

PERSONAL INFORMATION

Marco Prato

WORK EXPERIENCE

Since 16/01/2020

Permanent position as Associate Professor

Department of Physics, Informatics and Mathematics
 University of Modena and Reggio Emilia
 Sector MAT/08 – Numerical Analysis

01/09/2008 – 15/01/2020

Researcher

Department of Physics, Informatics and Mathematics
 University of Modena and Reggio Emilia
 Sector MAT/08 – Numerical Analysis

EDUCATION AND TRAINING

01/01/2008 – 31/08/2008

Post-doc

Laboratory of Innovative and Artificial Materials - CNR-INFM, Genova

01/09/2007 – 31/12/2007

Post-doc

Department of Computer Science, University of Genova

01/05/2007 – 31/08/2007

Post-doc

01/03/2006 – 28/02/2007

Department of Pure and Applied Mathematics, University of Modena and Reggio Emilia

25/05/2006

PhD in Mathematics and Applications

Department of Mathematics, University of Genova

03/02/2003

Degree in Mathematics, classification 110/110 cum laude

Department of Mathematics, University of Genova

PERSONAL SKILLS

Mother tongue(s)

Italian

Other language(s)

English

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
C1	C1	C1	C1	C1

Technical skills and competences

Numerical optimization

- Acceleration techniques for first-order methods
- Gradient projection methods for constrained optimization problems
- Forward-backward approaches for nonsmooth optimization

Inverse problems

- Variational approach to image reconstruction
- Regularization techniques for inverse problems
- Optimization algorithms for machine learning methodologies

Computer skills and competences

Operating systems: Windows
 Programming: Matlab, IDL
 General software: Microsoft Office

RESEARCH ACTIVITY

- Publications** Author/Co-author of more than 60 publications in National/International Journals and Conference Proceedings
- Selected papers (last 5 years):
- Bonettini S., Prato M., Rebegoldi S. 2021, New convergence results for the inexact variable metric forward-backward method. *Applied Mathematics and Computation* 391, 125719
 - Bubba T.A., Galinier M., Ratti L., Lassas M., Prato M., Siltanen S. 2021, Deep neural networks for inverse problems with pseudodifferential operators: an application to limited-angle tomography. *SIAM Journal on Imaging Science* 14(2), 470-505
 - Bertocchi C., Chouzenoux E., Corbineau M.-C., Pesquet J.-C. and Prato M. 2020, "Deep unfolding of a proximal interior point method for image restoration", *Inverse Problems* 36, 034005
 - Bonettini S., Prato M., Rebegoldi S. 2020, Convergence of inexact forward-backward algorithms using the forward-backward envelope. *SIAM Journal on Optimization* 30(4), 3069-3097
 - Bonettini S., Prato M. and Rebegoldi S. 2018, "A block coordinate variable metric linesearch based proximal gradient method", *Computational Optimization and Applications* 71, 5-52
 - Rebegoldi S., Bautista L., Blanc-Féraud L., Prato M., Zanni L. and Plata A. 2017, "A comparison of edge-preserving approaches for differential interference contrast microscopy", *Inverse Problems* 33, 085009
 - Bonettini S., Loris I., Porta F., Prato M. and Rebegoldi S. 2017, "On the convergence of a linesearch based proximal-gradient method for nonconvex optimization", *Inverse Problems* 33, 055005
 - Bonettini S., Prato M. and Rebegoldi S. 2016, "A cyclic block coordinate descent method with generalized gradient projections", *Applied Mathematics and Computation* 286, 288-300
 - Bonettini S., Loris I., Porta F. and Prato M. 2016, "Variable metric inexact line-search based methods for nonsmooth optimization", *SIAM Journal on Optimization* 26, 891-921
- Oral presentations** Author of more than 30 oral or poster presentations in National/International Conferences and Workshops.
- Last 5 years oral presentations track:
- Invited speaker:
- "Congress of SIMAI 2020-21", Parma, August 30 - September 3 2021. Symposium on "Solution methodologies of inverse problems: application to engineering issues" organized by Dott. Luca Cattani.
 - "SIAM Conference on Imaging Science", Toronto, July 6-9 2020. Virtual symposium on "Data driven image restoration" organized by Prof. Fiorella Sgallari and Prof. Serena Morigi.
 - "A Two-day Workshop on Structure-preserving Approximation of Evolutive Problems and Applications", L'Aquila, January 23-24 2020.
 - "21st Congress of UMI", Pavia, September 2-7 2019. Section on "Numerical optimization and inverse problems" organized by Prof. Luca Zanni and Prof. Benedetta Morini
 - "6th International Conference on Continuous Optimization", Berlin, August 5-8 2019. Symposium on "Block Alternating Schemes for Nonsmooth Optimization at a Large Scale" organized by Dr. Emilie Chouzenoux
 - "Applied Inverse Problems 2019", Grenoble, July 8-12 2019. Symposium on "Model driven deterministic and Bayesian regularization methods for applied inverse problems" organized by Prof. Claudio Estaco, Dr. Federico Benvenuto and Dr. Alberto Sorrentino
 - "INdAM Intensive Period on Computational Methods for Inverse Problems in Imaging", Como, June 18-20 2018. Short courses on "Numerical methods for astronomical imaging"
 - "International Biomedical and Astronomical Signal Processing (BASP) Frontiers 2017", Villars-sur-Ollon, January 29 - February 3 2017. Symposium on "Advanced optimization methods for solving inverse problems at a large scale" organized by Prof. Jean-Christophe Pesquet and Dr. Emilie Chouzenoux
- Contributed talks:
- "PCH60: Computational Inverse Problems - Insight and Algorithms", Copenhagen, August 23-25 2017
 - "Due Giorni di Algebra Lineare Numerica", Como, February 16-17 2017
 - "6th International Workshop on New Computational Methods for Inverse Problems", Cachan, May 20 2016

- Organization** Last 5 years track:
- Organizer of the workshop "Optimization Techniques for Inverse Problems IV", Modena, September 6-7 2021
 - Organizer of the symposium "Mathematical Methods for Data Science: Business Case Studies", SIMAI 2020{21, Parma, August 30 - September 3 2021.
 - Organizer of the symposium "Advanced optimization methods for image processing", SIAM Conference on Imaging Sciences, Bologna, June 5-8 2018
 - Organizer of the workshop "Optimization Techniques for Inverse Problems III", Modena, September 19-21 2016
 - Organizer of the symposium "Advances in regularization methods for applied inverse problems", SIMAI 2016, Milano, September 13-16 2016
- Peer review activity** Inverse Problems, Applied Mathematics and Computation, SIAM Journal on Imaging Sciences, Acta Astronautica, Applied Sciences, Current Bioinformatics, Digital Signal Processing, Electronic Transactions on Numerical Analysis, Experimental Astronomy, IEEE Access, IEEE Transactions on Cybernetics, IEEE Transactions on Neural Networks, IEEE Transactions on Systems, Man, and Cybernetics: Systems, International Journal for Numerical Methods in Biomedical Engineering, International Journal of Computer Mathematics, International Transactions in Operational Research, Inverse Problems and Imaging, Journal of Computational and Applied Mathematics, Journal of Mathematical Imaging and Vision, Journal of Space Weather and Space Climate, Journal of Visual Communication and Image Representation, Microporous and Mesoporous Materials, Pattern Recognition Letters, SIAM Journal on Scientific Computing, Sensors, TPM - Testing, Psychometrics, Methodology in Applied Psychology
- Projects** Principal Investigator (last 5 years)
- 2018 UNIMORE Mobility Actions: Hybrid image reconstruction and deep learning methods for limited angle computed tomography
 - 2017 UNIMORE Mobility Actions: Stochastic optimization methods for signal and image reconstruction
 - 2016 GNCS: New frontiers of nonsmooth optimization in inverse problems
- Research grant supports (last 5 years)
- 2020 GNCS: Numerical optimization in image restoration and reconstruction
 - 2019 GNCS: Adaptive techniques for optimization methods in machine learning
 - 2018 H2020/ECSEL-RIA: PRYSTINE - Programmable systems for intelligence in automobiles (grant 783190)
 - 2018 GNCS: Stochastic optimization methods for large scale machine learning problems
 - 2017 GNCS: Nonlinear numerical methods for inverse problems and applications
- Honours and awards** Paper awards
- Selection of the publication "Bonettini S., Loris I., Porta F., Prato M. and Rebegoldi S. 2017, Inverse Problems 33, 055005" for the Inverse Problems Highlights Collection 2017
 - Selection of the publication "Cornelio A., Porta F., Prato M. and Zanni L. 2013, Inverse Problems 29, 125013" for the Inverse Problems Highlights Collection 2013
 - Selection of the publication "Prato M., La Camera A., Bonettini S. and Bertero M. 2013, Inverse Problems 29, 065017" for the Inverse Problems Insights section
 - Selection of the publication "Bonettini S. and Prato M. 2010, Inverse Problems 26, 095001" for the Inverse Problems Highlights Collection 2010
- Others
- Assignment of the Italian "Fund for the financing of basic research activities (FFABR) 2017"
 - Assignment of the "NASA Group Achievement Award" as a member of the RHESSI Science and Data Analysis Team
 - Finalist in the competition "European Community on Computational Methods in Applied Sciences (ECCOMAS) PhD Thesis Award 2006"
- Membership**
- Gruppo Nazionale per il Calcolo Scientifico (GNCS) - Istituto Nazionale di Alta Matematica "Francesco Severi" (INdAM)
 - Unione Matematica Italiana (UMI)
 - Società Italiana di Matematica Applicata e Industriale (SIMAI)
 - Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) Science and Data Analysis Team
 - Optimization Algorithms and Software for Inverse Problems (OASIS) research group

TEACHING ACTIVITY

Teaching duties

Academic courses at the University of Modena and Reggio Emilia (last 5 years):

- Mathematics I, Bachelor's Degrees in Strategic Sciences (A.Y. 2021/22).
- Computational and Statistical Learning, Master's Degrees in Mathematics and Computer Science (A.Y. from 2020/21 to 2021/22).
- Numerical Analysis, Bachelor's Degree in Mathematics (A.Y. 2020/21).
- Inverse Problems and Applications, Master's Degree in Mathematics (A.Y. from 2019/20 to 2021/22).
- Numerical Analysis and Statistics, Bachelor's Degree in Computer Engineering (A.Y. from 2019/20 to 2021/22).
- Foundations of Analysis, Bachelor's Degree in Computer Engineering (A.Y. from 2018/19 to 2021/22).
- Numerical Methods, Master's Degree in Mathematics (A.Y. from 2013/14 to 2018/19).
- Empirical and Approximated Models, Master's Degree in Computer Science (A.Y. from 2017/18 to 2018/19).
- Numerical Analysis (Laboratory), Bachelor's Degree in Mathematics (A.Y. from 2017/18 to 2018/19).
- Mathematics II (Laboratory and/or exercises), Bachelor's Degree in Chemistry (A.Y. from 2016/17 to 2017/18).
- Numerical Calculus, Bachelor's Degree in Computer Science (A.Y. 2016/17).

Supervisor activity

- Tutor of the post-doc fellowship "New optimization strategies for image reconstruction" (University of Modena and Reggio Emilia, 16/02/2016-15/02/2017)
- Tutor of the Marie Skłodowska-Curie fellowship "Mathematical and computational methods for medical image processing", (University of Modena and Reggio Emilia, 01/11/2017 - 30/10/2020), INdAM-DP-COFUND-2015 - INdAM Doctoral Programme in Mathematics and/or Applications.
- Advisor/Co-advisor of 7 PhD Theses in Mathematics and 38 Theses in Mathematics and/or Computer Science.
- Outside examiner or referee of 8 PhD Theses.