



Alessia Nota

Curriculum Vitae

Personal details

First name Alessia
Family name Nota
Date of birth 19/04/1987
Place of birth Rome (IT)
Nationality Italian

Current position

01/01/2017 **Post Doctoral Researcher**
–31/12/2020 Research Institution: Institute for Applied Mathematics, University of Bonn.
Postdoctoral mentor: Prof. Dr. Juan J. L. Velázquez.
SFB Postdoc Position. Member of Collaborative Research Centre 1060 (SFB 1060): The Mathematics of Emergent Effects, project B5, funded by the German Research Foundation (DFG).

01/01/2019 *Member of the Research Area C1 (Mathematical modeling of matter and materials) of the Cluster of Excellence: Hausdorff Center for Mathematics, Bonn.*

Previous positions

01/12/2015 **Post Doctoral Researcher**
–31/12/2016 Research Institution: Institute for Applied Mathematics, University of Bonn.
Postdoctoral mentor: Prof. Dr. Juan J. L. Velázquez.
SFB Postdoc Position. Member of Collaborative Research Centre 1060 (SFB 1060): The Mathematics of Emergent Effects, project B5, funded by the German Research Foundation (DFG).

01/01/2015 **Post Doctoral Researcher**
–30/11/2015 Research Institution: Department of Mathematics and Statistics, University of Helsinki.
Postdoctoral mentor: Dr. Jani M. Lukkarinen.
Research group: Mathematical Physics.

5/2011–7/2011 **Research fellowship for post-graduate students**
International School for Advanced Studies (SISSA), Trieste.
Supervisors: Prof. Gianfausto Dell’Antonio & Prof. Ludwik Dabrowski.
Research area: Mathematical Physics (Quantum mechanics).
(Position with scholarship)

Formation

01/11/2011 **Ph.D. in Mathematics**
–22/12/2014 *Dipartimento di Matematica Guido Castelnuovo*, Sapienza, Università di Roma.
(Position with scholarship)

Ph.D. Thesis

Title *From microscopic dynamics to macroscopic equations: scaling limits for the Lorentz gas*
Supervisor Prof. Mario Pulvirenti
Research area Mathematical Physics (Kinetic theory)
Committee Prof. Laurent Desvillettes, Prof. Benedetto Scoppola
Prof. Guido Cavallaro
Defence date December 22, 2014

Education

12/2008–3/2011 **Master in Mathematics**
Dipartimento di Matematica Guido Castelnuovo, Sapienza, Università di Roma.

Master Thesis

Title *Teoremi adiabatici e applicazioni all’Effetto Hall quantistico*
(*Adiabatic theorems and applications to the quantum Hall Effect*)
Supervisor Prof. Gianluca Panati
Final grade 110/110 cum laude
Research area Mathematical Physics (Quantum mechanics)

10/2005–10/2008 **Bachelor in Mathematics**
Dipartimento di Matematica Guido Castelnuovo, Sapienza, Università di Roma.

Bachelor Thesis

Title *Onde viaggianti per equazioni di reazione-diffusione*
(*Traveling waves for reaction-diffusion equations*)

Supervisor Prof. Corrado Mascia

Final grade 110/110 cum laude

Research area Mathematical Analysis (Partial differential equations)

2000–2005 **High School Diploma**, *Liceo Scientifico Statale “Augusto Righi”*, Roma.

Final grade 100/100 cum laude.

Research

Kinetic theory, statistical mechanics, analysis of PDE, quantum mechanics.

- Rigorous derivation of effective evolution equations (Boltzmann equation, Landau equation, Vlasov equation, Non Markovian Boltzmann equations) from deterministic or stochastic particle systems;
- Derivation of macroscopic equation and phenomenological laws (Fourier’s and Fick’s law) from particle systems under diffusive limit;
- Well-posedness theory, qualitative analysis and asymptotic behaviour of the solutions of these macroscopic evolution equations;
- Dynamics of particle systems with long range interactions;
- Analysis of correlations for strongly correlated random variables and central limit theorems;
- Rigorous derivation of coagulation equations (Smoluchowski equation) from mechanical particle systems, analysis of coalescence processes and related continuum percolation theory, well-posedness theory, qualitative analysis and asymptotic behaviour of the solutions of these equations.

Research Papers

1. **A Diffusion Limit for a Test Particle in a Random Distribution of Scatterers**
Giada Basile, Alessia Nota and Mario Pulvirenti
Journal of Statistical Physics, Vol. 155, Issue 6, pp. 1087-1111 (2014)
2. **Diffusive limit for the random Lorentz gas**
Alessia Nota
From Particle Systems to Partial Differential Equations II, Springer Proceedings in Mathematics & Statistics, Vol. 129, pp. 273-292 (2015)
3. **Derivation of the Fick’s Law for the Lorentz Model in a low density regime**
Giada Basile, Alessia Nota, Federica Pezzotti and Mario Pulvirenti
Communication in Mathematical Physics, Vol. 336, Issue 3, pp. 1607-1636 (2015)

4. **Derivation of the linear Landau equation and linear Boltzmann equation from the Lorentz model with magnetic field**
Matteo Marcozzi, Alessia Nota
Journal of Statistical Physics, Vol.162, Issue 6, pp. 1539-1565 (2016)
5. **Harmonic chain with velocity flips: thermalization and kinetic theory**
Jani Lukkarinen, Matteo Marcozzi and Alessia Nota
Journal of Statistical Physics, Vol. 165, Issue 5, pp. 809-844 (2016)
6. **On the growth of a particle coalescing in a Poisson distribution of obstacles**
Alessia Nota, Juan J. L. Velázquez
Communication in Mathematical Physics, Vol. 354, Issue 3, pp. 957-1013 (2017)
7. **On the theory of Lorentz gases with long range interactions**
Alessia Nota, Sergio Simonella, Juan J. L. Velázquez
Reviews in Mathematical Physics, Vol. 30 No. 3, 1850007 (2018)
8. **Summability of connected correlation functions of coupled lattice fields**
Jani Lukkarinen, Matteo Marcozzi and Alessia Nota
Journal of Statistical Physics, Vol. 171, Issue 2, pp. 189-206 (2018)
9. **Self-similar profiles for homoenergetic solutions of the Boltzmann equation: particle velocity distribution and entropy**
Richard D. James, Alessia Nota, Juan J.L. Velázquez
Archive for Rational Mechanics and Analysis, Vol. 231, Issue 2, pp. 787-843 (2019)
10. **Self-similar asymptotic behavior for the solutions of a linear coagulation equation**
Barbara Niethammer, Alessia Nota, Sebastian Throm, Juan J.L. Velázquez
Journal of Differential Equations, Vol. 266, Issue 1, pp. 653-715 (2019)
11. **Long time asymptotics for homoenergetic solutions of the Boltzmann equation. Collision-dominated case**
Richard D. James, Alessia Nota, Juan J.L. Velázquez
Journal of Nonlinear Science, (2019) Vol. 29, Issue 5, pp. 1943–1973 (2019)
12. **Kinetic description of a Rayleigh Gas with annihilation**
Bertrand Lods, Alessia Nota, Raphael Winter
Journal of Statistical Physics, Vol. 176, Issue 6, 1434–1462 (2019)
13. **A Kac model for annihilation of particles**
Bertrand Lods, Alessia Nota, Federica Pezzotti
Journal of Nonlinear Science, (2020). <https://doi.org/10.1007/s00332-020-09614-z>
14. **Long time asymptotics for homoenergetic solutions of the Boltzmann equation. Hyperbolic-dominated case**
Richard D. James, Alessia Nota, Juan J.L. Velázquez
Accepted for publication in *Nonlinearity* (2020) arXiv:1906.08816

Conference Proceedings

1. **Kinetic description for the Lorentz Gas with long range interactions**
Alessia Nota
In *Oberwolfach Reports, Classical and Quantum Mechanical Models of Many-Particle Systems*, Report No. 56/2017, DOI: 10.4171/OWR/2017/56
2. **On the derivation of linear kinetic equations from a Lorentz Gas with long-range interactions**
Alessia Nota
In *Oberwolfach Reports, Large Scale Stochastic Dynamics*, Report No. 42/2019, DOI: 10.4171/OWR/2019/42

Preprints

1. **Stationary non-equilibrium solutions for coagulation systems**
Marina Ferreira, Jani Lukkarinen, Alessia Nota, Juan J.L. Velázquez
arXiv:1909.10608 (2019)
2. **Derivation of the generalized linear Boltzmann equation for magnetotransport**
Alessia Nota, Chiara Saffirio, Sergio Simonella
arXiv:1910.12983 (2019)
3. **Self-similar asymptotics for a modified Maxwell-Boltzmann equation in systems subject to deformations**
Alexander Bobylev, Alessia Nota, Juan J. L. Velázquez
arXiv:1912.12498 (2020)
4. **On the theory of kinetic equations for interacting particle systems with long range interactions**
Alessia Nota, Juan J. L. Velázquez, Raphael Winter
arXiv:2003.11605 (2020)

In preparation

1. **Rigorous derivation of the linear Landau equation for Lorentz gases with Coulombian potentials**
Alessia Nota, Juan J.L. Velázquez
2. **Stationary non-equilibrium solutions for multicomponent coagulation systems with injection**
Marina Ferreira, Jani Lukkarinen, Alessia Nota, Juan J.L. Velázquez

Scientific Communications

Invited talks

Upcoming

- 06-08/10/2020 *Panorama of Mathematics 2020*, Hausdorff Center for Mathematics, Bonn.
20-24/07/2020 *Workshop*, Gran Sasso Science Institute (GSSI), L'Aquila.
6-10/07/2020 *The Boltzmann equation: in the trail of Torsten Carleman*, Institut Mittag-Leffler, Sweden.

- 15-19/06/2020 *Recent Results in Kinetic Theory and its Applications*, Biennial SIMAI Congress, University of Parma.
- 18-22/05/2020 *SIAM Conference on Mathematical Aspects of Materials Science*, BCAM, Bilbao.

Past

- 5/05/2020 (Virtual) *Oberseminar Analysis - Probability*, Max Planck Institute, Leipzig.
- 24/04/2020 (Virtual) *Analysis Seminar*, Institute for Applied Mathematics, University of Bonn.
- 11-14/12/2019 *SIAM Conference on Analysis of Partial Differential Equations (PD19)*, La Quinta, California.
- 25-27/11/2019 *La genesi dei modelli: teoria, simulazioni e dati*, Accademia dei Lincei, Roma.
- 4-7/11/2019 *LIA COPDESC and Lions Magenes Days*, Laboratoire Jacques-Louis Lions, Sorbonne Université and Université Paris-Diderot.
- 14-18/10/2019 *Advances in Kinetic Theory*, Chongqing University, Chongqing, China.
- 16/09/2019 *Large Scale Stochastic Dynamics*, Mathematisches Forschungsinstitut Oberwolfach (MFO), Oberwolfach.
- 10/09/2019 *Analysis Seminar*, Department of Applied Mathematics, TU Delft.
- 04/09/2019 *XXI Congresso U.M.I. (Unione Matematica Italiana)*, Pavia.
- 02/09/2019 *Seminar*, Department of Mathematics, University of Pavia.
- 11/07/2019 *Kinetic Theory Trimester Seminar*, Hausdorff Research Institute for Mathematics, University of Bonn.
- 05/07/2019 *Seminar*, Mathematisches Institut, University of Münster.
- 19/06/2019 *Analytical and computational problems for mixtures and plasma dynamics*, Hausdorff Research Institute for Mathematics, University of Bonn.
- 17/06/2019 *Women in PDEs @ Vienna*, University of Wien.
- 05/06/2019 *Symposium in Mathematical Physics*, University of Heidelberg.
- 09/05/2019 *"Journeys of Women in Mathematics" in honor to Maryam Mirzakhani*, University of L'Aquila.
- 06/12/2018 *"Konstanz Women in Mathematics-Festtage"*, University of Konstanz.
- 20/11/2018 *Nonlinear Phenomena in Stockholm: Kinetic Meets Dispersive*, KTH Royal Institute of Technology. Stockholm.
- 25/10/2018 *Recent Trends in Kinetic Modelling and Related Fields*, Politecnico di Torino.
- 20/09/2018 *Joint meeting of the Italian Mathematical Union, the Italian Society of Industrial and Applied Mathematics and the Polish Mathematical Society.*
- 03/05/2018 *German Chapter Conference 2018 - EWM*, University of Heidelberg.
- 26/04/2018 *PDE and Mathematical Physics Seminar*, Institute of Mathematics, University of Zürich.
- 21/03/2018 *Mathematical Physics Seminar, Department of Mathematics, Politecnico di Torino.*
- 13/12/2017 *Mathematical Physics Seminar*, Department of Mathematics "F. Brioschi", Politecnico di Milano.

- 3-9/12/2017 *Classical and Quantum Mechanical Models of Many-Particle Systems*, Mathematisches Forschungsinstitut Oberwolfach (MFO). Oberwolfach.
- 11/08/2017 *Seminar*, Institute for Mathematics and its Applications, University of Minnesota, Minneapolis.
- 2/12/2016 *Mathematical Physics & PDEs Seminar*, LAGA, Université Paris 13. Paris.
- 28/11/2016 *Geometry and Analysis Seminar*, Mathematical Institute, University of Oxford. Oxford.
- 18/11/2016 *Analysis seminar*, Institute for Applied Mathematics, University of Bonn.
- 20/10/2016 *Kinetic Theory and its neighbours*, GSSI, Gran Sasso Science Institute, L'Aquila.
- 7/10/2016 *The Mathematics of Disorder - Young Women in Probability and Analysis 2016*, University of Bonn.
- 15/04/2016 *Analysis seminar*, Institute for Applied Mathematics, University of Bonn.
- 19/01/2016 *CRC seminar*, Institute for Applied Mathematics, University of Bonn.
- 11/01/2016 *Geometric Analysis and Partial Differential Equations seminar*, University of Cambridge.
- 12/10/2015 *Tullio Levi-Civita lecture*, Department of Mathematics, Sapienza, University of Rome.
- 14/7/2015 *Nonlinear evolutions: Kinetic equations and defect dynamics*, Hausdorff School, University of Bonn.
- 3/06/2015 *Periodic and Ergodic Spectral Problems Seminar*, Isaac Newton Institute for Mathematical Sciences, Cambridge.
- 17/3/2015 *Seminar series: "Mathematical Models for Kinetic Theory"*, Department of Mathematics, Sapienza, University of Rome.
- 19/2/2015 *Bernoullis Tafelrunde*, Mathematisches Institut, Universität Basel.
- 9/12/2014 *CRC Seminar*, Institute for Applied Mathematics, University of Bonn.
- 4/12/2014 *Mathematical Physics Seminar*, Dipartimento di Matematica, Sapienza, Università di Roma.
- 8/10/2014 *Mathematical Physics Seminar*, University of Helsinki.
- 21-26/07/2014 *Mathematical Physics, Analysis and Stochastics*, Summer School at Universität Heidelberg.
- 26-28/05/2014 *Young Women in Probability 2014*, University of Bonn.
- 21/01/2014 *HFAKT Seminar*, University of Bristol.
- 16/12/2013 *Kinetic Theory Methods Toward Applications*, Department of Mathematics, Politecnico di Torino.
- 12/12/2013 *Particle systems and PDE's - II*, Braga, Portugal.
- 17-28/06/2013 *Kinetic Description of Multiscale Phenomena*, Heraklion, Crete.
- 23-29/09/2012 *XXXVII Summer School on Mathematical Physics*, Ravello.

Summer Schools (INdAM)

- 23-29/09/2012 **XXXVII Summer School on Mathematical Physics**, Ravello, IT.

27/06- **Scuola Matematica Interuniversitaria (SMI) Perugia, IT.**
28/08/2009 *Completed courses: Functional Analysis, Partial Differential Equations in Mathematical Physics.*

Visiting Professorships

10/2019–11/2019 **Selected for a Visiting Professorship Position, University of Torino.**

Short Visits to International Research Institutions

10–11/2019 **University of Torino.**
10/2018 **University of Zurich.**
10/2018 **Politecnico di Torino.**
06/2018 **University of Oxford.**
04/2018 **University of Zurich.**
03/2018 **University of Torino.**
03/2018 **Université Paris Diderot.**
12/2017 **Politecnico di Milano.**
12/2017 **Mathematisches Forschungsinstitut Oberwolfach.**
08/2017 **Institute for Mathematics and its Applications, University of Minnesota.**
06/2017 **Institute Henri Poincaré,**
Thematic trimester: Stochastic Dynamics Out of Equilibrium.
04/2017 **Technische Universität München.**
03/2017 **University of Torino.**
12/2016 **LAGA, Université Paris 13.**
11/2016 **University of Oxford.**
03/2016 **University of Torino.**
01/2016 **DPMMS, University of Cambridge.**
01/2016 **University of Torino.**
10/2015 **Sapienza, University of Rome.**
06/2015 **Isaac Newton Institute for Mathematical Sciences.**
03/2015 **Institute Henri Poincaré (IHP).**
02/2015 **University of Basel.**
12/2014 **Hausdorff Center for Mathematics.**
09/2014 **Kumpula Campus, University of Helsinki.**
05/2014 **University of Bristol.**
01/2014 **University of Bristol.**

Teaching Experience

- Summer Term 2019/2020 **The rigorous mathematical approach to Kinetic Theory of Gases and Plasmas**, *Lecture course*, Institute for Applied Mathematics, University of Bonn.
- October/November 2019 **Measure Theory and Stochastic Processes**, *Lecture course “Mathematics for Finance”*, University of Torino (Visiting Professor).
- April 2019 **Two lectures on direct and inverse scattering in Quantum Mechanics**, Institute for Applied Mathematics, University of Bonn.
- Winter Term 2017/2018 **On the mathematical theory of Landau Damping**, *Graduate Seminar on Analysis (S4B1)*, Institute for Applied Mathematics, University of Bonn.
- Winter Term 2016/2017 **Spectral Theory in Quantum Mechanics**, *Graduate Seminar on Analysis (S4B1)*, Institute for Applied Mathematics, University of Bonn.
- Summer Term 2015/2016 **Scaling limits for particle systems**, *Graduate Seminar on Analysis (S4B1)*, Institute for Applied Mathematics, University of Bonn.
- 10/2014–12/2014 **OFA course in Mathematics (Analysis)**, *Sapienza*, Università di Roma.
- 10/2013–2/2014 **Teaching assistant for the Linear Algebra course at the Mathematics Department Guido Castelnuovo**, *Sapienza*, Università di Roma.

Since December 2015 I served as assistant for the exams of the Functional Analysis group, University of Bonn.

Thesis Supervisions

- **Second advisor for Master Thesis**
Candidate: Cintia Pacchiano, Institute for Applied Mathematics, University of Bonn
First Advisor: Prof. Dr. Juan J. L. Vélazquez
Thesis: The Hilbert Expansions in Kinetic Theory
Defence date: 16/03/2018
- **Second advisor for Master Thesis**
Candidate: Sarah Schreyer, Institute for Applied Mathematics, University of Bonn
First Advisor: Prof. Dr. Juan J. L. Vélazquez
Thesis: Drift-Diffusion Equations for Dye-Sensitized Solar Cells
Defence date: 02/11/2018
- **Second advisor for Master Thesis**
Candidate: Inigo Urriaga Erneta, Institute for Applied Mathematics, University of Bonn
First Advisor: Prof. Dr. Juan J. L. Vélazquez
Thesis: On the well-posedness for coagulation equations
Defence date: 02/07/2019
- **Advisor for Master Thesis.**
Candidate: Simone Sommarivilla, Institute for Applied Mathematics, University of Bonn
Thesis: On the asymptotic behaviour of the solutions of a linear Smoluchowski equation
Defence date: 21/06/2019

Projects

- From 2019 investigator of the **Research Area C1** (Mathematical modeling of matter and materials) of the **Cluster of Excellence: Hausdorff Center for Mathematics**, Bonn, Germany.
<https://www.hcm.uni-bonn.de/research-areas/#c13643>

- From 2016 member of the **Collaborative Research Centre 1060** (SFB 1060): The Mathematics of Emergent Effects, project B5. Funded by the German Research Foundation (DFG).

Organization of Scientific Events

11-14/12/2019 **Kinetic Modeling: Analysis and Applications (*Three Minisymposia*)**
SIAM Conference on Analysis of Partial Differential Equations (PD19), La Quinta, California.

Organizers: Irene M. Gamba, Alessia Nota, Maja Taskovic

10 -14/06/2019 **Derivation of effective equations: classical and quantum (*Workshop*)**, Hausdorff Research Institute for Mathematics, Bonn.

Organizers: Roberta Bianchini, Serena Cenatiempo, Lingbing He, Alessia Nota, Chiara Saffirio, Sergio Simonella, Raphael Winter

<https://www.him.uni-bonn.de/programs/future-programs/future-junior-trimester-programs/kinetic-theory-2019/workshop-effective-equations-frontiers-in-classical-and-quantum-systems-june-24-28-2019/>

20 - 24/05/2019 **Trails in kinetic theory: foundational aspects and numerical methods (*Summer school*)**, Hausdorff Research Institute for Mathematics, Bonn.

Organizers: Giacomo Albi, Sara Merino-Aceituno, Alessia Nota, Mattia Zanella

<https://www.him.uni-bonn.de/programs/future-programs/future-junior-trimester-programs/kinetic-theory-2019/summer-school/>

03 - 09/03/2019 **Lorentz Gas Dynamics: particle systems and scaling limits (*Mini-Workshop*)**, *Mathematisches Forschungsinstitut Oberwolfach*.

Organizers: Alessia Nota, Chiara Saffirio, Juan J.L. Velázquez

https://www.mfo.de/occasion/1910b/www_view

24 - 26/09/2018 **Young Women in Mathematical Physics (*Workshop*)**, *Hausdorff Center for Mathematics*, Bonn.

Organizers: Alessia Nota, Elena Pulvirenti

<https://www.iam.uni-bonn.de/ywmp>

Scientific Responsibilities

Institutional Responsibilities:

- 2020 : Member of the committee for selecting candidates to positions as Hausdorff Exzellenzchairs.
- May-August 2019: *Group leader* at Hausdorff Junior Trimester Program “Kinetic Theory”.
- February 2019: Selected as *Early career Researchers’ representative* in the *Excellence Strategy Evaluation* for the University of Bonn (Excellence Strategy of the German Federal and State Governments to Promote Science and Research at German Universities)

Referee Activity:

Referee for AMS, Annals of Applied Probability, Archive for Rational Mechanics and Analysis, Kinetic and Related Models, Computers and Mathematics with Applications, Comptes-rendus de Physique de l'Académie des Sciences (CRAS).

Professional Affiliations

Member of “International Association of Mathematical Physics” (IAMP).

Member of “Unione Matematica Italiana” (UMI).

Scientific Transfer (Broad Audience)

Talks

- 12/01/2019 **Fisica: Isaac Newton**, “*Giornate di studio: la Fisica*”, via Roma Libera, 23, Roma.
- 06/11/2015 **Materia energia pensiero: tra fisica e teoria della nascita**, *Aula Magna*, Sapienza, Università di Roma.
- 21/11/2015 **Luce, Gravità e Musica**, *Conferenza in occasione del centenario della Relatività Generale*, Biblioteca Vaccheria Nardi, Roma.

Contributed papers for broad audience

1. **Energia**

Alessia Nota

Sec. **Materia, energia, pensiero: fisica e teoria della nascita**
in *Atti Convegni all'Aula Magna Università di Roma*.

L'Asino d'oro edizioni (2016). ISBN: 978-88-6443-372-1

Languages

Italian	<i>Native</i>	English	<i>Fluent</i>
French	<i>Fluent</i>	German	<i>Basic</i>

References

Prof. Dr. Juan J. L. Velázquez, University of Bonn, velazquez@iam.uni-bonn.de ;

Prof. Richard D. James, University of Minnesota, james@umn.edu ;

Prof. Mario Pulvirenti, Sapienza, Università di Roma, pulvirenti@mat.uniroma1.it ,
pulviren@mat.uniroma1.it ;

Prof. Jani M. Lukkarinen, University of Helsinki, jani.lukkarinen@helsinki.fi