Marta Lazzaretti
Curriculum Vitæ

Teaching experience
01/2022 Exercise classes (8h), Université Côte d'Azur, Sophia Antipolis.
Exercise classes (TD) for the Master 2 course "Inverse problems in image processing".
Prepartion of Python notebooks and corrections of students' reports.
11/2020– 04/2021
Teaching assistant (40h), Università di Genova, Genova.
Tutoring for 1st Year students of Bachelor degrees in Mathematics, Physics and Statistics. Guided
exercises classes for the courses Calculus 1, Algebra 1, Linear algebra and analytic geometry.

Education
05-06/2022 Visiting PhD student at University of Cambridge, NoMADS Secondment, Cambridge
Image Analysis group, DAMTP, University of Cambridge, Cambridge, UK.
Project: 3D Single Molecule Localisation Microscopy with on-the-grid and off-the-grid aproaches
under the supervision of Leila Muresan, Jerome Boulanger, Yury Korolev
11/2020–
Present
Joint PhD in Applied Mathematics between Università di Genova and Université Côte d'Azur, Dima - Università di Genova, I3S Lab. - Université Côte d'Azur, Genova, Sophia Antipolis, Supervisors: CNRS Chargé de Recherche Luca Calatroni and Associate Professor Claudio Estatico.
Proximal gradient algorithms to solve sparse optimisation problems in Banach spaces
03–07/2020 Master 2 Internship Project, Université Côte d'Azur, I3S Laboratoire, Morphéme Team,
Sophia Antipolis, Supervisor: CNRS Chargé de Recherche Luca Calatroni.
Study of Super-Resolution techniques for biological images, development of a new variational model
for images corrupted by Poisson noise and suited to enforce sparsity, study of some optimization
algorithms and test of the model with simulated images on MatLab.
2018–2020 Master degree in Applied Mathematics, Università di Genova, Genova, 110/110 cum
Laude.
Title thesis: Continuous relaxation of sparse `0 optimisation problems in fluorescence microscopy
with Poisson data, Supervisors: CNRS Chargé de Recherche Luca Calatroni and Associate Professor
Claudio Estatico
09–12/2017 Erasmus exchange semester, University College Cork, Cork, Bachelor degree in Mathe-
matics: 6 modules of 5 ECTS each, passed with First Class Honours.
2015–2018 Bachelor degree in Mathematics, Università di Genova, Genova, 110/110 cum Laude.
Title thesis: RSA cryptosystem, Supervisor: Full Professor Maria Evelina Rossi. Granted

with first
year merit student award in 2016.
2010–2015 High school diploma in scientific studies, Liceo Scientifico G. D. Cassini, Genova.

Pubblications

Proceedings

A continuous, non-convex and sparse super-resolution approach for fluorescence microscopy data with Poisson noise, Lazzaretti M., Calatroni L., Estatico C., ICCSA 2021. IEEE CPS.

A Scaled and Adaptive FISTA Algorithm for Signal-Dependent Sparse Image Super-Resolution Problems, Lazzaretti M., Rebegoldi S., Calatroni L., Estatico C., Scale Space and Variational Methods in Computer Vision. SSVM 2021. Lecture Notes in Computer Science, vol 12679. Springer, Cham..

Weighted-CEL0 sparse regularisation for molecule localisation in super-resolution microscopy with Poisson data, M. Lazzaretti, L. Calatroni, C. Estatico, IEEE ISBI 2021.

Journal paper

Modular-proximal gradient algorithms in variable exponent Lebesgue spaces, Lazzaretti M., Calatroni L., Estatico C., SIAM Journal on Scientific Computing, Vol.44, Iss.6. (2022)

Preprint

Descent regularization algorithms in variable exponent Lebesgue spaces for imaging, Bonino B., Estatico C., Lazzaretti M., submitted to Springer Numerical Algorithms.

Conferences & workshops & seminars

2022

Sep.26-30 SIAM MDS22: SIAM Conference on Mathematics of Data Science, Invited speaker
at the Algorithmic Advances in Imaging Inverse Problems minisyposium, San Diego, USA.
Sep.12-14 MIA-MIVA workshop, Sophia-Antipolis, France.
Aug.30-Sep.2 ODS 2022: International Conference on Optimisation and Decision Science, Invited
speaker at the Numerical Optimization for Data Analysis and Imaging minisyposium, Firenze,
Italy.
June 16 MathWorks, Seminar, Cambridge, UK.
June 15 MRC Laboratory of Molecular Biology, Seminar, Cambridge, UK.
June 8 Cambridge Analysis Imaging Center, Seminar, Cambridge, UK.
April 8 Cambridge Image Analysis group meeting, Seminar, Cambridge, UK, (virtual).

2021

Nov.29-Dec.3 Micro-blind startup meeting, Workshop, CIRM, Luminy, France.
Oct. 11-13 PRIMO Workshop 2021, Bologna, Italy, (hybrid).
Sep. 13-17 YAMC 2021: First Young Applied Mathematicians Conference, Leuca, Italy.
Aug.30-Sep.3 SIMAI 2020+2021: congress of the Italian Society of Industrial and Applied Mathematics, Invited speaker at the Mathematics of Machine Learning minisyposium, Parma, Italy, (hybrid).
May 17-19 SSVM 2021: Eight Scale Space and Variational Methods in Computer Vision, poster presentation, Cabourg, France, (virtual).
April 13-16 IEEE ISBI 2021: International Symposium on Biomedical Imaging, poster presentation, Nice, France, (virtual).

Conference organisation
2022 Co-organiser of the Young Applied Mathematicians Conference, Arenzano (Genova, Italy), 18th-22nd September 2022
Grants
09/2022 SIAM Student Travel Award, SIAM Conference on Mathematics of Data Science 2022
(MDS22), San Diego
08/2022 Verizon Connect Italy grant for young female researcher, International Conference
on Optimization and Decision Science 2022, Firenze
02/2022 Travel financial support for early career researchers, to attend LMS Invited Lectures
on the Mathematis of Deep Learning, Isaac Newton Institute, Cambridge
Memberships
SIAM Society for Industrial and Applied Mathematics
SIMAI Società Italiana di Matematica Applicata e Industriale
GNCS Gruppo Nazionale per il Calcolo Scientifico, Istituto Nazionale Di Alta Matematica
PRIMO Post graduate Researchers in Inverse problems, Machine learning and Optimization
Other education activities and projects
03/2022 LMS Invited Lectures on the Mathematics of Deep Learning, Isaac Newton Institute,
Cambridge, Granted with travel financial support by Isaac Newton Institute.
The workshop aimed to provide a mathematical foundation of deep learning by an introduction to
the main mathematical questions and concepts of deep neural networks and their training.
01/2021 Research School: Mathematics, Signal Processing and Learning, Centre International Rencontres Mathématiques, Marseille, Luminy.
Doctoral school on mathematics and learning with an emphasis on signal and image processing.
06/2020 Regularization Methods for Machine Learning, Summer School, Machine Learning
Genoa Center, Genova.
20 hours advanced machine learning course including theory classes and practical laboratory sessions.
Emphasis on high dimensional data and regularization methods.
09/2019 Applied Harmonic Analysis and Machine Learning, Summer School, Machine Learning
Genoa Center, Genova.
Three minicourses on Signal Analysis and Big Data: Ill-posed problems: from linear to non-linear,
Computational Optimal Transport, Time-frequency analysis.
Computational skills
Basic R, SaS, C++, Python
Good MatLab, LATEX
Languages
Italian Mothertongue
English Fluent C1 level certified
French Basic