

GIULIA BASTI

CURRICULUM VITAE

PERSONAL DATA

DATE OF BIRTH: 17/12/1990
PLACE OF BIRTH: Rome, Italy
CITIZENSHIP: Italian
CIVIL STATUS: married, 1 child born on 26/11/2021
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LANGUAGES: **Italian:** mother tongue
English: fluent
German: basic



RESEARCH INTERESTS

Schrödinger operator with zero-range interactions Selfadjointness, boundedness from below and approximation of quantum Hamiltonians with point interactions.

Efimov effect Emergence of the Efimov effect. Relation with the Thomas effect.

Many-body quantum systems Equilibrium properties of dilute Bose Gases. Study of the ground state energy and low energy spectrum.

ACADEMIC POSITIONS

12/2020 – Present	PostDoc – <i>Gran Sasso Science Institute, School of advanced studies (IT)</i> Mathematics Area (on maternity leave from 26/11/2021 to 26/04/2022)
12/2017–11/2020	PostDoc – <i>Universität Zürich (CH)</i> Part of the research group of Prof. Benjamin Schlein

EDUCATION

18/01/2018	Ph.D. in Mathematics – <i>Sapienza, University of Rome (IT)</i> Thesis: Low Energy Behavior in Few-Particle Quantum Systems: Efimov Effect and Zero-Range Interactions Supervisor: Prof. Alessandro Teta
29/10/2014	Master degree in Mathematics – <i>Sapienza, University of Rome (IT)</i> Thesis: Hamiltoniane quantistiche con interazioni a zero-range per il problema dei tre corpi (transl.: Quantum Hamiltonian with point interactions for the three-body problem) Supervisor: Prof. Alessandro Teta Final mark: 110/110 cum laude
25/09/2012	Bachelor degree in Mathematics – <i>Sapienza, University of Rome (IT)</i> Thesis: Il modello di Cucker e Smale per la dinamica degli stormi (transl.: Cucker-Smale model for flocks dynamics) Supervisor: Prof. Paolo Buttà Final mark: 110/110 cum laude

PUBLICATIONS AND PREPRINTS

1. **G. B., S. Cenatiempo, A. Olgiati, G. Pasqualetti, B. Schlein**, “A second order upper bound for the ground state energy of a hard-sphere gas in the Gross-Pitaevskii regime”, Preprint: [arXiv:2203.11917](#).
2. **G. B.**, “A second order upper bound on the ground state energy of a Bose gas beyond the Gross-Pitaevskii regime”, *J. Math. Phys.*, **63**, 071902 (2022). [10.1063/5.0089790](#).
3. **G. B., S. Cenatiempo, A. Olgiati, G. Pasqualetti, B. Schlein**, “Ground state energy of a Bose gas in the Gross-Pitaevskii regime”, *J. Math. Phys.*, **63**, 041101 (2022). [10.1063/5.0087116](#).
4. **G. B., C. Cacciapuoti, D. Finco, A. Teta**, “Three-body Hamiltonian with regularized zero-range interactions in dimension three”, *Ann. Henri Poincaré* (accepted for publication). [arXiv:2107.07188](#).
5. **G. B., S. Centiempo, B. Schlein**, “A new second order upper bound for the ground state energy of dilute Bose gases”, *Forum of Mathematics, Sigma* **9**, e74 (2021). [10.1017/fms.2021.66](#).
6. **G. B.**, “Universal low-energy behavior in a quantum Lorentz gas with Gross-Pitaevskii potentials”, *Contribution to the Oberwolfach Rep. “Lorentz Gas Dynamics: particle systems and scaling limits”*. Rep.No. 10/2019, 629–631. [10.14760/OWR-2019-10](#).

7. **G. B., R. Figari, A. Teta**, “Regularized quadratic forms for a three boson system with zero-range interactions”, *Rend. Mat. Appl.* **7**(39) (2018), 205–216.
8. **G. B., S. Cenatiempo, A. Teta**, “Universal Low-Energy Behavior in a Quantum Lorentz Gas with Gross-Pitaevskii Potentials”, *Math. Phys. Anal. Geom.* **21**(11)(2018). [10.1007/s11040-018-9268-2](https://doi.org/10.1007/s11040-018-9268-2)
9. **G. B., C. Cacciapuoti, D. Finco, A. Teta**, “The three-body problem in dimension one: From short-range to contact interactions” *J. Math. Phys.* **59**, 072904 (2018). [10.1063/1.5030170](https://doi.org/10.1063/1.5030170)
10. **G. B., A. Teta**, “Efimov Effect for a Three-Particle System with Two Identical Fermions”, *Ann. Henri Poincaré* **18** (2017), 3975–4003. [10.1007/s00023-017-0608-8](https://doi.org/10.1007/s00023-017-0608-8)
11. **G. B., A. Teta**, “On the quantum mechanical three-body problem with zero-range interactions” *Functional Analysis and Operator Theory for Quantum Physics*, J. Dittrich, H. Kovarik, A. Laptev eds., EMS Publishing House, 2017, 71–93. [10.4171/175](https://doi.org/10.4171/175)

COMMUNICATIONS

INVITED SEMINARS

- 11/2021 **Seminar Mathematische Physik** (online)
KIT - Karlsruher Institut für Technologie, Karlsruhe (DE)
- 06/2021 **Munich-Aarhus-Santiago Seminar in Mathematical Physics**, (online)
LMU Munich (DE), Aarhus University (DK), Pontificia Universidad Católica de Chile, Santiago (CL)
- 02/2021 **Oberseminar “Analysis and Mathematical Physics”**, (online)
LMU Munich (DE)
- 01/2021 **SMAQ seminars**, (online)
L’Aquila (IT)
- 01/2018 **Mathematical Physics Seminar**,
Sapienza University of Rome (IT)
- 06/2017 **PDE and Mathematical Physics seminar**,
University of Zurich (CH)
- 05/2017 **Analysis Seminar**,
Politecnico di Torino (IT)

TALKS IN CONFERENCES (INVITED)

- 07/2022 **AMS-SMF-EMS Joint International Meeting**,
Université de Grenoble-Alpes, Grenoble (FR)
- 03/2019 **Mini-Workshop: Lorentz Gas Dynamics: particle systems and scaling limits**,
Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach (DE)
- 07/2018 **Mathematical Challenges of Zero-Range Physics**,
Istituto Nazionale di Alta Matematica Francesco Saveri (INDAM), Roma (IT)
- 11/2016 **Mathematical Challenges of Zero-Range Physics**,
Scuola Internazionale Superiore di Studi Avanzati (SISSA), Trieste (IT)
- 07/2015 **Trails in Quantum Mechanics and Surroundings (TQMS) 2015**,
Università dell'Insubria, Como (IT)

TALKS IN CONFERENCES (CONTRIBUTED)

- 06/2022 **Mathematical Challenges in Quantum Mechanics (MCMQ2022)**,
Como (IT)
- 08/2021 **International Conference in Mathematical Physics (ICMP)**,
International Conference Centre, Geneva (CH)
- 06/2021 **Emergent theories for wave turbulence and particle dynamics**,
SwissMAP Research Station, Les Diablerets (CH)
- 02/2021 **Mathematics of Condensed Matter and Beyond (MCMB)**,
American University of Beirut (LB) (online)
- 02/2018 **Mathematical Challenges in Quantum Mechanics (MCQM2018)**,
Sapienza, University of Rome (IT)
- 05/2017 **Assemblea Scientifica GNFM 2017**,
Montecatini Terme (IT)

POSTERS

- 04/2017 **Spectral Days 2017**,
University of Stuttgart (DE)
- 11/2016 **Mathematical Foundations of Physics**,
Mathematical Institute LMU, Munich (DE)

FELLOWSHIPS

- 2020 **Selected for a PostDoc fellowship** *GSSI, L'Aquila (IT)*
- 2014 **Selected for a PhD scholarship** *Sapienza, University of Rome (IT)*
- 2014 **Borsa di collaborazione** *Sapienza, University of Rome (IT)*,
150 working hrs. at the library of the Mathematics Department, selection based on merit.
- 2010 **Percorso d'eccellenza** *Department of Math. Sapienza, University of Rome (IT)*,
Additional courses and full compensation of the tuition fees for the academic year 2011/2012,
30 positions available.

COORDINATION AND PARTICIPATION IN RESEARCH PROJECTS

- 2021/2022 **Member** *Emergent Features in Quantum Bosonic Theories and Semiclassical Analysis*,
funded by Progetto Giovani GNFM 2021. (P.I.: Dr. Marco Falconi)
- 2018/2019 **Member** *Dinamica e scattering per sistemi a molti corpi*,
funded by Progetto Giovani GNFM 2018. (P.I.: Dr. Claudio Cacciapuoti)
- 2017/2020 **Member** *Dynamical and energetic properties of Bose-Einstein condensates*
funded by Swiss National Science Foundation (SNF) grants. (P.I.: Prof. Benjamin Schlein)
- 2016/2017 **Member** *Limiti di scala e sistemi quantistici a molte particelle con interazioni di contatto*
funded by Progetto Giovani GNFM 2016. (P.I.: Dr. Claudio Cacciapuoti)
- 2016 **P. I.** *Effetto Efimov ed Effetto Thomas in Sistemi Quantistici a Molti Corpi*,
funded by Progetto di Avvio alla Ricerca 2016 Sapienza, University of Rome (1 Participant)

VISITING PERIODS

- 08/2021 *University of Zurich (CH)* (1 week),
by invitation of Prof. Benjamin Schlein
- 06/2019 *Università dell'Insubria, Como (IT)* (1 week),
by invitation of Prof. Claudio Cacciapuoti
- 06/2018 *University of Zurich (CH)* (1 week),
by invitation of Prof. Benjamin Schlein
- 04/2018 *Gran Sasso Science Institute, L'Aquila (IT)* (1 week),
by invitation of Dr. Serena Cenatiempo
- 03/2017 *Politecnico di Torino (IT)* (1 week),
by invitation of Prof. Riccardo Adami
- 01/2016 *Scuola Internazionale Superiore degli Studi Avanzati, Trieste (IT)* (1 week),
by invitation of Dr. Alessandro Michelangeli

EVENTS BY INVITATION

- 09/2019 **Many-Body Quantum Systems** (1 week),
Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach (DE)
- 03/2019 **Many-body theory, effective equations & PDEs** (1 week),
Institut Mittag-Leffler, Djursholm (SE)
- 03/2019 **Lorentz Gas Dynamics: particle systems and scaling limits** (1 week),
Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach (DE)

TEACHING

- 2020-Present **PhD courses held at GSSI**
· *An Invitation to Quantum Statistical Mechanics*
- 2017-2020 **Teaching Assistant at the Institute for Mathematics, University of Zurich**
· Analysis III (2nd year class)
· Analysis II (1st year class)
· Analysis I (1st year class)
· Linear Algebra II (1st year class)
- 2016-2018 **Teaching Assistant at University of Rome Unitelma Sapienza**
· Online Remedial Course in Mathematics “OFA” (1st year)
- 2015-2017 **Teaching Assistant at Sapienza, University of Rome**
· Mathematical Analysis (1st year, Faculty of Engineering)
· Remedial Course in Mathematics “OFA” (1st year, Faculty of Science)

ORGANIZATION OF SCHOOLS AND WORKSHOPS

PART OF THE ORGANIZING COMMITTEE

Statistical and Quantum Mechanics: reconsidering their foundations in the light of new cutting edge experiments and theoretical models,
Gran Sasso Science Institute (GSSI), L'Aquila (IT), September 20-24, 2021

PART OF THE SCIENTIFIC AND ORGANIZING COMMITTEE

From Equilibrium Phenomena Towards Open Quantum Systems, (online)
Gran Sasso Science Institute (GSSI), L'Aquila (IT), March 22-26, 2021

REVIEWING ACTIVITY

Referee for *Math. Phys. Anal. Geom.*; *Springer Proceeding Series*; *Lett. Math. Phys.*

OUTREACH ACTIVITIES

Indovina chi viene stasera? Aperitivo con le Matematiche, (online)

Event addressed to students from the last years of high school on the occasion of the initiative

“May12, Celebrating Women in Mathematics”, June 3, 2021

MEMBERSHIP OF MATHEMATICAL ASSOCIATIONS

- *International Association of Mathematical Physics (IAMP)*
- *Gruppo Nazionale Fisica Matematica (GNFM)*

Last update: 05/09/2022