Università
Bocconi
MILANO

For more information on the program, admission procedures, selection criteria, documents required and financial support, please visit our website at **www.unibocconi.eu/phdstatscompscience** or email Angela Baldassarre, our PhD Administrative Assistant, at **infophd@unibocconi.it**

Bocconi

PhD IN STATISTICS AND COMPUTER SCIENCE

Bocconi. Knowledge that matters.

The 4-year **PhD in Statistics and Computer Science** is a high profile and rigorous doctoral program, within the Department of Decision Sciences, that develops strong **mathematical, statistical, computational and programming backgrounds**. It arises as an expansion of the PhD in Statistics, which has been offered by the Department since 2001 and has stood out as a success story in terms of both placement and scientific achievements of its graduates.

The cross-disciplinary nature of our program is essential for gaining first-class research skills. Indeed, the rise of *Machine Learning* and *Data Science* is providing undisputed evidence that the ideal **expertise** for achieving new exciting advances in these areas lies at the **boundaries of Statistics and Computer Science**. The ability of developing both novel **statistical methodologies** and highly **scalable computational algorithms** has become crucial, due to the increasing availability of large and complex datasets.

The program is tailored to extremely talented and motivated students who wish to stand out either as statisticians having also a deep knowledge of computing, algorithms and theoretical computer science or as computer scientists with a strong training in probabilistic and statistical modeling and applications. This merging of skills is a distinctive feature of modern data scientists working on cutting-edge research topics within academic institutions, research organizations and industry.

SCHOLARSHIPS THAT ARE AMONG THE BEST OFFERED AT A EUROPEAN LEVEL ARE ALSO AVAILABLE.

PROGRAM STRUCTURE

The program will be structured into TWO TRACKS: Statistics and Computer Science.

1st YEAR
Compulsory courses for both tracks, providing a common core methodological background.
At the end of the first year, students have to sit a **general exam**.
Main courses' topics: Measure theory, Advanced probability theory and applications, Stochastic processes, Theoretical computer science and computer programming, Mathematical statistics (frequentist and Bayesian approaches).

During the first year, students have to choose between the two tracks. These introduce students to frontier research topics in the following areas:

- STATISTICS: advanced Bayesian modeling and computations, applied multivariate analysis, statistical computing and machine learning, biostatistics, extreme value theory.
- COMPUTER SCIENCE: graph theory, deep learning and neural networks, optimization, statistical mechanics and disordered systems.

2nd YEAR
Each track will feature 4 compulsory specific courses and 5 elective courses.

3rd-4th YEAR
Devoted to the doctoral thesis

Students will also attend the **Bocconi Summer School in Advanced Statistics and Probability** at Villa del Grumello, on the shores of Lake Como. Past editions of the School have featured the following main instructors: Bernhard Schölkopf (Tübingen); Steffen Lauritzen (Copenhagen), Remco van der Hofstad (Eindhoven) and Shankar Bhamidi (UNC, Chapel Hill)

FACULTY

CARLO BALDASSI
ANNA BATTAUZ
MARCO BONETTI
EMANUELE BORGONOVO
SIMONE CERREIA VIOGLIO
DANIELE DURANTE
CHRISTOPH JOHANN FEINAUER
SANDRA FORTINI
SATOSHI FUKUDA
REBECCA GRAZIANI
ANTONIO LIJOI
CARLO LUCIBELLO
FABIO ANGELO MACCHERONI
EUGENIO MELILLI
PIETRO MULIERE
SIMONE PADOAN
SONIA PETRONE
RAFFAELLA PICCARRETA
IGOR PRUENSTER
LUCA TREVISAN
PIERO VERONESE
GIACOMO ZANELLA
RICCARDO ZECCHINA

VISITING PROFESSORS

Short PhD courses are delivered by visiting professors.
The following are some of the past invited VPs: **Persi Diaconis** (Stanford), **Michael Jordan** (UC Berkeley), **Mike West** (Duke), **David Dunson** (Duke), **Richard Davis** (Columbia), **Sidney Resnick** (Cornell), **Anthony Davison** (EPFL), **Alan Gelfand** (Duke), **Jon Welllner** (U Washington), **Balázs Szegedy** (A. Renyi Institute, Budapest), **Susan Holmes** (Stanford), **Bruno Sansò** (UC Santa Cruz), **Raquel Prado** (UC Santa Cruz), **Nils Hjort** (U Oslo), **Nicholas Polson** (U Chicago)

PLACEMENT*

The PhD program is designed to lay the foundations for successful international academic careers, and to develop research skills and expertise useful for career opportunities in non-academic institutions as well.

Below is a selection of first academic and non-academic positions attained after the PhD. The PhD in Statistics and Computer Science is in its first edition, so placement data refer to its predecessor, the PhD in Statistics.

ACADEMIC INSTITUTIONS

Andrea Arfè (2020) Postdoctoral Fellow, Harvard University, Harvard Program in Therapeutic Sciences
Tommaso Rigon (2020) Postdoctoral Fellow, Duke University, Department of Statistical Sciences
Paolo Leonetti (2019) Postdoctoral Fellow, Graz University of Technology, Institute of Analysis and Number Theory
Stefano Rizzelli (2019) Postdoctoral Fellow, École Polytechnique Fédérale de Lausanne, Laboratory of Statistics
Lorenzo Cappello (2018) Postdoctoral Fellow, Stanford University, Department of Statistics
Marco Battiston (2017) Postdoctoral Researcher, University of Oxford, Department of Statistics
Sara Wade (2013) Harrison Early Career Assistant Professor, University of Warwick, Department of Statistics

NON-ACADEMIC INSTITUTIONS

Silvia Missiroli (2017) Statistician, FAO
Sumeda Nilamani Siriwardena (2017) Statistician, FAO
Silvia Mongelluzzo (2012) Capital Model Manager, Vice President, Barclays

ABOUT MILAN

Recognized as the Italian financial and industrial capital, Milan also has a rich history of art, design, fashion and cuisine. It is a vibrant and bustling city, a great place to live for thousands of students and young professionals who enjoy a wide range of cultural and entertainment opportunities.

www.unibocconi.eu/aboutmilan

The PhD in Statistics at Bocconi provided me with a solid methodological background. The program offered the opportunity to work on multiple areas of Statistics and encouraged me to start developing my own lines of research, bridging different fields in an original way. I experienced a very stimulating environment, having access to bright young researchers and insightful senior professors. I had the chance to participate in international conferences and start prestigious scientific collaborations. As there are no teaching obligations, I could adapt the teaching load to my research needs. Overall, I found in the program all the key ingredients for the outset of a fruitful research career.

STEFANO RIZZELLI (2019)
POSTDOCTORAL FELLOW,
ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE,
LABORATORY OF STATISTICS

The Statistics PhD program at Bocconi was an invaluable and highly enjoyable experience. The first two years were filled with rigorous course work taught by professors who supported my training and progress, which gave me a solid theoretical foundation for my research. Over the final two years, my supervisor's guidance and passion were beyond helpful to my research. The opportunities and funding for international travel allowed me to attend international conferences, receive feedback on my research and establish new collaborations. As a professor, I strive to show students the caring and passion that I encountered at Bocconi

SARA WADE (2013)
LECTURER IN STATISTICS AND DATA SCIENCE,
UNIVERSITY OF EDINBURGH

The PhD program in Statistics at Bocconi combines theoretical courses taught by outstanding faculties with important discussions of case studies and applications from experts in various fields. My dissertation focused on Bayesian statistics, nonparametric models and statistical designs of clinical studies. The PhD experience has been extremely rewarding and effectively shaped my research skills, as in my current work I continue developing Bayesian models for adaptive clinical trial designs in oncology.

LORENZO TRIPPA (2009)
ASSOCIATE PROFESSOR IN BIOSTATISTICS,
HARVARD UNIVERSITY

* Graduation year in brackets