Francesco Caravenna

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Curriculum Vitæ

PERSONAL DETAILS

- *Birth:* March 15, 1979, in Treviglio (BG), Italy
- *Working address:* via Cozzi 55, 20125 Milano, Italy
  office 3062, U5 building
  phone +39 02 6448 5752
- *E-mail:* francesco.caravenna@unimib.it
- *Home page:* http://www.matapp.unimib.it/~fcaraven/
- *Language skills:* Italian (mother tongue), English, French
- *Computer skills:* C, R, HTML/CSS, LATEX

EDUCATION

- (21 Oct 2005) *Ph.D. in Mathematics*, University of Milano-Bicocca (I) and University of Paris 7 – Denis Diderot (F). Advisors: Giambattista Giacomin and Alberto Gandolfi.
- (19 Dec 2003) *'Diploma di Licenza' in Physics* cum laude, Scuola Normale Superiore of Pisa (I). Advisor: Sergio Caracciolo.
- (23 Sep 2002) *Master's Degree in Physics* cum laude, University of Pisa (I). Advisor: Sergio Caracciolo.

ACADEMIC POSITIONS

- (Nov 2010 – present) *Associate Professor of Mathematics (Probability and Statistics)*, Department of Mathematics and Applications, University of Milano-Bicocca (I).
- (Oct 2006 – Oct 2010) *Assistant Professor ('Ricercatore') of Mathematics (Probability and Statistics)*, Department of Pure and Applied Mathematics, University of Padova (I).
- (Oct 2005 – Sep 2006) *Postdoctoral Fellow in Mathematics* in the group of Erwin Bolthausen, Institute of Mathematics, University of Zürich (CH).

HONORS

- Winner of the "Guido Fubini Prize 2011", awarded by the Istituto Superiore Mario Boella to a young mathematician working in Italy in the field of random processes.

PH.D. STUDENTS

- Niccolò Torri, *"Localization and universality phenomena for random polymers"*, thesis defended on 18 September 2015, University of Milano-Bicocca (I) in partnership with the University Claude Bernarde Lyon 1 (F) [joint supervision with Fabio Lucio Toninelli]
- Jacopo Corbetta, *"General smile asymptotics and a multiscaling stochastic volatility model"*, thesis defended on 4 March 2015, University of Milano-Bicocca (I).

GRANTS

- Principal Investigator of the Grant *'Probabilistic models for the statistical mechanics of polymers, interacting particle systems and applications'* (CPDA082105/08) of the University of Padova [founding: 34 000 euros]
- Member of National Research Projects (PRIN) in probability / statistical mechanics (years 2004, 2006, 2009)

ORGANIZATION ACTIVITY

- Organization of the Winter School *"Recent Breakthroughs in Singular Stochastic PDEs"* (Milano-Bicocca, 2-6 February 2015), mini-courses by Massimiliano Gubinelli and Lorenzo Zambotti [in collaboration with Federica Masiero and Gianmario Tessitore].
- Member of the organizing committee of the *"XII Workshop on Quantitative Finance"* (Padova, January 27-28, 2011).

RESEARCH VISITS

- Five months at the *Mathematical Institute* of the *University of Leiden* (NL) as a visiting professor in the framework of the ERC Advanced Grant VARIS, at the invitation of Frank den Hollander (17 March - 11 May 2012; 1 May - 30 June 2013; 1-30 March 2014)
- Two months at the *Laboratoire de Probabilités et Modèles Aléatoires, Universities of Paris 6 and Paris 7* (F), at the invitation of Giambattista Giacomin and Lorenzo Zambotti (5 October - 13 December 2009) .
- One month at the *Institute of Mathematics* of the *Technical University of Berlin* (D) at the invitation of Jean-Dominique Deuschel (8 January - 2 February 2007) .
- Several shorter periods (one / two weeks) at the *University of Warwick* (16-21 Jun 2014), *National University of Singapore* (4-15 Apr 2016, 27 Jan - 8 Feb 2014), *University of Nantes* (18-22 Oct 2010), *Technical University of Berlin* (3-14 Nov 2008), *ENS Lyon* (16-20 Jun 2008), *University of Paris 7* (17-21 Jul 2006, 19-23 May 2008), *University of Zürich* (28 Apr - 2 May 2008), *Technical University of Eindhoven / Eurandom* (10-14 Jul 2006, 22-26 Oct 2007).

REFEREE ACTIVITY

- I acted as referee for the following journals: *Probability Theory and Related Fields, Annals of Probability, Communications in Mathematical Physics, Stochastic Processes and their Applications, Electronic Journal of Probability, Annales de l'Institut Henri Poincaré, Statistics and Probability Letters, Markov Processes and Related Fields, Potential Analysis.*

RESEARCH INTERESTS

My research activity is focused on probability theory and its applications. My main research lines are the following:

1. Statistical mechanics, in particular probabilistic models for polymers
2. Asymptotic properties of real random walks
3. Probabilistic models for financial series

I have co-authored 23 papers published on top international journals, such as *J. Eur. Math. Soc. (JEMS)*, *Probab. Theory Related Fields*, *Ann. Probab.*, *Commun. Math. Phys.*, *Ann. Appl. Probab.*, *Stochastic Process. Appl.*, *Electron. J. Probab.*, *Ann. Inst. H. Poincaré*.

PUBLICATIONS

Journal papers

- F. Caravenna, F. L. Toninelli, N. Torri, *Universality for the pinning model in the weak coupling regime*, Ann. Probab., to appear.
- F. Caravenna, F. den Hollander, N. Pétrélis, J. Poisat, *Annealed scaling for a charged polymer*, Math. Phys. Anal. Geom. (2016), 19:2.
- F. Caravenna, R. Sun, N. Zygouras, *The continuum disordered pinning model*, Probab. Theory Related Fields 164 (2016), 17-59.
- F. Caravenna, R. Sun, N. Zygouras, *Polynomial chaos and scaling limits of disordered systems*, J. Eur. Math. Soc. (JEMS), to appear.
- F. Caravenna, F. den Hollander, *A general smoothing inequality for disordered polymers*, Electron. Commun. Probab. 18 (2013), no. 76, 1-15.
- F. Caravenna, L. Chaumont, *An invariance principle for random walk bridges conditioned to stay positive*, Electron. J. Probab. 18 (2013), no. 60, 1-32.
- Q. Berger, F. Caravenna, J. Poisat, R. Sun, N. Zygouras, *The critical curve of the random pinning and copolymer models at weak coupling*, Commun. Math. Phys. 326 (2014), 507-530.
- F. Caravenna, P. Carmona, N. Pétrélis, *The discrete-time parabolic Anderson model with heavy-tailed potential*, Ann. Inst. H. Poincaré 48 (2012), 1049-1080.
- A. Andreoli, F. Caravenna, P. Dai Pra, G. Posta, *Scaling and multiscaling in financial series: a simple model*, Adv. in Appl. Probab. 44 (2012), 1018-1051.
- M. Borecki, F. Caravenna, *Localization for (1+1)-dimensional pinning models with* $(\nabla + \Delta)$ *interaction*, Electron. Commun. Probab. 15 (2010), 534-548.
- F. Caravenna, G. Giacomin, *The weak coupling limit of disordered copolymer models*, Ann. Probab. 38 (2010), 2322-2378.
- F. Caravenna, N. Pétrélis, *Depinning of a polymer in a multi-interface medium*, Electron. J. Probab. 14 (2009), 2038-2067.
- F. Caravenna, N. Pétrélis, *A polymer in a multi-interface medium*, Ann. Appl. Probab. 19 (2009), 1803-1839.
- F. Caravenna, G. Giacomin, M. Gubinelli, *Large scale behavior of semiflexible heteropolymers*, Ann. Inst. H. Poincaré Probab. Statist. 46 (2010), 97-118.
- F. Caravenna, J.-D. Deuschel, *Scaling limits of (1+1)-dimensional pinning models with Laplacian interaction*, Ann. Probab. 37 (2009), 903-945.
- E. Bolthausen, F. Caravenna, B. de Tilière, *The quenched critical point of a diluted disordered polymer model*, Stochastic Process. Appl. 119 (2009), 1479-1504.
- F. Caravenna, J.-D. Deuschel, *Pinning and wetting transition for (1+1)-dimensional fields with Laplacian interaction*, Ann. Probab. 36 (2008), 2388-2433.
- F. Caravenna, L. Chaumont, *Invariance principles for random walks conditioned to stay positive*, Ann. Inst. H. Poincaré Probab. Statist. 44 (2008), 170-190.

- F. Caravenna, G. Giacomin, L. Zambotti, *Sharp asymptotic behavior for wetting models in (1+1)-dimension*, Electron. J. Probab. 11 (2006), 345-362.

- F. Caravenna, G. Giacomin, L. Zambotti, *A renewal theory approach to periodic copolymers with adsorption*, Ann. Appl. Probab. 17 (2007), 1362-1398.

- F. Caravenna, G. Giacomin, M. Gubinelli, *A numerical approach to copolymers at selective interfaces*, J. Stat. Phys. 122 (2006), 799-832.

- F. Caravenna, G. Giacomin, *On constrained annealed bounds for pinning and wetting models*, Electron. Commun. Probab. 10 (2005), 179-189.

- F. Caravenna, *A local limit theorem for random walks conditioned to stay positive*, Probab. Theory Related Fields 133 (2005), 508-530.

Proceedings

- F. Caravenna, F. den Hollander and N. Pétrélis, *Lectures on Random Polymers*, in: Probability and Statistical Physics in Two and more Dimensions. Proceedings of the Clay Mathematics Institute Summer School and XIV Brazilian School of Probability (Buzios, Brazil). Edited by David Ellwood, Charles Newman, Vladas Sidoravicius and Wendelin Werner. Clay Mathematics Proceedings 15 (2012), 319-393.

- F. Caravenna, G. Giacomin, F. L. Toninelli, *Copolymers at selective interfaces: settled issues and open problems*, in: Probability in complex physical systems. In honour of Erwin Bolthausen and Jürgen Gärtner. Edited by J.-D. Deuschel, B. Gentz, W. König, M. von Renesse, M. Scheutzow, U. Schmock. Springer Proceedings in Mathematics 11 (2012), 289-312.

- A. Andreoli, F. Caravenna, P. Dai Pra, G. Posta, *A model for multiscaling and clustering of volatility in financial indexes*, Proceedings of the 19th International Symposium on Mathematical Theory of Networks and Systems - MTNS, vol.5, no.9, 2010/7.

- F. Caravenna, *Modelli di polimeri e passeggiate aleatorie*, Boll. Unione Mat. Ital. Serie IX, vol. I (2008), 559-571.

- F. Caravenna, G. Giacomin, L. Zambotti, *Infinite volume limits of polymer chains with periodic charges*, Markov Process. Related Fields 13 (2007), 697-730.

Textbook

- F. Caravenna, P. Dai Pra. *Probabilità. Un'introduzione attraverso modelli e applicazioni.* Springer-Verlag Italia, Milano (2013).

SEMINARS

I gave several invited talks at national and international conferences, as well as many other talks in universities and research centers, plus a few didactic talks.

Invited Talks

- (14 Jun 2016) *Scaling and universality in Probability*, Mathematics Colloquium of the University of Luxembourg (L).

- (10 Sep 2015) *A multilinear extension of the central limit theorem and the universality phenomenon for disordered systems*, XX Congress of the Italian Mathematical Union, Siena (I).

- (31 Aug 2015) *Universality in marginally relevant disordered systems*, Meeting on "Scaling Limits in Models of Statistical Mechanics", Oberwolfach Center of Mathematical Research (D).

- (5 May 2015) *Polynomial chaos and scaling limits of disordered systems*, Workshop on Stochastic Processes in Random Media, Institute for Mathematical Sciences, National University of Singapore.
- (28 Jul 2014) *The continuum disordered pinning model*, SPA 2014 Conference, "Random Polymers" Invited Session, Buenos Aires (AR).
- (6 Jun 2014) *Polynomial chaos and scaling limits of disordered systems*, Statistical Mechanics Conference, University of Nantes (F).
- (27 Apr 2014) *Polynomial chaos and scaling limits of disordered systems*, Mini-Workshop at NYU Abu Dhabi (UAE).
- (13 Mar 2014) *Scaling and universality in Probability*, General Colloquium, Institute of Mathematics, University of Leiden (NL).
- (12 Sep 2013) *Scaling limits and universality for random pinning models*, 15th Italian Meeting on Hyperbolic Equations, University of Milano-Bicocca (I).
- (9 Aug 2013) *Scaling limits and universality for random pinning models*, Workshop "Universality and Scaling Limits in Probability and Statistical Mechanics", Hokkaido University, Sapporo (JP).
- (21 Mar 2013) *Scaling limits and universality for random pinning models*, Workshop "Analysis and Stochastics in Complex Physical Systems", University of Leipzig (D).
- (15 Feb 2011) *The weak coupling limit of disordered copolymer models*, Workshop on Interacting Processes in Random Environments, Fields Instutute, Toronto (CDN).
- (16 Oct 2010) *The weak coupling limit of disordered copolymer models*, Workshop "Probabilistic Methods in Statistical Physics" on the occasion of Erwin Bolthausen's 65th birthday, Technische Universität Berlin (D).
- (7 Jun 2010) *Scaling and multiscaling in financial indexes: a simple model*, Workshop "Statistical Mechanics and Random Media", University of Nantes (F).
- (11 Jun 2008) *Pinning and wetting transition for (1+1)–dimensional fields with Laplacian interaction*, Workshop on Gradient Models and Elasticity, University of Warwick (UK).
- (6 Mar 2008) *The quenched critical point of a diluted disordered polymer model*, GREFI-MEFI 2008 Workshop, CIRM, Marseille (F).
- (26 Sep 2007) *Polymer models and random walks*, XVIII Congress of the Italian Mathematical Union, Bari (I).
- (22 Jun 2007) *On the phase diagram of random copolymers at selective interfaces*, Workshop "Random Polymer Models", Eurandom, Eindhoven (NL).
- (21 Feb 2007) *Pinning and wetting models with Laplacian interaction in (1+1)–dimension*, Workshop "Polymer Models and Related Topics", Laboratoire J.A. Dieudonné, University of Nice 'Sophia Antipolis' (F).
- (4 Sep 2006) *Pinning models with Laplacian interactions in (1+1)–dimension*, Meeting on "Spatial Random Processes and Statistical Mechanics", Oberwolfach Center of Mathematical Research (D).
- (6 Jun 2006) *A renewal theory approach to weakly inhomogeneous polymer models*, Workshop "Hydrodynamic Limits and Particle Systems", *Ennio De Giorgi* Center of Mathematical Research in Pisa (I).

Other Talks

- (15 Jun 2016) *Universality in marginally relevant disordered systems*, University of Luxembourg (L).
- (2 Jun 2016) *Universality in marginally relevant disordered systems*, University of Paris Diderot (F).
- (19 Nov 2015) *Multi-linear central limit theorems and scaling limits of disordered systems*, Vienna Seminar in Mathematical Finance and Probability (A).
- (19 Mar 2015) *Polynomial chaos and scaling limits of disordered systems*, Probability Seminar, ENS Lyon (F).
- (11 Oct 2013) *Polynomial chaos and scaling limits of disordered systems*, University of Padova (I).
- (12 Jul 2013) *Scaling limits and universality for random pinning models*, Rhein-Main Kolloquium Stochastik, University of Mainz (D).
- (13 Jun 2013) *Scaling limits and universality for random pinning models*, Most Informal Probability Seminar, University of Leiden (NL).
- (10 Jun 2013) *Scaling limits and universality for random pinning models*, University of Angers (F).
- (27 Jul 2012) *Scaling and multiscaling in financial series: a simple model*, Department of Statistics and Quantitative Methods, University of Milano-Bicocca (I).
- (10 Jul 2012) *A random copolymer near a selective interface*, University of Roma Sapienza (I).
- (3 Apr 2012) *Bootstrap percolation on Galton Watson trees*, Most Informal Probability Seminar, University of Leiden (NL).
- (12 Mar 2012) *Scaling and multiscaling in financial series: a simple model*, University of Modena and Reggio Emilia (I).
- (23 Sep 2011) *Scaling and multiscaling in financial indexes: a simple model*, University of Rome Tor Vergata (I).
- (16 Dec 2010) *A polymer in a multi-interface medium*, Oberseminar Stochastics, University of Bonn (D).
- (2 Nov 2010) *Scaling and multiscaling in financial indexes: a simple model*, University of Milano-Bicocca (I).
- (10 Jun 2010) *The weak coupling limit of disordered copolymer models*, University of Warwick (UK).
- (20 May 2010) *Scaling and multiscaling in financial indexes: a simple model*, University of Padova (I).
- (1 Feb 2010) *Scaling and multiscaling in financial indexes: a simple model*, University of Pavia (I).
- (8 Dec 2009) *A polymer in a multi-interface medium*, Séminaire de Probabilités, Laboratoire de Probabilités et Modèles Aléatoires, Universities of Paris 6 and Paris 7 (F).
- (5 Nov 2009) *Large scale behavior of semiflexible heteropolymers*, University of Nantes (F).
- (21 Jul 2009) *A polymer in a multi-interface medium*, University of Roma 3 (I).
- (12 Nov 2008) *A polymer in a multi-interface medium*, Berliner Kolloquium Wahrscheinlichkeitstheorie (IRTG Seminar), Humboldt University in Berlin (D).
- (19 Jun 2008) *Pinning and wetting transition for (1+1)–dimensional fields with Laplacian interaction*, Séminaire de Probabilités, ENS Lyon (F).

- (30 Apr 2008) *Pinning and wetting transition for (1+1)–dimensional fields with Laplacian interaction*, Seminar on Stochastic Processes, University of Zürich (CH).
- (23 Oct 2007) *The quenched critical point of a diluted disordered polymer model*, Random Spatial Structures Seminar, Eurandom, Eindhoven (NL).
- (17 Jul 2007) *The quenched critical point of a diluted disordered polymer model*, St. Flour Summer School of Probability (F).
- (24 Jan 2007) *Free energy lower bounds for random copolymers at selective interfaces*, Technical University of Berlin (D).
- (13 Jul 2006) *Pinning models with Laplacian interactions in (1+1)–dimension*, Random Spatial Structures Seminar, Eurandom, Eindhoven (NL).
- (17 Mar 2006) *A renewal theory approach to periodically inhomogeneous polymer models*, Seminaire de Probabilités et Statistique, Centre de Mathématiques et Informatique, University of Provence, Marseille (F).
- (21 Dec 2005) *A local limit theorem and an invariance principle for random walks conditioned to stay positive*, Seminar on Stochastic Processes, ETH Zürich (CH).
- (16 Dec 2005) *A renewal theory approach to periodically inhomogeneous polymer models*, Berlin-Leipzig Seminar, Technical University of Berlin (D).
- (19 Jul 2005) *A renewal theory approach to periodically inhomogeneous polymer models*, St. Flour Summer School of Probability (F).
- (27 May 2005) *Random copolymers at selective interfaces*, University of Milano-Bicocca (I).
- (2 Jun 2004) *A local limit theorem for random walks conditioned to stay positive*, Rencontres de Probabilités, University of Rouen (F).

Didactic Talks

- (12 Mar 2015) *Mathematics in the university*, talk for an audience of high school students, Open Day "Privavera in Bicocca 2015".
- (14 Mar 2013) *Research in mathematics*, talk for an audience of high school students, Open Day "Privavera in Bicocca 2013".
- (5 Nov 2008) *The Banach-Tarski Paradox*, Technische Universität Berlin (D).
- (29 June 2006) *What is. . . the Banach-Tarski Paradox?*, Zürich Graduate Colloquium (CH).

TEACHING EXPERIENCE

Since my Ph.D., I have given many undergraduate courses and recitations in several universities (Milano-Bicocca, Padova, Zurich, Politecnico di Milano). I have also given more advanced courses and mini-courses for Ph.D. programs, schools and workshops.

Courses and mini-courses in schools and workshops

- (2 Jun 2016) *Polynomial chaos and scaling limits of disordered systems* [3h], Working group on "Statistical mechanics and particle systems", University of Paris Diderot (F).
- (7 - 11 Mar 2016) *Polynomial chaos and scaling limits of disordered systems* [3 x 1.5h], Workshop YEP XIII, Eurandom, TU Eindhoven (NL).
- (28 Sep - 2 Oct 2015) *Polynomial chaos and scaling limits of disordered systems* [5 x 1.5h], Berlin-Potsdam Summer School 2015, Levico Terme (I).

- (10-12 Jan 2013) *Random Polymers and Localization Strategies* [3 x 2h], School of "Random Polymers", Eurandom, Eindhoven (NL).
- (14-18 May 2012) *Random Polymers and Localization Strategies* [3 x 2h + 1h], Worshop "Random Polymers and Related Topics", Institute for Mathematical Sciences, National University of Singapore.
- (6-10 Sep 2011) *The strange behavior of a random walk* [1.5h + 2h], Mathematics Summer School "Alfa Class" for top undergraduate students by "Progetto Diderot" – Fondazione CRT, Solonghello (AL), Italy.
- (2-7 Aug 2010) *Random Polymers* [5x1h tutorials, in collaboration with Nicolas Pétrélis, for the course given by Frank den Hollander], XIV Brazilian School of Probability and Clay Mathematics Institute 2010 Summer School "Probability and Statistical Physics in Two and more Dimensions", Búzios – Rio de Janeiro (BR).

Ph.D. Courses

- (Spring 2014) *Random Graphs and Complex Networks*, Ph.D. in Mathematics, joint course ("interdottorato") for the Universities of Milano, Milano-Bicocca, Pavia and Politecnico of Milano [in collaboration with Federico Bassetti].
- (Spring 2010) *Random Graphs and Complex Networks*, Ph.D. in Mathematics, University of Padova (I) [in collaboration with Paolo Dai Pra].
- (Spring 2009) *Poisson Point Processes and Applications*, Ph.D. in Mathematics, University of Padova (I).
- (Fall 2006) *Polymer Models and Random Walks*, Ph.D. in Mathematics, University of Padova (I).

Undergraduate Courses and Recitations

At the University of Milano-Bicocca

- (Spring 2016) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2015) *Probability Theory* (course), Bachelor's Degree in Mathematics.
- (Spring 2015) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2014) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2014) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2013) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2013) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2012) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2012) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].
- (Fall 2011) *Probability Theory* (course + recitations), Bachelor's Degree in Mathematics.
- (Spring 2011) *Stochastic Processes* (course), Master's Degree in Mathematics [in collaboration with Gianmario Tessitore].

- (Spring 2005) *Stochastic Processes* (recitations), Master's Degree in Mathematics [teacher: Gianmario Tessitore].
- (Spring 2004) *Stochastic Processes* (recitations), Master's Degree in Mathematics [teacher: Daniela Bertacchi].
- (Spring 2004) *Probability and Statistics* (recitations), Bachelor's Degree in Mathematics [teacher: Daniela Bertacchi].

At the University of Padova

- (Spring 2011) *Stochastic Calculus* (course), Master's Degree in Mathematics [in collaboration with David Barbato].
- (Spring 2010) *Statistics* (recitations), Bachelor's Degree in Molecular Biology [teacher: Paolo Dai Pra].
- (Spring 2010) *Stochastic Calculus* (course), Master's Degree in Mathematics.
- (Spring 2009) *Probability and Statistics* (recitations), Bachelor's Degree in Mathematics [teacher: Paolo Dai Pra].
- (Spring 2009) *Stochastic Calculus* (course), Master's Degree in Mathematics.
- (Spring 2008) *Probability Theory* (course), Bachelor's Degree in Engineering, University of Padova (I) [in collaboration with Caterina Sartori].
- (Spring 2008) *Probability and Statistics* (recitations), Bachelor's Degree in Mathematics [teacher: Paolo Dai Pra].
- (Spring 2008) *Statistical Methods for Biology* (recitations), Bachelor's Degree in Biology [teacher: Paolo Dai Pra].
- (Spring 2007) *Statistical Methods for Biology* (recitations), Bachelor's Degree in Molecular Biology [teacher: Paolo Dai Pra].
- (Spring 2007) *Statistical Methods for Biology* (recitations), Bachelor's Degree in Biology [teacher: Paolo Dai Pra].

At the University of Zurich

- (Spring 2006) *Linear Algebra II* (recitations), Bachelor's Degree in Mathematics [teacher: Erwin Bolthausen].
- (Fall 2005) *Linear Algebra I* (recitations), Bachelor's Degree in Mathematics [teacher: Erwin Bolthausen].

At Politecnico di Milano

- (Spring 2003) *Probability and Statistics* (on-line recitations), Bachelor's Degree in Engineering [teacher: Elio Piazza].
- (Spring 2003) *Probability and Statistics* (numerical laboratory), Bachelor's Degree in Engineering [teacher: Elio Piazza].