



Luca Rubini

Curriculum Vitae

Born in Torino, Italy, 20th June 1989. Citizenship italian.

Education

- 2014–2016 **Ph.D. in Computer Science**(with three-year scholarship) , University of Torino
Thesis *Regularised pseudoinversion for neural training: optimal weights determination.*
Supervisor Prof. R. Cancelliere (University of Torino)
Co-supervisor Prof. P. Gallinari (LIP6, Université Pierre et Marie Curie, Paris)
- 2011–2013 **Master of Science in Mathematics**, University of Torino
Thesis *Gravitational and radiational models for traffic distribution: optimisation algorithms, comparative analysis and applications.*
Supervisor Prof. C. Dagnino (University of Torino)
Co-supervisor Dott. D. Inaudi (SiTI, Polytechnic of Torino)
Mark 110/110 *cum Laude.*
- 2008–2011 **Bachelor of Science in Mathematics**, University of Torino
Thesis *Matrix factorisations and applications.*
Supervisor Prof. I. Cravero (University of Torino)
Mark 104/110.
- 2008 **Maturità Scientifica P.N.I** at L.S.S. Gino Segrè, Torino. Mark: 100/100.

Computing Skills

- Operative System Windows, Linux.
- Applications and Program Languages Python, advanced skills with scientific Python libraries *NumPy*, *SciPy*, *TensorFlow*, Matlab, Java, Maple, Octave, Sas, C++, Xppaut, CPLEX, \LaTeX , HTML, Excel, MS-Office, Wordpress.

Professional Experience

- mar. 2017 - present **Nuance: Sr. Research Scientist - Deep Learning in ASR.** Research on new ideas and algorithm for Deep Learning in ASR. Develop and implementation of new techniques into Nunace's toolkit.
- 2015– 2016 **Teaching activity at University of Torino.**
Tutoring for the courses '*Programming I*' and '*Programming II*'. Lectures for the course '*Neural Networks*'. Assistant for the course '*Matricial calculus and operational research*'.

- Oct. 2016 Member of the organizing committee, responsible for social media communication and coordinator of high school activity for the Workshop '**Il Nettare della Matematica**'. The event aimed to explore the connections between applied mathematics, modeling and biology. The scope of the event was twofold: scientific divulgation inviting students from high school; give an opportunity to researchers of different areas to find a possible collaboration finding novel ideas to their work. The project was founded by *Fondazione Fondo Ricerca e Talenti, CRT foundation* after an open call phase of evaluation.
- Mar. 2015–**Traineeship at LIP6, Université Pierre et Marie Curie, Paris.** (winner of *Erasmus*
July 2015 *Traineeship* grant)
Models for predicting the dynamics of the information diffusion in Social Networks. During the traineeship I studied and developed learning models for spatio-temporal series to analyse the spread of information in Social Networks. I focused my research on optimal projection and data representations in hidden vector spaces. Models have been tested on real case of studies of Social Networks as Weibo and Digg.
- Sept. 2015 Member of the local organizing committee for the international Workshop '**CAMo: from molecules to modeling**', Torino, Italy.
- Feb. 2015 **Creation and management of website** *www.actastudio.eu* for Acta s.r.l. (Torino). The society needed a website to show its portfolio to possible new clients and a simple way to be contacted.
- Aug. 2014 Member of the local organizing committee for the '**International Conference of Models in Population Dynamics and Ecology (MPDE14)**', Torino, Italy.
- Mar. 2013–**Curricular internship at SiTI, Polytechnic of Torino.** Traffic distribution models, algo-
Sept. 2013 rithm development and applications to real cases of study.
During my internship I analyzed traffic distribution models with applications to real cases of study. The target was to compare different optimization approaches in the distribution of traffic flow, in a context of a four-stage model, highlighting effectiveness and efficiency.

Languages

Italian	Mother tongue
English	Advanced (B2)
French	Basic (A2)

Courses, Schools and Conferences

- Dec. 2016 '**30th Annual Conference on Neural Information Processing Systems (NIPS2016)**', Barcelona, Spain.
- Dec. 2015 '**Tools and techniques for massive Data Analysis**', provided by CINECA, Roma, Italy.
- Sept. 2015 '**CAMo: from molecules to modeling**', Torino, Italy.
- Sept. 2015 '**European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML - PKDD 2015)**', Porto, Portugal.
- Oct. 2014 '**Optimization Methods for Machine Learning**', held by Prof. J. Nocedal (Northwestern University), Firenze, Italy
- Sept. 2014 '**16th International Conference on Artificial Intelligence: Methodology, Systems, Applications (AIMSA 2014)**', Varna, Bulgaria. Speaker of a talk titled '*Computational experience with pseudoinversion-based training of neural networks using random-projection matrices*'.
- Aug. 2014 '**International Conference of Models in Population Dynamics and Ecology (MPDE14)**', Torino, Italy.
- Jun. 2014 '**Regularization Methods for Machine Learning (RegML 2014)**', held by Prof. L. Rosasco and Prof. F. Odone at University of Genova, Genova, Italy.

- Feb. 2014 '**Bertinoro International Spring School (BISS 2014)**' held by Prof. N. Cristianini - University of Bristol (UK), Prof. U. Dal Lago - University of Bologna (Italy), Prof. C. Ghezzi - Polytechnic of Milano (Italy), Bertinoro, Italy.
- Jan. 2014 '**Management of innovation**', promoted by '*Unione Industriale di Torino*', with the contribution of '*Camera di Commercio di Torino*' and University of Torino, Torino, Italy.
- 2011 '**Statistica e Data Mining per le applicazioni**', held by University of Torino with the collaboration of CSI Piemonte, Torino, Italy.
- Courses During my PhD I attended **courses** on Machine Learning, Artificial Intelligence, Optimisation and Applied Mathematics:
University of Torino: Numerical Methods for Scattered Data Approximation, Some recent models in mathematical biology, Research Public Funding, Foundations of Intelligent Systems, Laboratory of Intelligent Systems.
Polytechnic of Torino: Optimization methods for engineering problems, Mimetic Learning, Data Mining: Concepts and Algorithms.
BISS2014: Big Data Analysis of Patterns in Media Content, Development of dynamically evolving and self-adaptive software, Introduction to Probabilistic and Quantum Programming.
University of Eastern Piedmont: Intelligent Decision Support Systems.

Research Interests

- Keywords** Neural Networks, Machine Learning, Data Analysis, Optimisation, Modeling, Numerical Methods, Applied Mathematics.
- Researcher profile** The master degree in Mathematics and a PhD in Computer Science aided me to develop transversal knowledge in different fields. This, coupled with my passion for research and the ability to adapt without too much difficulty to a new context, let me afford in a comprehensive and efficient way different work situations. I developed the ability to present my ideas to people with various and different scientific backgrounds, learning to interact and collaborate with them to find possible solutions to their problems.
- Research experiences** During my master thesis on Mathematics I worked on the creation, calibration and evaluation of a model for the traffic distribution in cities in the framework of a real data case of study. I made it in a period of internship at SiTI, a research institute of Polytechnic of Torino. Then I studied the dynamics of the spread of diseases in populations[5]. After obtaining my graduation *cum laude* in Mathematics I obtained a PhD fellowship at the Department of Computer Science of University of Torino.
 My PhD focused on **machine learning** in particular on supervised learning. I have studied the training process of a Neural Network through methods based on direct fast pseudo-inversion algorithms, applying them to real case studies. I also studied methods of regularization and their possible applications to improve stability and generalization of the learned model [3]. In particular, I studied weights determination in order to improve performance saving computational time and memory resources [4]. We also found an analytical way for determining the regularization parameters, characterized by lower computational complexity [2] with respect to the classic not deterministic methods. I also studied how to improve learning performance using strategies from operational research domain [1].
 I spend five months with the *Erasmus Traineeship* program in Paris at research laboratory LIP6 of Université Pierre et Marie Curie. I applied my background of mathematics, traffic distribution models and biological models to the field of content diffusion in Social Networks, approaching this problem from a novel point of view and considering real case datasets as Weibo and Digg. The proposed learning technique for spatio-temporal series aims at joining together different concepts such as heat diffusion, contagion and optimal data representation. Recently I focused my research interests on Deep learning, both from an algorithmic and applicative point of view.

Publications

- 2016 [1] Rubini L., Cancelliere R., Gallinari P., Grosso A., *Local search and pseudoinversion: an hybrid approach to neural network training*, Knowledge and Information Systems, vol. 48(2), pp. 493–503, Springer.
- 2015 [2] Cancelliere R., Gai M., Gallinari P., Rubini L., De Luca R., *OCReP: An Optimally Conditioned Regularisation for Pseudoinversion Based Neural Training*, Neural Networks, vol. 71, pp. 76–87, Elsevier.
- 2015 [3] Cancelliere R., Deluca R., Gai M., Gallinari P., Rubini L., *An analysis of numerical issues in neural training by pseudoinversion*, Computational and Applied Mathematics, pp. 1–11, Springer.
- 2014 [4] Rubini L., Cancelliere R., Gallinari P., Grosso A., Raiti A., *Computational experience with pseudoinversion-based training of neural networks using random-projection matrices*, proceedings of conference AIMSA 2014, pp. 236–245, Springer.
- 2014 [5] De Rossi A., Lisa F., Rubini L., Zappavigna A., Venturino E., *A food chain ecoepidemic model: Infection at the bottom trophic level*, Ecological Complexity, vol. 21, pp. 233–245, Elsevier.

Professional and Other Memberships

- 2015–2016 Member of **GNCS** (*Gruppo Nazionale di Calcolo Scientifico*).
- 2014 Member of **ESMTB** (*European Society for Mathematical and Theoretical Biology*).

Personal Experiences and Interests

Member of the management of the sport society *Salus*. Volleyball coach of young/adult teams.

Volunteer at the no-profit association *Onda Giovane Salus*, Torino. Educator, coordinator of Summer Camps for children aged from 6 to 18 years old and responsible for the educational formation of a group of teens from 12 to 19 years old. Coordinator and actor for the associated theatre company, over 15 different pieces have been setted up in these last years.

Private teaching activity for high school students.

Interests: Volleyball, Cinema, Travel, Photography, Reading.

Luca Rubini

(Autorizzo il trattamento dei dati personali in base art. 13 del D. Lgs. 196/2003)