

Elisa Riccietti | PostDoc

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Work Experience

Research associate

Toulouse, France

Toulouse INP - IRIT, ENSEEIHT

2017–ongoing

- *Advisor:* Prof. Serge Gratton
 - *Topic:* Collaboration with TOTAL, application of Artificial Neural Networks to the solution of PDEs.
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PhD in Mathematics

Firenze, Italy

Università degli Studi di Firenze, Department of Mathematics

2014–2017

- *Advisor:* Prof. Stefania Bellavia, Department of Industrial Engineering - Numerical Analysis Group.
 - *Topic:* my PhD research revolves around the numerical resolution of ill-posed nonlinear inverse problems, in particular large-scale, nonlinear least-squares problems with noisy data.
 - *Date of award:* 7 March 2018.
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6 month visit to Prof. Serge Gratton

Toulouse, France

INPT-ENSEEIHT

2016–2017

Description: designing novel Levenberg-Marquardt methods to handle noisy functions and gradients in the resolution of large-scale least-squares problems, in particular arising from data assimilation and machine learning applications.

Collaboration on industrial problems

Firenze, Italy

Università degli Studi di Firenze, Department of Industrial Engineering

2014–2017

Description: improving the parametric design of turbomachinery components by means of machine learning techniques.

5 month research internship @ Enel

Pisa, Italy

Enel Engineering and Research

Feb.–Jun. 2014

Topic: developing Particle Swarm Optimization (PSO) and Sequential Linear Programming (SLP) solvers for the optimization of energy districts.

Education

PhD in Mathematics with "Doctor Europaeus" label

Firenze, Italy

Università degli Studi di Firenze

March 6th, 2018

Thesis title: *Levenberg-Marquardt methods for the solution of noisy nonlinear least squares problems*

Advisor: Prof. Stefania Bellavia, Università degli Studi di Firenze.

Co-Advisor: Prof. Serge Gratton, IRIT, Toulouse, France

Master degree in Mathematics (major in Numerical Optimization) **Firenze, Italy**
Università degli Studi di Firenze, 110/110 cum laude *Oct. 15th, 2014*
Thesis title: *Numerical methods for optimization problems: an application to energetic districts.*
Advisor: Prof. Stefania Bellavia, Università degli Studi di Firenze.
Co-Advisor: Dott. Stefano Sello, Enel Engineering and Research.

Bachelor degree in Mathematics **Firenze, Italy**
Università degli Studi di Firenze, 110/110 cum laude *Oct. 17th, 2012*
Thesis title: Euler's Gamma function and the trapezoidal rule.
Advisor: Prof. Alessandra Papini, Università degli Studi di Firenze.

Awards

- July 2017, Honorable mention for the talk: '*Parametric design of a family of centrifugal pumps: dealing with unbalancedness of geometries dataset*', given for award session of the Summer School on Optimization, Big Data and Applications (OBA), Veroli, Italy.
- May 2016, Winner of the degree award 'Hansjörg Wacker Memorial Prize', jointly funded by ECMI (European Consortium of Mathematics in Industry) and by a consortium of institutions from Linz.
- October 2015, Winner of the degree award 'Premio Laurea Magistrale o Specialistica in Matematica ed Informatica', by Università degli Studi di Firenze.
- October 2015, Winner of the degree award 'Premio di Laurea Magistrale Mario Negri', by Fondo Mario Negri.

Scholarships awarded

- October 2014, Winner of a PhD scholarship at Università degli Studi di Firenze.
- October 2014, Winner of a PhD scholarship at Università degli Studi Insubria.
- October 2014, Winner of a PhD scholarship at IMT (Institute for Advanced Studies) Lucca.

Participation to research projects

- 2017 INDAM-GNCS Project *Numerical methods for large scale constrained optimization problems and applications*, Coordinator: Prof. Luca Bergamaschi, Università di Padova.
- 2016 INDAM-GNCS Project *PING - Inverse Problems in Geophysics*, Coordinator: Prof. Giuseppe Rodriguez, Università di Cagliari.
- 2015 INDAM-GNCS Project *Regularizing methods for optimization problems and applications*, Coordinator: Prof. Stefania Bellavia, Università degli Studi di Firenze.

Participation to Schools

- Summer School on Optimization, Big Data and Applications (OBA), Veroli, Italy, 02/07/2017-08/07/2017.
- Exploiting Hidden Structure in Matrix Computations. Algorithms and Applications, CIME-EMS Summer School in Applied Mathematics 2015 - Cetraro, Italy, 22/06/2015-26/06/2015.

Publications

International Journal Articles.....

- S.Bellavia, B.Morini, E.Riccietti, *On an adaptive regularization for ill-posed nonlinear systems and its trust-region implementation*, Computational Optimization and Applications, pp. 1-30, 2015.
- E. Riccietti, J.Bellucci, M.Checucci, M.Marconcini, A.Arnese, *Support Vector Machine classification applied to the parametric design of centrifugal pumps*, Engineering Optimization, pp. 1-21, 2017.
- S.Bellavia, E.Riccietti, *On an elliptical trust-region procedure for ill-posed nonlinear least squares problems*, Journal of Optimization Theory and Applications, vol.158,n.3, 2018.
- E.Riccietti, S.Bellavia, S.Sello, *Sequential Linear Programming and Particle Swarm Optimization for the optimization of energy districts*, Engineering Optimization, pp.1-17, 2018.

International Journal Articles (Submitted).....

- S.Bellavia, S.Gratton, E.Riccietti, *A Levenberg-Marquardt method for large nonlinear least squares problems with noisy functions and gradients*, submitted to Numerische Mathematik.

Proceedings

- E.Riccietti, S.Bellavia, S.Sello, *Numerical methods for optimization problems arising in energetic districts*, ECMI proceedings 2016.

Thesis.....

- E. Riccietti, *Numerical methods for optimization problems: an application to energetic districts* - Master Thesis, 2014.
- E. Riccietti, *Levenberg-Marquardt methods for the solution of noisy nonlinear least squares problems* - PhD Thesis, 2018.

Talks

Invited Talks.....

- *A Levenberg-Marquardt method for large scale noisy nonlinear least squares problems*, SIOPT 2017, Vancouver, Canada, 22/05/2017-25/05/2017.
- *Support Vector Machine classification applied to the parametric design of centrifugal pumps*, Congresso Nazionale SIMA 2016, Milano, 13/09/2016-16/09/2016.
- *Regularizing trust-region approaches for ill-posed nonlinear systems and nonlinear least squares*, 20th Conference of the International Linear Algebra Society (ILAS), Leuven, Belgium, 11/07/2016-15/07/2016.
- *Numerical methods for optimization problems: an application to energetic districts*, 19th European Conference on Mathematics for Industry, Santiago de Compostela, Spain, 13/06/2016-17/06/2016, invited speaker for receiving the degree award 'Hansjörg Wacker Memorial Prize'.
- *On an adaptive regularization for ill-posed nonlinear systems and its trust-region implementation*, Networking in Numerical Analysis 2015 a two day meeting in Bertinoro', Bertinoro, Italy, 21/2015-22/11/2015.

Contributed Talks.....

- *Solving ill-posed nonlinear systems with noisy data: a regularizing trust-region approach*, 'PING - Inverse Problems in Geophysics' Workshop Firenze, Italy, 6/04/2016.

- *A regularization trust-region approach for ill-posed nonlinear systems*, Workshop 'Optimization and Data Assimilation', CERFACS, Toulouse, France, 13/01/2016-15/01/2016.
- *On an adaptive regularization for ill-posed nonlinear systems and its trust-region implementation*, XX Congresso UMI, Siena, Italy, 12/09/2015.

Seminars for PhD course.....

- *Levenberg-Marquardt methods for the solution of ill-posed nonlinear least squares problems*, Università di Firenze, 27/09/2016.
- *Trust-region methods for ill-posed nonlinear systems*, Università di Firenze, 15/10/2015.
- *Support Vector Machine methods for optimization*, talk given for the Optimization Course, Università di Firenze, 10/05/2015.

Posters.....

- *Levenberg-Marquardt method for ill-posed large scale nonlinear least squares problems*, OIP2016-Optimization Techniques for Inverse Problems III, Modena, Italy, 19/09/2016- 21/09/2016.

Workshops and other conferences

- AVENUE Project Workshop on Data Assimilation, Toulouse, France, 20/06/2017-21/06/2017.
- ISMP 2015, 22nd International Symposium on Mathematical Programming, Pittsburgh (USA), 12/07/2015-17/07/2015.

Teaching

- Teaching assistant in Scientific Computing, IRIT, Toulouse, 2018.
- Tutor for the course 'Calcolo Numerico', degree course in Mechanical Engineering at Università degli Studi Firenze, 2016.
- Co-supervisor for the master thesis 'Self-Organizing Maps for Parametric Design of Turbomachinery' of a student of Università degli Studi di Firenze. Topic: use of machine learning techniques (Self-Organizing Maps (SOM) and Artificial Neural Networks (ANN)) to improve the parametric design of a turbomachinery component, 2017.