germany) and Shanghai (China), 01/08/2023–04/08/2023. Invited talk on “Inverse design for some systems of conservation laws”.
  9. *RISM Summer School: Exotic solutions and well-posedness in PDEs and ODEs*, RISM (Riemann International School of Mathematics), Varese (Italy), 10/07/2023–12/07/2023. Invited talk on “Regularization phenomena and long-time behavior for nonlocal conservation laws”.
  10. Workshop *Modelling, analysis and numerical methods of complex dynamics*, CIRM (Centre International de Rencontres Mathématiques), Marseille (France), 21/06/2023–23/06/2023. Invited talk on “Long-time behavior for scalar conservation laws: old and new”.
  11. *VI Congreso de Jóvenes Investigadores de la RSME 2023*, Universidad de León, León (Spain), 06/02/2023–10/02/2023. Invited talk on “Control of advection-diffusion equations on networks and singular limits” in the mini-symposium *Avances Recientes en Teoría de Control*.
  12. *CA18232 Heating up networks – Analysis meets applications workshop*, Fraunhofer Institute for Industrial Mathematics, Kaiserslautern (Germany), 04/10/2022–07/10/2022. Invited talk on “Control of advection-diffusion equations on networks and singular limits”.
  13. *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022. Invited talk on “Weak regularity property of the flow generated by a BV vector field” in the thematic session *Linear, nonlinear, and nonlocal transport phenomena*.
  14. *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.

Invited talk on “Blow-up asymptotics for the fractional Brézis-Nirenberg problem in low dimension” in the thematic session *Variational methods*.

15. *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022. Invited talk on “Liouville theorems for the 2D steady MHD system” in the thematic session *Stabilization, regularity, and discretization in wave phenomena and fluids*.
16. *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022. Invited talk on “Existence, weak-strong uniqueness, and long-time behavior for fractional cross-diffusion systems in a bounded domain” in the thematic session *Control, inverse problems and beyond*.
17. *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022. Invited talk on “Control of advection-diffusion equations on networks and singular limits” in the CA18232 MAT-DYN-NET special session.
18. *SIAM Conference on Analysis of Partial Differential Equations (PD22)*, Online, 14/03/2022–18/03/2022. Invited talk on “Boundary controllability and stabilization for a class of nonlocal conservation laws” in the mini-symposium *Nonlocal conservation laws*.
19. *XMaths Workshop 2021*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 21/12/2021–22/12/2021. Invited talk on “Nonlocal-to-local singular limits for conservations laws”.
20. INdAM Workshop *Present Research Trends in Conservation Laws*, Rome (Italy), 08/09/2021–10/09/2021. Invited talk on “Nonlocal to local singular limits for conservation laws”.
21. *VIII Partial Differential Equations, Optimal Design and Numerics 2019*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 18/08/2019–30/08/2019. Invited talk on “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation” in the thematic session *Perspectives in free boundary problems*.
22. *VIII Partial Differential Equations, Optimal Design and Numerics 2019*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 18/08/2019–30/08/2019. Invited talk on “Well-posedness and approximation schemes for nonlocal boundary-value problems” in the thematic session *Nonlocal PDE and control*.
23. *Applied Mathematical Problems in Geophysics* (CIME-EMS Summer School in Applied Mathematics), CIME (Centro Internazionale Matematico Estivo), Cetraro (Italy), 03/07/2019. Invited talk on “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation”.
24. *INdAM Intensive Period Contemporary Research in Elliptic PDEs and Related Topics*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 05/06/2017. Invited talk on “Well-posedness of viscosity solutions for a class of partial integro-differential equations modeling pricing under uncertainty”.

## 7.2 Contributed talks in scientific events

1. *Workshop on Mathematical modeling, Analysis and Approximation of Vehicular and Pedestrian Dynamics*, Université de Tours, Tours (France), 05/06/2023–8/06/2023.

Contributed short talk and poster presentation on “Regularization phenomena and long-time behavior for nonlocal conservation laws”.

2. Summer School *Horizons in non-linear PDEs*, Universität Ulm, Ulm (Germany), 26/09/2022–30/09/2022. Contributed talk on “Nonlocal regularizations of conservation laws”.
3. Winter School *Gradient Flows and Variational Methods in PDEs*, Universität Ulm, Ulm (Germany), 25/11/2019–29/11/2019. Contributed talk on “Differentiability properties of the flow associated with a nearly incompressible BV vector field”.

### 7.3 Contributed poster presentations in scientific events

1. Summer School *Horizons in non-linear PDEs*, Universität Ulm, Ulm (Germany), 26/09/2022–30/09/2022. Contributed poster presentation on “Liouville theorems for the 2D steady MHD equations”.
2. *PDEs and continuum mechanics*, RISM (Riemann International School of Mathematics), Varese (Italy), 21/07/2021–24/07/2021. Contributed poster presentation on “The singular limit of nonlocal conservation laws to local conservation laws”.
3. Winter School *Gradient Flows and Variational Methods in PDEs*, Universität Ulm, Ulm (Germany), 25/11/2019–29/11/2019. Contributed poster presentation on “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation”.
4. Workshop *Calculus of Variations and Applications in Trani*, Trani (Italy), 28–31 October, 2019. Contributed poster presentation on “Sharp criteria for the waiting time phenomenon in solutions to the thin-film equation”.
5. *ISTerns’ Posters Session* 2018, ISTA, Klosterneuburg (Austria), 22/08/2018. Contributed poster presentation on “Waiting time phenomenon for the thin-film equation: sharp criteria in terms of the mass of the initial data”.

### 7.4 Invited seminars in universities and research institutes

1. Friedrich-Alexander-Universität Erlangen-Nürnberg, *IntComSin Colloquium*. At the invitation of Gunther Grün: seminar on “Nonlocal interface evolution problems”. Erlangen (Germany), 03/05/2024.
2. CY Cergy Paris Université. At the invitation of Eliot Pacherie: seminar on “Sharp bounds on enstrophy growth for viscous scalar conservation laws”. Cergy (France), 29/04/2024.
3. University of Oslo. At the invitation of Ola Mæhlen: seminar on “Sharp bounds on enstrophy growth for viscous scalar conservation laws”. Oslo (Norway), 21/03/2024.
4. Université de Franche-Comté. At the invitation of Carlotta Donadello: seminar on “Sharp bounds on enstrophy growth for viscous scalar conservation laws”. Besançon (France), 15/02/2024.
5. Queen’s University. At the invitation of Maria Teresa Chiri: seminar on “Sharp bounds on enstrophy growth for viscous scalar conservation laws”. Kingston (Canada) and online, 13/02/2024.
6. Université de Tours. At the invitation of Boris Andreianov: seminar on “Sharp bounds on enstrophy growth for viscous scalar conservation laws”. Tours (France), 25/01/2024.

7. University of Wisconsin–Madison. At the invitation of Dallas Albritton: seminar on “Scalar conservation laws modeling supply-chains under constraints”. Madison (USA), 13/11/2023.
8. University of Chicago. At the invitation of Luis Silvestre: seminar on “Regularization phenomena and long-time behavior for nonlocal conservation laws”. Chicago (USA), 09/11/2023.
9. University of Texas at Austin. At the invitation of Alexis Vasseur: seminar on “Regularization phenomena and long-time behavior for nonlocal conservation laws”. Austin (USA), 01/11/2023.
10. Politecnico di Bari. At the invitation of Giuseppe Maria Coclite: seminar on “Regularization phenomena and long-time behavior for nonlocal conservation laws”. Bari (Italy), 09/03/2023.
11. Universität Graz. At the invitation of Kristian Bredies and Silvio Franzon: seminar on “Nonlocal regularizations of scalar conservation laws”. Online, 26/01/2023.
12. Nanzan University. At the invitation of Noboru Sakamoto: seminar on “Nonlocal regularizations of conservation laws”. Nagoya (Japan), 19/11/2022.
13. NTT Musashino R&D. At the invitation of Masato Wakayama: seminar on “Control of advection-diffusion equations on networks and singular limits”. Tokyo (Japan), 08/12/2022.
14. Universität Münster. At the invitation of Christian Seis: seminar on “Nonlocal regularizations of conservation laws”. Münster (Germany), 11/05/2022.
15. Technische Universität Wien & Universität Wien. At the invitation of Elisa Davoli: seminar on “Nonlocal regularizations of conservation laws”. Wien (Austria), 17/03/2022.
16. Université de Franche-Comté. At the invitation of Carlotta Donadello: seminar on “Control of advection-diffusion equations on networks and singular limits”. Besançon (France), 10/03/2022.
17. Université de Tours. At the invitation of Abraham Sylla: seminar on “Control of advection-diffusion equations on networks and singular limits”. Tours (France), 24/02/2022.
18. Politecnico di Bari. At the invitation of Giuseppe Maria Coclite: seminar on “Control of advection-diffusion equations on networks and singular limits”. Bari (Italy), 14/01/2022.
19. Technischen Universität Darmstadt. At the invitation of Jan Giesselmann: seminar on “Control of advection-diffusion equations on networks and singular limits”. Darmstadt (Germany), 16/11/2021.
20. Università degli Studi di Pavia. At the invitation of Stefano Lisini and Antonio Segatti: seminar on “Control of advection-diffusion equations on networks and singular limits”. Pavia (Italy), 11/05/2021.
21. Politecnico di Bari. At the invitation of Giuseppe Maria Coclite: seminar on “Differentiability in measure of the flow associated to a nearly incompressible BV vector field”. Bari (Italy), 26/12/2020.
22. Friedrich-Alexander-Universität Erlangen-Nürnberg. At the invitation of Enrique Zuazua: seminar on “Interface evolution and mixing phenomena in liquids”. Erlangen (Germany), 20/11/2019.

23. Universidad de Deusto, DeustoTech. At the invitation of Umberto Biccari: seminar on “Differentiability properties of the flow associated with rough vector fields”. Bilbao (Spain), 13/09/2019.
24. BCAM. At the invitation of Daniel Eceizabarrena: seminar on “Well-posedness and approximation schemes for nonlocal boundary-value problems”. Bilbao (Spain), 10/09/2019.
25. ISTA. At the invitation of Julian Fischer: seminar on “Waiting time phenomenon for the thin-film equation: sharp criteria in terms of the mass of the initial data”. Klosterneuburg (Austria), 06/09/2018.

## 8 Scientific events attended (selected list)

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

1. *European Congress of Mathematics*, Sevilla (Spain), 15/07/2024–19/07/2024.
2. *Multiscale and Nonlocal Problems in PDEs*, Università degli Studi di Palermo, Palermo (Italy), 20/06/2024–21/06/2024.
3. *New developments and challenges in Stochastic Partial Differential Equations (Workshop I)*, Bernoulli Center (EPFL), Lausanne (Switzerland), 17/06/2024–21/06/2024.
4. *One-day Workshop on Applied Mathematics 2024*, Politecnico di Bari, Bari (Italy), 30/05/2024.
5. *Second RISM Congress on PDEs and Continuum Mechanics*, RISM (Riemann International School of Mathematics), Varese (Italy), 10/04/2024–12/04/2024.
6. *XMaths Workshop 2023*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 20/12/2023–21/12/2023.
7. *Bernoulli Workshop: Enjoying Probability and Fluids in Lausanne*, Bernoulli Center (EPFL), Lausanne (Switzerland), 18/09/2023–22/09/2023.
8. *Summer school: Deterministic and random features of fluids*, EPFL, Lausanne (Switzerland), 03/07/2023–07/07/2023.
9. *RISM Summer School: Exotic solutions and well-posedness in PDEs and ODEs*, RISM (Riemann International School of Mathematics), Varese (Italy), 10/07/2023–12/07/2023.
10. *Workshop Modelling, analysis and numerical methods of complex dynamics*, CIRM (Centre International de Rencontres Mathématiques), Marseille (France), 21/06/2023–23/06/2023.
11. *Workshop on Mathematical modeling, Analysis and Approximation of Vehicular and Pedestrian Dynamics*, Université de Tours, Tours (France), 05/06/2023–08/06/2023.
12. *Erice 2023: Nonlinear Evolution PDEs and Fluid-dynamics*, Centro di Cultura Scientifica Ettore Majorana, Erice (Italy), 25/05/2023–31/05/2023.
13. *VI Congreso de Jovenes Investigadores de la RSME 2023*, Universidad de León, León (Spain), 06/02/2023–10/02/2023.
14. *International Workshop on Multiphase Flows: Analysis, Modelling and Numerics*, Waseda University, Tokyo (Japan), 05/12/2022–09/12/2022.

15. *CA18232 Heating up networks – Analysis meets applications workshop*, Fraunhofer Institute for Industrial Mathematics, Kaiserslautern (Germany), 04/10/2022–07/10/2022.
16. Summer School *Horizons in non-linear PDEs*, Universität Ulm, Ulm (Germany), 26/09/2022–30/09/2022.
17. Summer School *Analysis and Applied Mathematics*, Universität Münster, Münster (Germany), 12/09/2022–16/09/2022.
18. *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.
19. School–Workshop *Analysis, Control & Inverse Problems for Diffusive Systems with Application to Natural and Social Sciences*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 18/07/2022–22/07/2022.
20. *12th Meeting on Nonlinear evolution PDEs, fluid dynamics and transport equations*, Università degli Studi dell'Aquila, L'Aquila (Italy), 13/07/2022–15/07/2022.
21. *SIAM Conference on Analysis of Partial Differential Equations (PD22)*, Online, 14/03/2022–18/03/2022.
22. *XMaths Workshop 2021*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 21/12/2021–22/12/2021.
23. *Workshop on Non-Linear Analysis and Control Theory in honor of Prof. Enrique Zuazua*, Universidad de Santiago de Chile, Online, 03/11/2021–05/11/2021.
24. *Recent Developments in Mathematical Analysis (ReDiMA 2021)*, Università degli Studi di Bari Aldo Moro, Bari (Italy) and online, 23/09/2021–24/09/2021.
25. *Riemann Prize Week*, RISM (Riemann International School of Mathematics), Varese (Italy) and online, 20/09/2021–24/09/2021.
26. INdAM Workshop *Present Research Trends in Conservation Laws*, Rome (Italy), 08/09/2021–10/09/2021.
27. *PDEs and continuum mechanics*, RISM (Riemann International School of Mathematics), Varese (Italy), 21/07/2021–24/07/2021.
28. *IMS Lecture Series on Regularity Theory for Quasilinear Equations*, ShanghaiTech, Online, 01/05/2020–03/05/2020.
29. Winter School *Mathematics for Engineering Applications*, Politecnico di Bari, Bari (Italy), 27/01/2020–31/01/2020.
30. *EDP e dintorni: V meeting around PDE*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 19/12/2019.
31. Winter school on *Gradient Flows and Variational Methods in PDEs*, Universität Ulm, Ulm (Germany), 25/11/2019–29/11/2019.
32. *IntComSin Workshop on Numerical Analysis and Scientific Computing – on the occasion of Prof. Eberhard Bänsch's 60th birthday*, Friedrich-Alexander-Universität Erlangen-Nürnberg, Erlangen (Germany), 22/11/2019–23/11/2019.
33. Workshop *Calculus of Variations and Applications in Trani*, Trani (Italy), 28/10/2019–31/10/2019.
34. *Advances and Challenges in Nonlinear Analysis... and Beyond! On the occasion of Vieri Benci's 70<sup>th</sup> birthday*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 24/09/2019–27/09/2019.



35. *Geometric measure theory and applications: from geometric analysis to free boundary problems*, CIME (Centro Internazionale Matematico Estivo), Cetraro (Italy), 02/09/2019–06/09/2019.
36. *VIII Partial Differential Equations, Optimal Design and Numerics 2019*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 18/08/2019–24/08/2019.
37. *GMT and PDEs in Basel. A young researchers meeting*, University of Basel, Basel (Switzerland), 08/07/2019–10/07/2019.
38. *Applied mathematical problems in geophysics* (CIME-EMS Summer School in Applied Mathematics), CIME (Centro Internazionale Matematico Estivo), Cetraro (Italy), 01/07/2019–05/07/2019.
39. *III One Day Workshop on Applied Mathematics*, Università degli Studi di Bari Aldo Moro and Politecnico di Bari, Bari (Italy), 06/06/2019.
40. *Giornata INdAM 2019*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 03/06/2019.
41. *Bilbao Workshop on Theoretical Fluid Dynamics*, BCAM, Bilbao (Spain), 27/02/2019.
42. *Winter school on FLUId DYnamics, DIspersive equations and QUAntum fluids*, Bressanone (Italy), 17/12/2018–21/12/2018.
43. *MAR: Metric Analysis & Regularity*, Università degli Studi di Catania, Catania (Italy), 24/09/2018–28/09/2018.
44. *New trends in the variational modeling of failure phenomena*, Erwin Schrödinger International Institute for Mathematics and Physics, Vienna (Austria), 20/08/2018–24/08/2018.
45. *The Fourth Annual Workshop on Mathematics in Medicine: Mathematical Models in Cancer*, Universität Wien, Vienna (Austria), 20/07/2018–21/07/2018.
46. *Junior Quantum Days 2018*, SISSA and Università degli Studi di Trieste, Trieste (Italy), 11/05/2018.
47. *Junior Math Days 2018*, SISSA, Trieste (Italy), 06/05/2018–10/05/2018.
48. *XMaths Workshop 2017*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 20/12/2017–21/12/2017.
49. *One Day Workshop on Applied Mathematics*, Università degli Studi di Bari Aldo Moro and Politecnico di Bari, Bari (Italy), 08/06/2017.
50. *PDE in Bari*. Celebrating the 60<sup>th</sup> Birthday of Enrico Jannelli, Università degli Studi di Bari Aldo Moro, Bari (Italy), 01/02/2018–02/02/2018.
51. *EDP e dintorni: III meeting around PDE*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 18/12/2017.
52. *INdAM Intensive Period Contemporary Research in Elliptic PDEs and Related Topics: Conference*, Università degli Studi di Bari Aldo Moro, Bari (Italy), 30/05/2017–31/05/2017.
53. *Seminars on Analysis and Geometry*, Politecnico di Bari, Bari (Italy), 22/02/2017.
54. *Novos Talentos em Matemática* National Meeting, Instituto Superior Técnico de Lisboa, Lisbon (Portugal), 09/07/2016.
55. *Novos Talentos em Matemática Summer School: Partial Differential Equations*, Instituto Superior Técnico de Lisboa, Lisbon (Portugal), 04/07/2016–08/07/2016.

56. 3<sup>rd</sup> Annual Summer School in Mathematics: *The Legacy of Paul Erdős*, Institute of Mathematics of Eötvös Loránd University, Budapest (Hungary), 08/06/2015–15/06/2015.
57. 5<sup>th</sup> Annual *Modern Mathematics: International Summer School for Students*, Jacobs University Bremen, Bremen (Germany), 04/07/2015–14/07/2015.
58. 4<sup>th</sup> Annual *Modern Mathematics: International Summer School for Students*, École Normale Supérieure de Lyon, Lyon (France), 20/08/2014–29/08/2014.
59. *LXXXI Corso di Orientamento Universitario*, Scuola Normale Superiore di Pisa, San Miniato (Italy), 20/07/2013–25/07/2013.

## 8.2 Advanced courses

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

## 9 Organization of scientific events

### 9.1 Conferences, congresses, and workshops

1. *Machine Learning and PDEs* Workshop, Friedrich-Alexander-Universität Erlange-Nürnberg, Erlangen (Germany), 28/04/2025–30/04/2025 (upcoming).  
Responsibility: Organization of the workshop and fundraising (co-organizers: Giuseppe Maria Coclite, Lorenzo Liverani, Enrique Zuazua).
2. *One-day Workshop on Applied Mathematics 2024*, Politecnico di Bari, Bari (Italy), 30/05/2024.  
Responsibility: Organization of the workshop and fundraising from INdAM (GNAMPA & GNCS), PoliBA, and LUM (co-organizers: Alessandro Coclite, Giuseppe Fanizza, Giorgio Martaló, Gianluca Orlando, and Sabrina Francesca Pellegrino).

### 9.2 Mini-symposia and thematic sessions

1. Thematic session *Linear, nonlinear, and nonlocal transport phenomena* in the framework of the *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.  
Responsibility: Organization of the session (co-organizer: Timothée Crin-Barat).
2. Thematic session *Variational methods* in the framework of the *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.  
Responsibility: Organization of the session (co-organizers: María del Mar González Nogueras and Marco Fontelos).
3. Thematic session *Stabilization, regularity, and discretizations in wave phenomena and fluids* in the framework of the *IX Partial Differential Equations, Optimal Design and Numerics 2022*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 21/08/2022–02/09/2022.  
Responsibility: Organization of the session (co-organizer: Konstantin Zerulla).
4. Thematic session *Perspectives in free boundary problems* in the framework of the *VIII Partial Differential Equations, Optimal Design and Numerics 2019*, Centro de Ciencias De Benasque Pedro Pascual, Benasque (Spain), 18/08/2019–30/08/2019.  
Responsibility: Organization of the session (co-organizers: Borjan Geshkovski and Debayan Maity).

### 9.3 Seminar series

1. Seminar series of the Chair for Dynamics, Control, Machine Learning and Numerics at the Friedrich-Alexander-Universität Erlangen-Nürnberg.  
Responsibility: Organization of the seminar series for the academic year 2022/2023.

## 10 Teaching activities

**Summary:** *Main lecturer* for 1 Bachelor's course and 7 Master's courses; *co-lecturer* for 2 Master's courses; *teaching assistant/tutor* for 2 Bachelor's courses and 2 Master's courses.

## 10.1 Bachelor's courses

1. **Academic year 2024/2025 (winter semester).** EPFL.  
Course: "Introduction to Partial Differential Equations" (Bachelor's Degree in Mathematics).  
Role: Lecturer.  
Personal teaching load: 2 weekly hours of lectures (total: 28 hours).
2. **Academic year 2023/2024 (summer semester).** EPFL.  
Course: "Analysis IV" (Bachelor's Degree in Mathematics).  
Role: Teaching assistant (lecturer: Maria Colombo).  
Personal teaching load: 2 weekly hours of exercise classes (total: 28 hours).
3. **Academic year 2018/2019.** Università degli Studi di Bari Aldo Moro.  
Course: "Analisi Matematica 1" (Bachelor's Degree in Mathematics).  
Role: Tutoring (lecturers: Silvia Romanelli and Sandra Lucente).  
Personal teaching load: 250 hours of exercise classes and individual tutoring.

## 10.2 Master's courses

1. **Academic year 2022/2023 (summer semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.  
Course: "Scalar Conservation Laws" (Master's Degree in Computational and Applied Mathematics).  
Role: Lecturer (course supervisor: Enrique Zuazua).  
Personal teaching load: 2 weekly hours of lectures + 0.5 weekly hour of exercise classes (total: 35 hours).
2. **Academic year 2022/2023 (summer semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.  
Course: "Wave Phenomena" (Master's Degree in Computational and Applied Mathematics).  
Role: Lecturer (course supervisor: Enrique Zuazua).  
Personal teaching load: 2 weekly hours of lectures + 0.5 weekly hour of exercise classes (total: 35 hours).
3. **Academic year 2022/2023 (winter semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.  
Course: "Transport Phenomena" (Master's Degree in Computational and Applied Mathematics).  
Role: Lecturer (course supervisor: Enrique Zuazua).  
Personal teaching load: 2 weekly hours of lectures + 0.5 weekly hour of exercise classes (total: 35 hours).
4. **Academic year 2022/2023 (winter semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.  
Course: "Mathematical Modeling in the Life Sciences" (Master's Degree in Computational and Applied Mathematics).  
Role: Lecturer (course supervisor: Enrique Zuazua).  
Personal teaching load: 2 weekly hours of lectures + 0.5 weekly hour of exercise classes (total: 35 hours).
5. **Academic year 2021/2022 (summer semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.

Course: “Scalar Conservation Laws” (Master’s Degree in Computational and Applied Mathematics).

Role: Lecturer (course supervisor: Enrique Zuazua).

Personal teaching load: 2 weekly hours of lectures + 0.5 weekly hour of exercise classes (total: 35 hours).

6. **Academic year 2021/2022 (summer semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.

Course: “Modeling and Analysis in Continuum Mechanics 2” (Master’s Degree in Computational and Applied Mathematics).

Role: Lecturer (course supervisor: Enrique Zuazua).

Personal teaching load: 2 weekly hours of lectures + 0.5 weekly hour of exercise classes (total: 35 hours).

7. **Academic year 2021/2022 (winter semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.

Course: “Transport Phenomena” (Master’s Degree in Computational and Applied Mathematics).

Role: Lecturer (course supervisor: Enrique Zuazua).

Personal teaching load: 2 weekly hours of lectures + 0.5 weekly hour of exercise classes (total: 35 hours).

8. **Academic year 2021/2022 (winter semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.

Course: “Modeling and Analysis in Continuum Mechanics 1” (Master’s Degree in Computational and Applied Mathematics).

Role: Lecturer, together with Enrique Zuazua.

Personal teaching load: 2 weekly hours of lectures + 1 weekly hour of exercise classes (total: 45 hours).

9. **Academic year 2020/2021 (summer semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.

Course: “Modeling and Analysis in Continuum Mechanics 2” (Master’s Degree in Computational and Applied Mathematics).

Role: Teaching assistant (lecturer: Enrique Zuazua).

Personal teaching load: 1 weekly hour of exercise classes (total: 15 hours).

10. **Academic year 2020/2021 (winter semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.

Course: “Modeling and Analysis in Continuum Mechanics 1” (Master’s Degree in Computational and Applied Mathematics).

Role: Lecturer, together with Enrique Zuazua.

Personal teaching load: 2 weekly hours of lectures + 1 weekly hour of exercise classes (total: 45 hours).

11. **Academic year 2019/2020 (summer semester).** Friedrich-Alexander-Universität Erlangen-Nürnberg.

Course: “Partial Differential Equation, Control, and Numerics” (Master’s Degree in Computational and Applied Mathematics)

Role: Teaching assistant (lecturer: Enrique Zuazua).

Personal teaching load: 1 weekly hour of exercise classes (total: 15 hours).

## 11 Student supervision

### 11.1 Internship supervision

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 Hady 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”.

### 11.2 Leadership in mathematics competitions

1. **Team leader (EPFL Bernoulli Team), International Mathematics Competition for University Students 2024**, Blagoevgrad (Bulgaria), 05/08/2024–11/08/2024 (upcoming).  
Responsibilities: Problem selection; students’ work evaluation.

## 12 Editorial activity

### 12.1 Referee/reviewer activity

- Multiple referee reports or opinions for the following international scientific journals:
  1. “Journal de Mathématiques Pures et Appliquées” (JMPA);
  2. “Journal of Differential Equations” (JDE);
  3. “Journal of Functional Analysis” (JFA);
  4. “Annales de l’Institut Henri Poincaré C. Analyse non linéaire” (AIHPC);
  5. “SIAM Journal on Control and Optimization” (SICON);
  6. “Nonlinearity”;
  7. “Numerische Mathematik”;
  8. “Nonlinear Analysis”;
  9. “Nonlinear Analysis: Real World Applications” (NARWA);
  10. “Mathematical Control and Related Fields” (MCRF);
  11. “Zeitschrift für Angewandte Mathematik und Physik” (ZAMP);
  12. “Networks & Heterogeneous Media” (NHM);
  13. “Journal of Mathematical Analysis and Applications” (JMAA);
  14. “Communications on Pure and Applied Analysis” (CPAA);
  15. “Pure and Applied Analysis” (PAA);
  16. “Springer INdAM Series”;
  17. “Journal of Dynamical and Control Systems” (JCDS);
  18. “Journal of Nonlinear Mathematical Physics”;
  19. “Advances in Continuous and Discrete Models” (AIDE);
  20. “IEEE Open Journal of Control Systems” (IEEE OJ-CSYS);
  21. “Mathematics and Mechanics of Complex Systems” (MEMOCS);
  22. “Complex Analysis and Operator Theory” (CAOT);
  23. “Physica Scripta”;
  24. “Communications on Applied Mathematics and Computation” (CAMC).
- Reviewer (no. 160889) for MATHSCINET (since 11/2021).

## 13 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* (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.