

Percorso Autonomo Autorizzato

Title	Modeling and Data Analysis (MoDA)
Coordinator	(Dept. Mathematics, PoliMi): Prof. Laura M. Sangalli
Supporting coordinators	(Dept. Mathematics, PoliMi): Prof. Luca Formaggia, Prof. Piercesare Secchi
Scientific collaborations and partnerships	EPFL École Polytechnique Fédérale de Lausanne, Switzerland University of Cambridge
Description	<p>Data Science is a multidisciplinary field, embracing statistics, mathematics, information and computer science. Increasingly complex data have nowadays pervaded industry, business, administration, and most domains of life. The ability to extract insights from such data, appropriately quantifying uncertainty, and the ability to model complex phenomena are both crucial when dealing with complex problems in engineering and in sciences, as well as in the third sector.</p> <p>Within this context, the program in “Modeling and Data Analysis” focuses on a sound quantitative training, with methods across applied mathematics and statistics. In particular, the Department of Mathematics at Politecnico di Milano offers a unique opportunity to specialize in this area, thanks to its strong expertise in numerical analysis, scientific computing and statistics, and the synergy among these research areas, with consolidated experiences in interdisciplinary research programs.</p>
Study Plan	<p>This program is available to students enrolled in both majors of Computational Sciences for Engineering and of Applied Statistics. The program profits from courses offered in both majors, such as “Advanced partial differential equations”, “Numerical analysis for partial differential equations” and “Advanced programming for scientific computing”, from the major in Computational Sciences for Engineering, as well as “Applied Statistics” and “Bayesian Statistics”, from the major in Applied Statistics.</p> <p>Various topics are available for students interested in developing joint projects for the courses of “Numerical analysis for partial differential equations”, “Advanced programming for scientific computing”, “Applied statistics” and “Bayesian statistics”. Likewise, thesis may be co-supervised by professors in numerical analysis and in statistics.</p> <p>Moreover, students can complement their studies choosing courses in the area of machine learning and deep learning, offered by the Department of Electronics, Information and Bioengineering.</p>
Past MSc theses	<p>Nicholas Tarabelloni (Ing. Mtm.), “Metodi numerici e statistici per la simulazione e validazione di ECG”, 2013</p> <p>Eardi Lila (Ing. Mtm.), “Smooth Principal Component Analysis over two-dimensional manifolds with application to Neuroimaging”, 2014</p> <p>Matthieu Wilhelm (EPFL), “Generalized Spatial Regression with Differential</p>

	<p>Penalization”, 2013</p> <p>Gabriele Mazza (Ing. Mtm.), “Regressione con regolarizzazioni differenziali per dati spazio-temporali, con applicazione all'analisi della produzione di rifiuti urbani nella provincia di Venezia”, 2015</p> <p>Ilaria Savoldi (Ing. Mtm.), “Functional principal component analysis over irregular spatial domains with a neuroimaging application”, 2016</p> <p>Clelia Bambini (Ing. Mtm.), “Spatial Regression Models with Partial Differential Regularization: problems and solutions in Big Data Settings”, 2017</p> <p>Luca Negri (Ing. Mtm.), “Functional principal component analysis over volumetric domains with neuroimaging applications”, 2018</p>
<p>Job opportunities</p>	<p>The data scientist is the most in-demand job today, among high-qualification jobs, and will be the most in-demand job for years to come.</p> <p>Besides all the job opportunities for the Majors in Computational Sciences for Engineering and Applied Statistics, the program in “Modeling and Data Analysis” also offers a specific and highly qualified preparation to work as data scientist and modeler in research and development centers in the engineering, energy, physical sciences, geosciences and life sciences sectors, centers for weather forecasting, climatology and environment, consulting companies, telecommunication companies, internet-related companies, large business companies, and all companies that necessitate the analysis of complex data.</p>