Daniele Bracale

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GitHub Profile
LinkedIn Profile
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Personal Site

Education

- **Ph.D. in Statistics** *September, 2021 - Today*
  University of Michigan, Ann Arbor, USA
- **Master of Science in Stochastics and Data Science** *October, 2020*
  Institute of Mathematics - University of Turin (UNITO), Turin, Italy
  – **Thesis**: "Large-width functional asymptotics for deep Gaussian Neural Networks" (Supervisor: Prof. Stefano Favaro)
- **Bachelor in Mathematics** *July, 2016*
  Institute of Mathematics - University of Turin (UNITO), Turin, Italy
  – **Thesis**: "Implicit function theorem on Banach spaces" (Supervisor: Prof. Vivina Laura Barutello)

Research & Technical Skills

Research Interests: Dynamic Pricing; Performative Predictions; Optimal Transport; Neural Networks; more broadly: theoretical statistics and probability with particular attention to stochastic processes; other areas of interest are functional analysis, differential equations, variational methods, and dynamic control theory.

Computing Skills: R, Python, Docker.

Text Editor: LaTeX.

Publications

- **Infinite-channel deep stable convolutional neural networks**. Bracale, D., Favaro, S., Fortini, S., Peluchetti, S. – *35th Conference on Neural Information Processing Systems* 2021.
- **Large-width functional asymptotics for deep Gaussian neural networks**. Bracale, D., Favaro, S., Fortini, S., Peluchetti, S. – *ICLR* 2021.
- **Learning the Distribution Map in Reverse Causal Performative Prediction**. Bracale, D., Maity, S., Banerjee, M., Sun, Y. – *Submitted for review* 2024.
- **Microfoundation inference in strategic classification**. Bracale, D., Maity, S., Somerstep, S., Maia Polo, F., Banerjee, M., Sun, Y. – *Submitted for review* 2024.
- **Dynamic Pricing in the Linear Valuation Model using Shape Constraints**. Bracale, D., Banerjee, M., Sun, Y., Stoll, K., Turki, S.

Preprints

- **Optimal Nonlinear Online Learning under Sequential Price Competition via s-Concavity**. Bracale, D., Banerjee, M., Shi, C., Sun, Y.

Seminars Talks

- **Dynamic Pricing via Shape Constraints**. *Stochastic and Data Science*, University of Turin (Italy), May 19th, 2025.

Conferences - Invited Sessions

- **Learning the Distribution Map in Reverse Causal Performative Prediction**. Bracale, D., Maity, S., Banerjee, M., Sun, Y. – *CFE-CMStatistics 2024*, London (UK), oral presentation.

Conferences - Contributions

- **Constructing Prediction Intervals with Ensemble Machine Learning Models.** Bracale, D., Tarkhan, A., Jamshidian, F. – *MedTech Data Science Showcase 2024*, Toronto (Canada), poster presentation.
- **Learning the Distribution Shift in Performative Prediction.** Bracale, D., Maity, S., Banerjee, M., Sun, Y. – *JSM 2024*, Portland (Oregon), oral presentation.
- **Learning the Distribution Shift in Performative Prediction.** Bracale, D., Maity, S., Banerjee, M., Sun, Y. – *MSSISS 2024*, Ann Arbor (Michigan), oral presentation.
- **Semi-parametric Non-Smooth Optimal Dynamic Pricing.** Bracale, D., Banerjee, M., Sun, Y. – *2023 Joint Statistical Meetings*, Toronto (Canada), oral presentation.
- **Semi-parametric Non-Smooth Optimal Dynamic Pricing.** Bracale, D., Banerjee, M., Sun, Y. – *XVI Latin American Congress of Probability and Mathematical Statistics (CLAPEM), 2023*, Sao Paulo (Brazil), contributed poster.
- **Semi-parametric Non-Smooth Optimal Dynamic Pricing.** Bracale, D., Banerjee, M., Sun, Y. – *IWAP2023*, Thessaloniki (Greece), oral presentation.
- **Semi-parametric Non-Smooth Optimal Dynamic Pricing.** Bracale, D., Banerjee, M., Sun, Y. – *MSSISS 2023*, Ann Arbor (Michigan), oral presentation.

Work Experiences

- **Johnson&Johnson, Biosense Webster** *May 13th 2024 - August 23th 2024*
  Clinical Data Scientist Summer Intern, Irvine, CA, USA
  – **Description:** As a J&J MedTech BPDM intern, I collaborated with statisticians and data engineers to explore statistical and data science applications in clinical and nonclinical medical device settings. My primary project involved developing a statistical model to generate Prediction Intervals (PI) for recommending clinical devices to medical professionals. This model was rigorously developed with theoretical proofs ensuring statistical guarantees, such as convergence and probability coverage. These theoretical results were further validated through simulation studies. We proposed a methodology and applied it to a real dataset provided by J&J. Our work has been accepted at the MedTech Data Science Showcase 2024 conference as a poster presentation.

- **University of Michigan** *July 2023 - Today*
  Tutor for Master Students in Statistics, Ann Arbor, USA
  – **Description:** Tutor for Master students in Statistics. I tutored the following courses:
    * Linear Algebra PhD preparation course, with application to statistics and probability.
    * Probability and Distribution Theory: STATS 510.
    * Introduction to Statistical Theory: STATS 511.
    * Statistical Learning: STATS 601.

- **University of Michigan / University of Turin** *August, 2021 - May, 2023 / September 2017 - June 2021*
  Graduate Student Instructor, Ann Arbor, USA / Turin, Italy
  – **Description:** I taught the following courses:
    * **Introduction to Theoretical Statistics (STATS 426)**: University of Michigan, Department of Statistics, Undergraduate Senior Lever, Winter 2024; duties: grading, Office Hours.
    * **Data Mining and Statistical Learning (STATS 415)**: University of Michigan, Department of Statistics, Undergraduate Senior Lever, Winter 2023; duties: lab in R, grading, Office Hours.
    * **Applied Regression Analysis (STATS 413)**: University of Michigan, Department of Statistics, Undergraduate Senior Lever, Fall 2022; duties: lab in R, grading, Office Hours.
    * **Introduction to Statistics and Data Analysis (STATS 250)**: University of Michigan, Department of Statistics, Undergraduate Sophmore Lever, Winter 2022; duties: lab in R, grading, Office Hours.
    * **Introduction to Theoretical Statistics (STATS 426)**: University of Michigan, Department of Statistics, Undergraduate Senior Lever, Fall 2021; duties: grading, Office Hours.
    * **Statistics for Stochastic processes**: University of Turin (UNITO), Department of Mathematics, Graduate, Winter 2021; duties: tutoring, grading, Office Hours.
    * **Mathematical Analysis 1 and 2**: University of Turin (UNITO), Department of Mathematics, Undergraduate, Fall 2017 and Winter 2018; duties: tutoring, grading, Office Hours.
    * **Mathematical Analysis 1 and 2**: University of Turin (UNITO), Department of Data Science, Undergraduate, Winter 2018; duties: tutoring, grading, Office Hours.

Service

- **GRIN** (Graduate Rackham International) group at U-M: President (2023/2024 AA); manager of the GRIN site (2022/2023 AA); organizer of DEI events for international graduate students (2021/2022 AA). Site: www.grinrackham.com. On this site, I have created the page *"Student Guide"* (see www.grinrackham.com/student-guide) and I have contributed to developing the content.
- **LGBTQ+ working group** (2022/2023 AA): stipulate recommendations to LSA for supporting members of U-M community.
- **HIV/STI Counselor** at *UNIFIED HIV and Beyond* (April 2023 - January 2025): Certified by the State of Michigan to conduct HIV/STI testing, phlebotomy, and blood draw (certificated for Phlebotomy/Venipuncture Training sponsored by the Michigan Department of Human Health and Human), and sexual health counseling on behalf of Vivent Health and in partnership with the Spectrum Center at the University of Michigan. Provide confidential counsel on matters of sexual health; determine need and connect clients to support services. Conduct and interpret HIV/STI tests; draw blood and prepare biological samples for lab testing.
- **Engaged Learning Graduate Consultant at Ginsberg Center, Ann Arbor, USA** (May 2023 - July 2024). Description: facilitate workshops on topics including foundations of community engagement, anti-racist community engagement, and appreciative interviewing; contribute to the development of new curriculum and materials for Ginsberg Center workshops and training; develop and practice skills including leadership, communication, workshop facilitation, consultation, curriculum development, public speaking, research, and equitable community engagement practice; engage in training and professional development with other consultants in a collaborative community of practice, in order to develop a professional identity as a community engagement consultant and educator; participate in other aspects of Ginsberg Center's work, including data analysis, creating and analyzing surveys, program evaluation, and research.
- **DEI committee at the Department of Statistics** (2023/2024 AA): I am a member of the group, that contributes to improving recruitment and outreach in the department.

Awards

- Harvey G. & Joyce H. Behner Graduate Fellowship Award (Spring/Summer 2024)
- *Rackham Conference Travel Grant (2024)*: grant for presenting the project *Learning the Distribution Shift in Performative Prediction* at the conference JSM, 2024, in Portland (Oregon/USA).
- *Rackham Doctoral Intern Fellowship (2024).* The Rackham Doctoral Intern Fellowship Program allows doctoral students to pursue a fully supported and funded internship during their graduate training (spring/summer).
- *Michigan Difference Student Leadership Award (2023/2024).* Given to the Ginsberg Center group whose programs and efforts educate people on social justice issues on campus and/or abroad and have shown evidence of a significant impact on addressing power, privilege, and discrimination to foster inclusiveness and a socially just society.
- *Outstanding Graduate Student Instructor Award-Team (2023).* The Outstanding Graduate Student Instructor Awards Team recognizes the efforts and accomplishments of GSIs who demonstrate extraordinary dedication and excellence as teachers. The Award goes to the team composed of Daniele Bracale, Prayag Chatha, and Junting Wang, the GSIs of the course STATS-413 taught in the Fall of the academic year 2022-2023.
- *Outstanding Graduate Student Service Award - honorable mention (2023).* Given to a graduate student in recognition of excellent service to the department or the graduate student community.
- *Rackham Conference Travel Grant (2023)*: grant for presenting the project *Semi-parametric Non-Smooth Optimal Dynamic Pricing* at the conference CLAPEM, 2023, in Sao Paulo (Brazil).
- *Rackham Conference Travel Grant (2023)*: grant for presenting the project *Semi-parametric Non-Smooth Optimal Dynamic Pricing* at the conference IWAP, 2023, in Thessaloniki (Greece).

Languages

- Italian (Native language), Portuguese (fluent), English (fluent).

Other Certificates

- *Phlebotomy/Venipuncture Training.* Sponsored by Michigan Department of Human Health and Human. September 11th, 2023.