

# Curriculum Vitae of Laura Azzimonti



## Personal information

Name **Laura Azzimonti**  
Address Galleria 1, CH-6928 Manno, Switzerland  
Email [laura.azzimonti@supsi.ch](mailto:laura.azzimonti@supsi.ch)  
Nationality Italian  
Date of birth 1 December 1985

## Current position

Dates from September 2017  
Position **Lecturer - Researcher at IDSIA, "Dalle Molle" Institute for Artificial Intelligence**  
Name of organization Department of Innovative Technologies - SUPSI, University of Applied Sciences of Southern Switzerland

## Previous positions

Dates February 2015 – August 2017  
Position **Researcher** at IDSIA, "Dalle Molle" Institute for Artificial Intelligence  
Name of organization Department of Innovative Technologies - SUPSI, University of Applied Sciences of Southern Switzerland  
Duties Research in the field of Bayesian networks and Bayesian hierarchical models. Development and software implementation of approximate inference methods. Management of team work and relations with project partners. Teaching activities.

Dates January 2014 – January 2015  
Position **Research Specialist Engineer** at MOXOFF srl, Milano, Italy  
Duties Development and software implementation of mathematical and computational methods for data analysis, signal processing and task optimization for customers in different business areas, including electronics, biomedicine, automotive, transport, ecology. Management of team work and relations with clients, including formulation of commercial offers and technical meetings.

Dates January 2013 – January 2014  
Position **Post-doctoral fellowship researcher** at MOX – Department of Mathematics, Politecnico di Milano, Italy  
Research project "Advanced statistical and numerical models and methods for the analysis of functional and spatial data, with applications in life sciences and engineering"  
Duties Research in the field of non-parametric surface estimation methods and numerical optimization of partial differential equations, in particular development of numerical methods for data assimilation in boundary value problems. Software implementation and application to relevant biomedical studies. Study of the random properties, such as accuracy and precision, of estimated stochastic fields. Divulcation of results by public keynotes at international conferences and by technical, peer-reviewed publications.

## Teaching

Dates from September 2015  
Position **Lecturer**, *Calculus* for Engineering at SUPSI  
Duties Teaching theoretical and practical lessons. Preparation of teaching material, including formulation of exercises, online quizzes and preparation of exams.

Dates	20 May 2016
Position	<b>Lecturer</b> , <i>Machine Learning - Workshop on Data Mining and Big Data</i> in collaboration with Fondazione AGIRE
Dates	September 2015 – February 2016
Position	<b>Lecturer</b> , <i>Data Mining for Business Intelligence</i> for Management Engineering at SUPSI
Duties	Teaching theoretical and practical lessons. Preparation of teaching material, including formulation of exercises and preparation of exams.
Dates	March – July 2011 and 2013
Position	<b>Teaching Assistant</b> , <i>Statistics</i> for Mechanical Engineering (English language) and Energy Engineering at Politecnico di Milano
Duties	Teaching exercise and laboratory lessons. Preparation of teaching material, including formulation of exercises and preparation of exams.

### Internship

October 2013	“Scientific computing and uncertainty quantification” group (prof. Fabio Nobile), Department of Mathematics, EPFL, Lausanne.
April-July 2012	“Scientific computing and uncertainty quantification” group (prof. Fabio Nobile), Department of Mathematics, EPFL, Lausanne.

### Education

Dates	September 2017 - June 2019
Name and type of organization	SUPSI, University of Applied Sciences of Southern Switzerland
Title of qualification awarded	<b>Teaching qualification</b> , Certificate for Advanced Studies in Teaching.
Dates	January 2010 – December 2012
Name and type of organization	Politecnico di Milano
Title of qualification awarded	<b>PhD in Mathematical Models and Methods in Engineering</b>
Grade	Doctor Europaeus certification with merit.
Title of Thesis	“Blood flow velocity field estimation via spatial regression with PDE penalization” <a href="http://hdl.handle.net/10589/76565">http://hdl.handle.net/10589/76565</a>
Dates	September 2007 – December 2009
Name and type of organization	Politecnico di Milano
Title of qualification awarded	<b>Master’s Degree in Mathematical Engineering, Specialization Scientific Computing and Statistics.</b>
Grade	110/110 cum laude.
Title of Thesis	“Modelli a effetti misti: teoria e applicazioni a dati longitudinali in ambito biologico” (“Mixed effects models: theory and applications to longitudinal biological data”) Thesis developed at the Laboratory of Modeling and Scientific Computing (MOX) of the Department of Mathematics - Politecnico di Milano in collaboration with San Raffaele Hospital, Milano
Dates	September 2004 – September 2007
Name and type of organization	Politecnico di Milano
Title of qualification awarded	<b>Bachelor’s Degree in Mathematical Engineering, Specialization Scientific Computing.</b>
Grade	110/110 cum laude.
Title of Thesis	“Sistemi di urne interagenti e teoria dei valori estremi applicati alla modellizzazione della crescita tumorale: teoria e simulazioni” (“Interacting urn systems and extreme value theory for modeling tumor growth: theory and simulations”)
Dates	1999–2004
Name and type of organization	Liceo Scientifico Arturo Tosi, linguistic specialization, Busto Arsizio
Title of qualification awarded	<b>Maturità Scientifica.</b>

Grade 100/100 cum laude

## Research Topics

current Bayesian networks, hierarchical Bayesian models, variational inference, non parametric statistics, biostatistics

past Mathematical and statistical modeling, numerical analysis, statistics, data mining, analysis of complex and high dimensional data, spatial statistics, analysis of repeated measures and longitudinal data, design of experiments, scientific computing, Finite Elements computing, computational fluid dynamics, data assimilation, inverse problems, PDE optimal theory, parallel computing.

## Publications

- 2019**
- K. Sechidis, L. Azzimonti, A. Pocock, G. Corani, A. Weatherall, G. Brown: "Efficient feature selection using shrinkage estimators", *Machine Learning Journal*, 2019.
  - L. Azzimonti, G. Corani, M. Zaffalon: "Hierarchical estimation of parameters in Bayesian networks", *Computational Statistics and Data Analysis*, vol. 137, 67-91, 2019. <https://doi.org/10.1016/j.csda.2019.02.004>
  - E. Arnone, L. Azzimonti, F. Nobile, L.M. Sangalli: "Modeling spatially dependent functional data via regression with differential regularization", *Journal of Multivariate Analysis*, vol. 170, 275 - 295, 2019. <https://doi.org/10.1016/j.jmva.2018.09.006>
- 2017**
- F. Gorini, L. Azzimonti, G. Delfanti, L. Scarfó, C. Scielzo, M.T. Bertilaccio, P. Ranghetti, A. Gulino, C. Doglioni, A. Di Napoli, M. Capri, C. Franceschi, F. Calligaris-Cappio, P. Ghia, M. Bellone, P. Dellabona, G. Casorati, C. de Lalla: "Invariant NKT cells contribute to Chronic Lymphocytic Leukemia surveillance and prognosis", *Blood*, vol. 129, no. 26, 3440-3451, 2017. <http://www.bloodjournal.org/content/129/26/3440>
  - C. Cruder, D. Falla, F. Mangili, L. Azzimonti, L.S. Araùjo, A. Williamon, M. Barbero: "Profiling the location and extent of musicians' pain using digital pain drawings", *Pain Practice*, 2017. <http://dx.doi.org/10.1111/papr.12581>
- 2016**
- B. Guerciotti, C. Vergara, L. Azzimonti, L. Forzenigo, A. Buora, P. Biondetti, M. Domanin: "Computational study of the fluid-dynamics in carotids before and after endarterectomy", *Journal of Biomechanics*, vol. 49, 26–38, 2016. <https://doi.org/10.1016/j.jbiomech.2015.11.009>
- 2015**
- L. Azzimonti, L.M. Sangalli, P. Secchi, M. Domanin, F. Nobile: "Blood flow velocity field estimation via spatial regression with PDE penalization", *Journal of the American Statistical Association, Theory and Methods Section*, vol. 110, no. 511, 1057–1071, 2015. <http://amstat.tandfonline.com/doi/abs/10.1080/01621459.2014.946036>
- 2014**
- L. Azzimonti, F. Nobile, L.M. Sangalli, P. Secchi: "Mixed finite elements for spatial regression with PDE penalization", *SIAM/ASA Journal on Uncertainty Quantification*, vol. 2, 305–335, 2014. <http://epubs.siam.org/doi/abs/10.1137/130925426>
  - L. Azzimonti, M.A. Cremona, A. Ghiglietti, F. Ieva, A. Menafoglio, A. Pini, P. Zanini: "BARCAMP: Technology Foresights and Statistics for the Future" in "Advances in Complex Data Modeling and Computational Methods in Statistics - Contributions to Statistics", Springer, eds: A.M. Paganoni, P. Secchi, 53–67, 2014.
- 2013**
- L. Azzimonti, F. Ieva, A.M. Paganoni: "A new unsupervised classification technique through nonlinear non parametric mixed effects models" in "Complex Models and Computational Methods in Statistics - Contributions to Statistics", Springer, eds: Grigoletto, Lisi, Petrone, 1–11, 2013
  - L. Azzimonti, F. Ieva, A.M. Paganoni: "Nonlinear nonparametric mixed-effects models for unsupervised classification", *Computational Statistics*, vol. 28, no. 4, 1549–1570, 2013. <http://www.springerlink.com/content/5243v4w550168827/>
- 2011**
- C. de Lalla, A. Rinaldi, D. Montagna, L. Azzimonti, M.E. Bernardo, L.M. Sangalli, A.M. Paganoni, R. Maccario, A. Di Cesare-Merlone, M. Zecca, F. Locatelli, P. Dellabona, G. Casorati: "Invariant Natural Killer T-cell reconstitution in pediatric leukemia patients given HLA-haploidentical stem cell transplantation defines distinct CD4+ and CD4- subset dynamics and associates with the remission state", *The Journal of Immunology*, vol. 186, no. 7, 4490–4499, 2011, <http://www.jimmunol.org/content/186/7/4490>

## Refereed conference proceedings

- 2017**
- L. Azzimonti, G. Corani, M. Zaffalon: "Hierarchical Multinomial-Dirichlet model for the estimation of conditional probability tables", IEEE 17th International Conference on Data Mining (ICDM), 2017. <https://doi.org/10.1109/ICDM.2017.85>
  - E. Arnone, L. Azzimonti, F. Nobile, L. Sangalli: "A time-dependent PDE regularization to model functional data defined over spatio-temporal domains" in "Functional Statistics and Related Fields", Springer International Publishing, eds: G. Aneiros, E.G. Bongiorno, R. Cao, P. Vieu, 41–44, 2017. [https://doi.org/10.1007/978-3-319-55846-2\\_6](https://doi.org/10.1007/978-3-319-55846-2_6)
- 2014**
- L. Azzimonti, L.M. Sangalli, P. Secchi: "Modeling prior knowledge on complex phenomena behaviors via partial differential equations", Proceedings of the 47th Scientific Meeting of the Italian Statistical Society 2014, Cagliari, June 11-13, 2014, <http://www2.mate.polimi.it/ocs/viewpaper.php?id=403&cf=33>
- 2013**
- L. Azzimonti, L.M. Sangalli, P. Secchi: "Spatial regression with PDE penalization: an application to blood velocity field estimation", Proceedings of the 8th conference on statistical computation and complex systems, Milano, September 9-11, 2012, <http://www2.mate.polimi.it/ocs/viewpaper.php?id=403&cf=33>
- 2012**
- L. Azzimonti, L.M. Sangalli, P. Secchi, M. Domanin: "PDE penalization for spatial fields smoothing", Proceedings of the 46th Scientific Meeting of the Italian Statistical Society 2012, Rome, June 20-22, 2012, <http://meetings.sis-statistica.org/index.php/sm/sm2012/paper/view/1962>
- 2011**
- L. Azzimonti, F. Ieva, A.M. Paganoni: "A new unsupervised classification algorithm for nonlinear non parametric mixed effects models", Proceedings of the 7th conference on statistical computation and complex systems, Padova, September 19-21, 2011, [http://homes.stat.unipd.it/mgri/SCo2011/Papers/CS/CS-8/azzimonti\\_leva\\_paganoni.pdf](http://homes.stat.unipd.it/mgri/SCo2011/Papers/CS/CS-8/azzimonti_leva_paganoni.pdf)
  - L. Azzimonti, M. Domanin, L.M. Sangalli, P. Secchi: "Surface estimation via spatial spline models with PDE penalization", Proceedings of the 7th conference on statistical computation and complex systems, Padova, September 19-21, 2011, [http://homes.stat.unipd.it/mgri/SCo2011/Papers/CS/CS-3/azzimonti\\_domanin\\_sangalli\\_secchi.pdf](http://homes.stat.unipd.it/mgri/SCo2011/Papers/CS/CS-3/azzimonti_domanin_sangalli_secchi.pdf)
- 2010**
- L. Azzimonti, C. de Lalla, D. Montagna, A.M. Paganoni, L.M. Sangalli: "Mixed-effects models for growth curves: an application to the study of reconstitution kinetics of lymphocyte subpopulations", Proceedings of the 45th Scientific Meeting of the Italian Statistical Society 2010, Padova, June 16-18, 2010, <http://homes.stat.unipd.it/mgri/SIS2010/Program/contributedpaper/647-1344-1-DR.pdf>

## Speeches and presentations at conferences and workshops

- 2010-2017**
- 20 speeches and presentations during national and international conferences and workshops including:
- "Hierarchical Multinomial-Dirichlet model for the estimation of conditional probability tables", IEEE 17th International Conference on Data Mining (ICDM), 2017, New Orleans
  - "Spatial regression with PDE penalization", International Conference of the ERCIM WG on Computational and Methodological Statistics - invited session, London
  - "Mixed Finite Elements for spatial regression with PDE penalization", European Numerical Mathematics and Advanced Applications Conference, Lausanne, Switzerland
  - "PDE regularized blood velocity estimation", High Dimensional and Dependent Functional Data Conference, Bristol, United Kingdom
  - "PDE penalized statistical estimation of blood flow velocity profiles", 11th Conference of the Italian Society for Applied and Industrial Mathematics - invited session, Torino, Italy
  - "Non parametric estimation in nonlinear mixed-effects models for unsupervised classification", 31st Conference of Applied Statistics in Ireland, Galway, Ireland.
- Full details available under request.

## Awards and grants

Best Graduate Student Prize of the Academic year 2008-2009 for the Master Degree in Mathematical Engineering at Politecnico di Milano, Italy, April 20, 2011.

Best Graduate Student Prize of the Academic year 2006-2007 for the Bachelor's Degree in Mathematical Engineering at Politecnico di Milano, Italy, March 12, 2009.

Grant for early career researchers for the attendance of the school "Statistical Modelling for Biological and Environmental Systems" in Venice, Italy, funded by CRiSM - Statistical Department of the University of Warwick September 12-16, 2011.

## Scientific and management activities

2018 - 2019	Manager of different projects in Fintech, in collaboration with Swiss banks.
2018	Co-investigator of the project " <b>ALBIS: A new integrated system for risk-based surveillance of invasive mosquito <i>Aedes albopictus</i> in Switzerland</b> ", funded by SUPSI.
2016-2018	Co-investigator of the project " <b>Statistical learning and inference on big data with probabilistic graphical models</b> ", funded by SNSF - Swiss National Science Foundation.
2016	Manager of the projects " <b>Analytics</b> ", in collaboration with Ente Ospedaliero Cantonale, and " <b>Data mining for public statistics</b> ", in collaboration with Ustat, Statistical office of Canton Ticino.
2015	Manager of the projects " <b>Support for the master plan development</b> ", in collaboration with Ente Ospedaliero Cantonale, and " <b>Climate change impact on debris flow hazard in Ticino region</b> ", in collaboration with IFEC ingegneria SA.
2014	Responsible for the statistical analysis within the project " <b>Study of Chronic Lymphocytic Leukemia</b> " in collaboration with DIBIT - San Raffaele Hospital in Milan.
2014	Manager of the projects " <b>Workforce management optimization for car parking companies</b> ", " <b>Customer intelligence for automotive companies</b> " and " <b>Mathematical models for food safety</b> ".
2013	Co-responsible for the organization of the BarCamp "Technology foresight and statistics for the future" during Sco 2013 conference at Politecnico di Milano.
2011 - 2013	Co-investigator of the FIRB "Futuro in Ricerca" project " <b>Advanced statistical and numerical methods for the analysis of high dimensional functional data in life sciences and engineering</b> ", funded by MIUR Ministero dell'Istruzione dell'Università e della Ricerca and co-investigator of the PRIN project " <b>Advanced numerical methods and applications for scientific computing</b> ", funded by MIUR Ministero dell'Istruzione dell'Università e della Ricerca.
2008 - 2013	Co-responsible for the statistical analysis within the projects: " <b>MACAREN@MOX</b> " (Mathematics for Catorid Endarterectomy) in collaboration with U.O. di Chirurgia Vascolare Fondazione I.R.C.C.S. Ca' Granda Ospedale Maggiore Policlinico, Milano and Dipartimento di Scienze Chirurgiche Specialistiche, Università di Milano, " <b>iNKT cell reconstitution</b> " in collaboration with DIBIT - San Raffaele Hospital in Milan, " <b>Cytotoxic treatment for rectal cancer</b> " in collaboration with San Raffaele Hospital in Milan and " <b>Equine growth Hormone</b> " in collaboration with the Veterinary Medicine Department - Università degli Studi di Milano.

## Other academic activities

Tutoring for thesis	Master's Degree in Mathematical Engineering "Analysis of Doppler blood flow velocity in carotid arteries for the detection of atherosclerotic plaques", October 4, 2011. Bachelor's Degree in Computer Science Engineering "Bayesian neural networks", September, 2019. Bachelor's Degree in Mathematical Engineering "Metodi numerici per stime di massima verosimiglianza" ("Numerical methods for maximum likelihood estimates"), December, 2012.
Tutoring for projects	Master project "Hierarchical Bayesian Networks", October, 2019.

## Language skills

Mother tongue(s)

Italian

Self-assessment  
European level

English

Understanding		Speaking		Writing	
Listening	Reading	Spoken interaction	Spoken production		
C1 Proficient user	C2 Proficient user	C2 Proficient user	C2 Proficient user	C2	Proficient user

<b>French</b>	B2	Independent user	B2	Independent user	B2	Independent user	B2	Independent user	B1	Independent user
<b>German</b>	A2	Basic user	A2	Basic user	A2	Basic user	A2	Basic user	A2	Basic user

Certificates English: TOEFL (240/300)

### Computer and programming skills

Extensive knowledge of R (statistical data analysis), Matlab, Octave (mathematical programming) and FreeFem++ (Finite Element programming language). Good C++, Python and Latex programming skills. Extensive knowledge of Finite Element programming and good knowledge of parallel computing. Proficient user of Mac OSX and Windows XP, Vista, 7. Good knowledge of command-line Unix. Proficient user of the Microsoft Office suite of programs. Basic knowledge of WinBUGS, stan, HTML, SQL.

### Management skills

Project management, team building, communication, customer orientation, relationship management.

For further information visit the website <http://people.idsia.ch/~azzimonti/>