

MARCO CARFAGNINI

Appointments

- Fall 2022 - Present **Stefan E. Warschawski Visiting Assistant Professor**, University of California San Diego, La Jolla, CA. Working with Todd Kemp and Tianyi Zheng.
- September 2023 **IHES Invited Researcher**, Institut des Hautes Études Scientifiques, Bures-sur-Yvette, Paris, France. Visiting Yilin Wang.
- Spring 2022 **Salgo-Noren Program Associate Fellow**, Simons Laufer Mathematical Sciences Institute (former MSRI), Berkeley, CA.

Education

- 2017 - 2022 **University of Connecticut**, Storrs, CT. Ph.D. in Mathematics. Advisor: Maria Gordina. Thesis: *Analysis and Geometry of Path Spaces*.
- 2015 - 2017 **Università degli Studi di Roma Tor-Vergata**, Rome, Italy. M.S. in Pure Mathematics, 110/110 cum laude. Advisor: Domenico Marinucci. Thesis: *Random Fields on Riemannian Manifolds: the Gaussian Kinematic Formula*.
- 2016 - 2017 **Georg-August-Universität Göttingen**, Göttingen, Germany. Visiting student, Erasmus+.
- 2012 - 2015 **Università degli Studi di Roma Tor-Vergata**, Rome, Italy. B.S in Mathematics, 110/110 cum laude. Advisor: Ciro Ciliberto. Thesis: *Geometry of Lines and Ruled Surfaces*.

Publications and Preprints

1. *Poisson approximation for the Euler-Poincaré characteristic of high level excursion sets of random spherical harmonics*, with Maurizia Rossi, in preparation.
2. *Chung's law of the iterated logarithm and small balls for Gaussian random fields on the sphere*, with Anna Paola Todino, in preparation.
3. *Onsager-Machlup functional for SLE κ loop measures*, with Yilin Wang, submitted.
4. *On the Onsager-Machlup functional for the Brownian motion on the Heisenberg group*, with Maria Gordina, submitted.
5. *Spectral gap bounds on H-type groups*, with Maria Gordina, accepted for publication in **Contemp. Math**.

6. *On the support of a hypoelliptic diffusion on the Heisenberg Group*, **ALEA-Lat. Am. J. Probab. Math. Stat.** 20, (2023) 697-711.
7. *Dirichlet sub-Laplacians on homogeneous Carnot groups: spectral properties, asymptotic, and heat content*, with Maria Gordina, **Int. Math. Res. Not.** (2023).
8. *Small deviations and Chung's law of iterated logarithm for a hypoelliptic Brownian Motion on the Heisenberg Group*, with Maria Gordina, **Trans. Amer. Math. Soc.** Ser. B 9 (2022), 322-342.
9. *A functional law of the iterated logarithm for weakly hypoelliptic diffusions at time zero*, with Juraj Földes and David P. Herzog, **Stoch. Process. Appl.** 149 (2022) 188-223.
10. *An application of the Gaussian correlation inequality to the small deviations for a Kolmogorov diffusion*, **Electron. Commun. Probab.** 27 (2022) n. 1, 1-7.

Invited Talks

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| June 2024 | <i>Fourth Italian Meeting on Probability and Mathematical Statistics</i> , special session on Random Fields, Rome, Italy |
| June 2024 | <i>QuMA: Queer and Trans in Mathematical Analysis</i> , Basque Center for Applied Mathematics, Bilbao, Spain. |
| Spring 2024 | <i>Probability Seminar</i> , CUNY Graduate Center, New York City, NY. |
| December 2023 | <i>Probability Seminar</i> , University College Dublin, Dublin, Ireland. |
| December 2023 | <i>Hunter College Math Colloquium</i> , Hunter College, CUNY, New York City, NY. |
| September 2023 | <i>RoMaDS, Rome Center on Mathematics for Modeling and Data Science</i> , University of Rome Tor Vergata, Rome, Italy. |
| September 2023 | <i>Probability and Analysis Seminar</i> , Institut des Hautes Études Scientifiques (IHES), Bures-sur-Yvette, Paris, France. |
| September 2023 | <i>Probability Seminar</i> , University of Milano-Bicocca, Milan, Italy. |
| August 2023 | <i>Frontiers in Stochastic Analysis</i> , University of Illinois at Chicago, Chicago, IL. |
| February 2023 | <i>Probability Seminar</i> , Lehigh University, Bethlehem, PA. |
| June 2022 | <i>Third Italian Meeting on Probability and Mathematical Statistics</i> , special session on Stochastic Processes and Geometry, Bologna, Italy. |
| April 2022 | <i>Joint Mathematics Meeting (JMM)</i> , special session on “Analysis on metric Spaces (a Mathematics Research Communities Session)” (online). |
| March 2022 | <i>AMS Special Session</i> , Purdue University (online). |
| March 2022 | <i>Harmonic Analysis and PDE Seminar</i> , University of Virginia (online). |
| July 2019 | <i>Probability Seminar</i> , University of Pisa, Pisa, Italy. |

Talks (Seminars and Conferences)

- November 2022 *Spectral gap bounds on H-type groups.* 21st Northeast Probability Seminar, Columbia University, New York City, NY.
- March 2022 *Brownian motion on Lie groups and quasi-invariance.* AGRS junior seminar, MSRI, Berkeley, CA.
- November 2021 *Small deviations and Chung's laws of iterated logarithm for hypoelliptic diffusions.* 20th Northeast Probability Seminar, Online.
- October 2021 *Random Facts.* series of talks in stochastic analysis and its connection to potential theory, functional analysis, differential geometry, and Lie-algebras. Analysis Learning Seminar, University of Connecticut, Storrs, CT.
- March 2021 *Small deviations and Chung's law of iterated logarithm for a hypoelliptic Brownian Motion on the Heisenberg Group.* Banff Workshop on Stochastics and Geometry, Online.
- September 2020 *A Probabilistic Lagrangian.* Math-Physics Learning Seminar, University of Connecticut, Online.
- February 2020 *Volume of Balls: from Euclidean spaces to Infinite Dimensions.* Math-Club, University of Connecticut, Storrs, CT.
- September 2019 *Brownian Motion and Itô's Integral.* Analysis Learning Seminar, University of Connecticut, Storrs, CT.
- June 2019 *On the Onsager-Machlup Functional for the Brownian Motion on the Heisenberg Group.* Second Italian Meeting on Probability and Mathematical Statistics, Vietri sul Mare, Italy.
- October 2018 *Random Fields on Riemannian Manifold: The Gaussian Kinematic Formula.* Sigma Seminar, University of Connecticut, Storrs, CT.

Posters

- June 2023 International Conference on Malliavin Calculus and Related Topics, University of Luxembourg, Luxembourg.
- March 2022 Seminar on Stochastic Processes, Lehigh University, Bethlehem, PA.
- November 2021 Symposium on Stochastic Hybrid Systems and Applications, University of Connecticut, Storrs, CT.
- September 2021 10th International Conference on Stochastic Analysis and its Applications, Online.

Honors and Recognition

- July 2023-July 2025 *AMS-Simons Travel Grant.*

Summer 2022	Kovalevskaya Grant. Grant to participate in the International Congress of Mathematics in July 2022.
Summer 2022	Early-career AMS-NSF-Simons-ICM Travel Grant. Grant to participate in the International Congress of Mathematics in July 2022.
Spring 2022	Salgo-Noren Foundation Fellow. Fellowship awarded to only one MSRI Program Associate each year.
April 2022	Michael Neumann Dissertation Award. This award recognizes the best research thesis in the department of mathematics at the University of Connecticut.
April 2022	Lavender Graduation Award: Outstanding UConn Graduate Student Leader. This award honors a graduate student leader at the University of Connecticut who demonstrates effective leadership that benefits UConn's diverse communities of gender identities, gender expressions and sexualities.
November 2021	AMS Travel Grant. Travel grant to support the attendance at the Joint Mathematics Meetings.
April 2021	Connie Strange Community Award. "This award is to acknowledge your impressive community work within the Mathematics graduate student population and the department".
March 2021	Top 5% student at the University of Tor-Vergata, AY 2015/2016.
March 2020	Top 5% student at the University of Tor-Vergata, AY 2014/2015.
Fall 2019	Excellence in Teaching. Letter from University of Connecticut's Provost.
May 2019	Predocctoral Fellowship. University of Connecticut.
Spring 2019	Excellence in Teaching. Letter from University of Connecticut's Provost.
February 2019	Best M.S. thesis in Mathematics. University of Rome Tor Vergata.
Fall 2018	Excellence in Teaching. Letter from University of Connecticut's Provost.
October 2015	Outstanding student in STEM. Award given to the best 10 students in STEM, A.Y. 2014/2015, University of Rome Tor Vergata.
October 2014	Outstanding student in STEM. Award given to the best 10 students in STEM, A.Y. 2013/2014, University of Rome Tor Vergata.
October 2013	Outstanding student in STEM, Award given to the best 10 students in STEM, A.Y. 2012/2013, University of Rome Tor Vergata.

Visiting Positions

May 2022	University of Cincinnati, Cincinnati, OH.
May-August 2019	University of Rome Tor Vergata, Rome, Italy.
July 2019	University of Pisa, Pisa, Italy.

Conferences and Summer Schools

August 2023 *Frontiers in Stochastic Analysis*, University of Illinois at Chicago, Chicago, IL.

June 2023 *International Conference on Malliavin Calculus and Related Topics*, University of Luxembourg, Luxembourg.

May 2023 *Southern California Probability Symposium*, UC San Diego, La Jolla, CA.

November 2022 *21st Northeast Probability Seminar*, Columbia University, New York City, NY.

October 2022 *Random Media and Large Deviations, conference in honor of Ofer Zeitouni's 60th birthday*, Courant Institute, New York University, New York City, NY.

March 2022 *SSP, Seminar on Stochastic Processes*, Lehigh University, Bethlehem, PA.

November 2021 *20th Northeast Probability Seminar*, Online.

September 2021 *10th International Conference on Stochastic Analysis and its Applications*, Online.

September 2021 *Bath Mathematical Symposium on PDE and Randomness*, Online.

August 2021 *ICERM workshop: Spectra LGBTQ+ in Mathematics conference*, Online.

July 2021 *Mathematical Science Research Institute (MSRI), Summer School: Random Conformal Geometry*, Online.

June 2021 *Stochastic Differential Geometry and Mathematical Physics*, Henri Lebesgue Center, Online.

March 2021 *Banff International Research Station for Mathematical Innovation and Discovery (BIRS): Workshop on Stochastics and Geometry*, Online.

February 2021 *Stochastic quantization of the Euclidean ϕ^4_3 Quantum Field Theory*, Course by Massimiliano Gubinelli, Online.

August 2020 *Bernoulli-IMS One World Symposium 2020*, Online.

July 2020 *Bath Mathematical Symposium on PDE and Randomness*, Online.

October 2019 *Workshop for Northeast Women in PDE and Applied Math*, University of Connecticut, Storrs, CT.

September 2019 *2019 Northeast Analysis Network Conference*, University of Connecticut, Storrs, CT.

June 2019 *Second Italian Meeting on Probability and Mathematical Statistics*, Vietri sul Mare, Italy.

March 2019 *GAHA Geometric and Harmonic Analysis: a Conference for Graduate Students*, University of Connecticut, Storrs, CT.

November 2018 *Workshop on Functional Inequalities in Probability*, University of Connecticut, Storrs, CT.

October 2018 *40th Midwest Probability Colloquium*, Northwestern University, Evanston, IL.

July 2018 *48th Probability Summer School*, Saint-Flour, France.

May 2018 *SSP, Seminar on Stochastic Processes*, Brown University, Providence, RI.

April 2018 *WiMS Women in Mathematics and Statistics*, Harvard University, Cambridge, MA.

October 2017 *Charles River Lectures in Probability*, Harvard University, Cambridge, MA.

September 2017 *WiMin Women in Mathematics in New England*, Smith College, MA.

April 2017 Hausdorff School *Large Random Graphs: Geometry and Applications*. Hausdorff Center for Mathematics, Bonn, Germany.

Teaching Experience

Primary Instructor:

Introduction to Stochastic Processes II	Spring 2024 (UCSD).
Introduction to Stochastic Processes I	Winter 2024 (UCSD).
Introduction to Probability	Spring 2023, Fall 2023 (UCSD).
Linear Algebra	Fall 2022 (UCSD), Fall 2020 (UConn).
Elementary Differential Equations	Spring 2020 (UConn).
Calculus for Business	Spring 2021 (UConn).

Teaching assistant:

Calculus 1	Fall 2017, Spring 2018 (UConn).
Calculus 2	Fall 2018, Fall 2021 (UConn).
Multivariable Calculus	Spring 2019, Fall 2019 (UConn).
Geometry and Linear Algebra for Engineering Majors	Spring 2017 (University of Rome-TVG).
Probability Theory for Math Majors	Spring 2016 (University of Rome-TVG).
Mathematics for Biology Majors	Fall 2015 (University of Rome-TVG).

Grader:

Transition to Advance Math.	Fall 2017 (UConn).
Introduction to Complex Analysis	Fall 2017 (UConn).

Community and Extra-Curricular Competences

F 2023 - Present	<u>Organizer</u> of the Probability Seminar at UC San Diego.
F 2020 - Present	<u>Reviewer</u> for <i>Electronic Communications in Probability</i> , <i>Forum Mathematicum</i> , <i>International Mathematics Research Notices</i> , and <i>Journal of Functional Analysis</i> .
S 2019 - S 2021	<u>Web Master</u> for <i>Association for Women in Mathematics (AWM) Chapter</i> at UConn.
F 2017 - S 2021	<u>Mentor</u> for first-year grad students in the Math Department at UConn.
F 2020 - S 2021	<u>Co-organizer</u> of the Mathematical-Physics Learning Seminar, together with Masha Gordina.
F 2020 - S 2021	<u>Mentor</u> for the Directed Reading Program at UConn.
F 2019 - S 2020	<u>Co-organizer</u> of the Analysis Learning Seminar at UConn, together with Matthew Badger.