Valentina Candiani

Curriculum Vitae

Personal Information

Name Valentina Candiani
Birth Date
Birth Place
Nationality
Webpage

Research Interests

{ Inverse Problems, with application to Medical Imaging

{ Linear and Nonlinear Reconstruction Algorithms

{ Machine Learning

{ Finite Element Methods

{ Regularization and Optimization

Current Position

12/2021– **PostDoctoral Researcher**, *University of Genova*, Genova, Italy.
present Collab. with Prof. Michele Piana, Prof. Cristina Campi, Prof. Anna Maria Massone. { Artificial Intelligence for the analysis of solar FLARES data (Activities of the MIDA group http://mida.dima.unige.it)

{ Radiomics analysis and Artificial Intelligence for outcome prediction in meningioma patients (Activities of the LiscompLab https://liscomp.dima.unige.it) in collab. with IRCCS Ospedale Policlinico San Martino.

Research and working experience

11/2017– **PhD Student**, *Aalto University, Dept. of Mathematics and Systems Analysis*, Espoo,
11/2021 Finland.
Thesis: *Computational approaches in electrical impedance tomography with applications to head imaging*.
Date of defense: 12 November 2021.
Supervisor: Prof. Nuutti Hyvönen.
Pre-examiners: Prof. Sarah J. Hamilton, Marquette University, USA, and Prof. Lucas Chesnel, Ecole Polytechnique, France.
Opponent: Prof. Erkki Somersalo, Case Western Reserve University, USA.

01/2020– **Visiting Researcher**, *University of Auckland*, Auckland, New Zealand. 04/2020 Topic:
Optimization of electrode positions in electrical impedance tomography.
Advisor: Prof. Jari P. Kaipio.

Education

09/2015– **Master Degree in Mathematics**, *University of Genova*, Italy, 110/110 cum laude.
10/2017   Thesis title: The role of segmentation in kidney compartmental analysis.
Supervisors: Prof. Anna Maria Massone, Prof. Cristina Campi.
09/2012– **Bachelor Degree in Mathematics**, *University of Genova*, Italy, 109/110.
09/2015   Thesis title: The signal equation in Magnetic Resonance Imaging.
Supervisor: Prof. Anna Maria Massone.
2007–2012 **Scientific high school diploma**, *Liceo Scientifico L. Lanfranconi*, Italy.

Publications

2021 **Candiani, V., Hyvönen, N., Kaipio, J. P., and Kolehmainen, V.**, *Approximation error method for imaging the human head by electrical impedance tomography*, Inverse Problems, 37(12), 125008, https://doi.org/10.1088/1361-6420/ac34 6a.

2021 **Candiani, V., and Santacesaria, M.**, *Neural networks for classification of stroke in electrical impedance tomography on a 3D head model*, Mathematics in Engineering 4(4), 1–22, http://aimspress.com/article/doi/10.3934/mine.2022029.

2020 **Candiani, V., Dardé, J., Garde, H., and Hyvönen, N.**, *Monotonicity-based reconstruction of extreme inclusions in electrical impedance tomography*, SIAM Journal of Mathematical Analysis, 52(6), 6234–6259, https://doi.org/10.113 7/19M1299219.

2019 **Candiani, V., Hannukainen, A., and Hyvönen, N.**, *Computational framework for applying electrical impedance tomography to head imaging*, SIAM Journal of Scientific Computing, 41(5), B1034–B1060, https://doi.org/10.1137/19M124 5098.

Teaching Experience

2017–2021 **Teaching Assistant**, *Aalto University*, Espoo, Finland.
I have been a teaching assistant at Aalto University. Duties of a teaching assistant include grading and/or holding recitation sections. I have been a teaching assistant for the following courses.

{ Computational inverse problems (Aalto University, Spring 2018, Spring 2019) { Computational methods for differential equations (Aalto University, Fall 2018, Fall 2019)

{ Prediction and time series analysis (Aalto University, Fall 2019)

{ Hilbert Spaces (Aalto University, Fall 2020, Fall 2021)

{ Differential and integral calculus 3 (Aalto University, Spring 2021) {

Tutor for bachelor level courses (Aalto University, 2017-2020).

Work Experience

01/2016– **Professional Trainee**, *Paramed MRI unit, Paramed*, Genova, Italy.
06/2016 Professional training course on the development of techniques for image processing and reduction of distortion effects in Magnetic Resonance Imaging (MRI).

01/2016– **Professional Trainee**, *CAMELOT biomedical systems S.r.l.*, Genova, Italy.
06/2016 Professional training course on industrial applications of mathematical methods for data analysis, as image co-registration, image segmentation and machine learning for various applications.

Service

2022 Part of the organizing committee for the "28th Nordic Congress of Mathematicians", Aalto University, August 2022: https://ncm28.math.aalto.fi/Sessions.

2022 Scientific tutor at the 2022 Mathematics stage at DIMA http://www2.dima.un ige.it/it/per_le_scuole/stage_al_dima

2021 Activity as a referee for the journal Inverse Problems. https://publons.com/re searcher/4615354/valentina-candiani/

2020 Volunteer for the October 2020 math camp for high school students offered by the Department of Mathematics of Systems Analysis, Aalto University. https://www. aalto.fi/fi/tapahtumat/matematiikkaleiri-lukiolaisille-2020.

2019 Co-organizer of the Mathematical workshops for "Tyttöjen päivä" (Girls' Day) for high schools, at Heureka Science Center, Helsinki, October 2019, as a means of encouraging young women to become interested in science, technology, engineering, and mathematics.

2019 Co-organizer of the seminar series "What is..?" at Aalto University, a seminar series meant for PhD students and post-docs.

2018 Part of the organizing committee for the conference "Inverse Days 2018", Aalto University, December 2018. http://math.aalto.fi/en/research/applied/in verseproblems/inverse_days-2018/.

Awards and Grants

2022 **GNCS Bando Giovani Ricercatori**, *Young researchers grant by GNCS*.

2022 **Aalto University dissertation award**, *The core criteria for the award are quality, impact and originality.*, https://www.aalto.fi/en/news/best-doctoral-the ses-and-masters-theses-of-2021-in-the-school-of-science-awarded.

2021 **Finnish Inverse Prize (Dissertation Prize)**, *Annual award of the Finnish Inverse Problems Society awarded to a young researcher for an outstanding doctoral thesis in inverse problems*, see: http://www.fips.fi/fipsprize.php.

2020 **Finnish Cultural Foundation (Suomen Kultturirahasto)**, *Grant as a continuation of the project: Computational method for determining the type of stroke by impedance tomography*, February 2020 (e 26,000), see: https://apurahat.skr .fi/myonnot.

2019 **Finnish Cultural Foundation (Suomen Kultturirahasto)**, *Grant for the project: Computational method for determining the type of stroke by impedance tomography*, February 2019 (e 8,000).

Talks and Presentations

Invited Talks

upcoming **GIMC-SIMAI Young 2022**, *Pavia, Italy*, "Classification of strokes in electrical impedance tomography: from the inverse problem to a neural networks approach", September 2022.

upcoming **MATCHES 2022 Workshop**, *Rome, Italy*, Quantitative imaging and radiomics: feasibility and challenges, June 2022.

2022 **Inverse Problems: Modeling and Simulation (IPMS) conference**, *Malta*, "Machine learning approach for stroke detection in electrical impedance tomography", 24/05/2022.

2022 **SIAM Conference on Imaging Sciences**, *Berlin, Germany (virtual)*, "Approximation error method for imaging the human head by electrical impedance tomography", 25/03/2022.

2021 **Società Italiana di Matematica Applicata e Industriale (SIMAI) conference**, *Parma, Italy*, "Computational framework for applying electrical impedance tomography to head imaging", 31/08/2021.

2021 **SIAM Annual Meeting 2021**, *Spokane, Washington, USA (virtual)*, "Robust monitoring of the human head by electrical impedance tomography", 19/07/2021.

2020 **EIT seminar**, *University of Helsinki (virtual)*, "Applying EIT to head imaging", 15/05/2020.

2020 **Applied Math seminar**, *University of Auckland, Auckland, New Zealand*, "Computational approaches in electrical impedance tomography", 17/02/2020.

2019 **Inverse Problems seminar**, *University of Helsinki, Helsinki, Finland*, "Monotonicitybased reconstruction of extreme inclusions in electrical impedance tomography", 18/11/2019.

2019 **International Congress of Industrial and Applied Mathematics (ICIAM)**, *Valencia, Spain*, "Computational framework for applying EIT to head imaging", 19/07/2019.

2019 **Applied Inverse Problems (AIP) Conference**, *Grenoble, France*, "Computational framework for applying EIT to head imaging", 10/07/2019.

Contributions in Conferences and Seminars

upcoming **Inverse Days 2022**, *Kuopio, Finland*, December 2022.

upcoming	**YAMC 2022 Conference**, *Arenzano, Italy*, September 2022.
2020	**Inverse Days 2020**, *Helsinki, Finland (virtual)*, "Approximation error method for imaging the human head by electrical impedance tomography", 15/12/2020.
2020	**Australia and New Zealand Industrial and Applied Mathematics (ANZIAM) conference**, *Macquarie University, Hunter Valley, Australia*, "Computational framework for applying EIT to head imaging", 4/02/2020.
2019	**Inverse Days 2019**, *University of Jyväskylä, Jyväskylä, Finland*, "Monotonicitybased reconstruction of extreme inclusions in electrical impedance tomography", 18/12/2019.
2019	**EIT seminar**, *Tampere, Finland*, "Machine learning for classification of strokes in EIT", 4/04/2019.

Computer skills

Advanced	Matlab, L^{A}TEX
Intermediate	Python, R
Basic	C++, CoCoA, SAS

Languages

Italian	Mothertongue
English	Advanced, Cambridge Assessment Exam (CAE) at level C2, Dec. 2020
French	Intermediate, Diplôme d'Études en Langue Française (DELF) at level B2, Dec. 2011
Finnish	Basic, University of Helsinki certificate at level A2, Dec. 2018

Memberships

2022–now	Gruppo Nazionale per il Calcolo Scientifico (GNCS)
2021–now	Gruppo UMI Matematica delle Immagini, della Visione e delle loro Applicazioni (MIVA)
2021–now	Unione Matematica Italiana (UMI)
2020–now	European Women in Mathematics (EWM)
2017–now	Finnish Inverse Problems Society (FIPS)

References

Professor Michele Piana, *piana@dima.unige.it*. Professor,
Department of Mathematics, University of Genova

Professor Nuutti Hyvönen, *nuutti.hyvonen@aalto.fi*.
Professor, Department of Mathematics and Systems Analysis, Aalto University

I authorize the use of my personal data in compliance to Italian Law L. D. 196/03.

June 14, 2022, Genoa, Italy.

Valentina Candiani