

PERSONAL INFORMATION **Andrea ASPRI****EDUCATION AND TRAINING**01/11/2020 – **Postdoctoral position**

Winner in September 2020 of a postdoc position at Mathematics Department "F. Casorati" of Università di Pavia, under the supervision of Prof. Elisabetta Rocca.

- Title of the research project: Problemi di controllo e di dinamiche a lungo termine per sistemi di equazioni alle derivate parziali non lineari;
- Project funds: FRG5 – Fondo Ricerca & Giovani es. 2019 and Progetto Dipartimento di Eccellenza 2018-2022.

01/10/2017 – 31/10/2020 **Postdoctoral Research Scientist**

Research Scientist at RICAM (Johann Radon Institute for Computational and Applied Mathematics), in the group "Inverse Problems and Mathematical Imaging", under the supervision of Prof. Otmar Scherzer, Linz, Austria.

01/11/2013 – 31/10/2016 **PhD in Mathematics**

EQF 8

Mathematics Department "Guido Castelnuovo", Sapienza Università di Roma  
Piazzale Aldo Moro 5, 00185 Roma (Italy)

- Thesis Title: *Analysis of a linear elastic model relative to a small pressurized cavity embedded in the half-space.*
- Advisors: Prof. Elena Beretta (Mathematics Department, Politecnico di Milano), Prof. Corrado Mascia (Mathematics Department, Sapienza Università di Roma).
- Referees report: Ammari Habib, Scherzer Otmar.
- Date of Defense: January 13, 2017.
- Committee: *Ammari Habib, Francini Elisa, Gianni Roberto.*
- Classification: excellent.

01/10/2010 – 25/03/2013 **Master's Degree in Applied Mathematics**

EQF 7

Mathematics Department "Guido Castelnuovo", Sapienza Università di Roma  
Piazzale Aldo Moro 5, 00185 Roma (Italy)

- Thesis Title: *Deformazioni elastiche e variazioni gravitazionali generate da intrusioni ellissoidali con applicazioni alla vulcanologia* (Elastic deformations and gravity anomalies due to ellipsoidal intrusions with applications in volcanology).
- Final grade: 110/110 cum laude.
- Supervisors: Prof. Corrado Mascia (Mathematics Department, Sapienza Università di Roma), Prof. Maurizio Battaglia (Department of the Earth Sciences).

26/09/2005 – 21/09/2010 **Bachelor's Degree in Mathematics**

EQF 6

Mathematics Department "Guido Castelnuovo", Sapienza Università di Roma  
Piazzale Aldo Moro 5, 00185 Roma (Italy)

- Thesis Title: *Prodotti infiniti e funzione euleriana Gamma.*
- Final grade: 107/110.
- Supervisor: Prof. Flavia Lanzara (Mathematics Department, Sapienza Università di Roma).

09/2000 – 07/2005 **High School Diploma**

EQF 4

Liceo Scientifico Statale "Giovanni Vailati", Genzano di Roma, Rome (Italy)

- Final grade: 100/100.

## SCIENTIFIC ACTIVITY

### 1. PAPERS AND PROJECTS

#### Scientific Interests

- Inverse problems for PDEs with particular interest for mathematical models coming from the applications.
- Partial differential equations of elliptic type and integral equations.
- Shape optimization.
- Regularization methods for ill-posed problems: Data driven regularizations.

#### Book

- A. Aspri, **An Elastic Model for Volcanology**, published in “Lecture Notes in Geosystems Mathematics and Computing”, Birkhäuser, Springer Nature Switzerland, December 2019. <https://www.springer.com/gp/book/9783030314743>.

#### List of Publications

1. A. Aspri, E. Beretta, C. Mascia, **Asymptotic Expansion for Harmonic Functions in the Half-Space with a Pressurized Cavity**, *Mathematical Methods in the Applied Sciences*, Volume 39, Issue 10, July 2016, 2415–2430.
2. A. Aspri, E. Beretta, C. Mascia, **Analysis of a Mogi-type model describing surface deformations induced by a magma chamber embedded in an elastic half-space**, *Journal de l'École polytechnique — Mathématiques*, Volume 4, January 2017, 223-255.
3. A. Aspri, E. Beretta, E. Rosset, **On an elastic model arising from volcanology: an analysis of the direct and inverse problem**, *Journal of Differential Equations*, Volume 265, Issue 12, December 2018, 6400–6423.
4. A. Aspri, E. Beretta, A. Mazzucato, M. de Hoop, **Analysis of a model of elastic dislocations in geophysics**, *Archive for Rational Mechanics and Analysis* (online first November 2019), Volume 236, Issue 1, April 2020, 71–111.
5. A. Aspri, S. Banert, O. Öktem, O. Scherzer, **A data-driven iteratively regularized Landweber iteration**, *Numerical Functional Analysis and Optimization*, (online first March 2020), Volume 41, Issue 10, 2020, 1190-1227.
6. A. Aspri, E. Beretta, O. Scherzer, M. Muszkieta, **Asymptotic expansions for higher order elliptic equations with an application to quantitative photoacoustic tomography**, August 2020. Accepted for publication in “SIAM Journal on Imaging Sciences”.
7. A. Aspri, Y. Korolev, O. Scherzer, **Data driven regularization by projection**, August 2020. Accepted for publication in “Inverse Problems”. DOI: 10.1088/1361-6420/abb61b

#### Submitted/Under revision

1. A. Aspri, E. Beretta, A. Mazzucato, **Dislocations in a layered elastic medium with applications to fault detection**, March 2020. Under review in “Journal of the European Mathematical Society”.
2. A. Aspri, E. Beretta, A. Gandolfi, E. Wasmer, **Mortality containment vs. Economics opening: Optimal Policies in a SEIARD model**, May 2020. Under review in “Journal of Mathematical Economics”.

## Preprints & Works in progress

- A. Aspri, E. Beretta, A. Gandolfi, K. Jamshad, M. Jiang, **Optimal strategy for schools' reopenings.**
- A. Aspri, E. Beretta, A. Mazzucato, **Detection of an elastic dislocation in an anisotropic medium.**
- P. Antonietti, A. Aspri, E. Beretta, A. L. Mazzucato, **Shape derivative for detection of an open surface in the conductivity equation.**
- P. Antonietti, A. Aspri, E. Beretta, A. L. Mazzucato, **A shape optimization approach for detection of elastic dislocations.**
- A. Aspri, E. Beretta, E. Francini, S. Vessella, **Stability estimates for elastic polyhedral inclusions.**
- A. Aspri, L. Frischauf, O. Scherzer, **A data driven regularization by projection: the frame case.**

## Bibliometric Indices

Legend: SC=Scopus, WoS= Web of Science, GS= Google Scholar;

Publications: SC=5, WoS=4, GS=10

Citations: SC=5, WoS=2, GS=23

H-index: SC=2, WoS=1, GS=3

## 2. AWARDS, RESEARCH VISITS

### Awards

- August 2015 – December 2016 **Research Project:** Principal Investigator of the project "Avvio alla Ricerca 2015" for young researches financed by Sapienza Università di Roma, 1K euro.
- Project's Title: *Problemi inversi e algoritmi di ricostruzione relativi a cavità pressurizzate in semispazi con applicazioni alla vulcanologia (Inverse problems and reconstruction algorithms for pressurized cavities in the half-space with applications in volcanology).*

### Research visits

- 14 - 20 December 2019 Mathematics Department "Renato Caccioppoli" of University of Naples "Federico II". Invitation received by Salvatore Cuomo and Francesco Calabrò.
- 24 February– 10 March 2020 Mathematics Department of New York University Abu Dhabi. Invitation received by Elena Beretta.
- 15 – 23 February 2019
- 3 – 12 March 2017
- 13 – 21 February 2016

## 3. CONFERENCES, WORKSHOPS AND SEMINARS

### Organization of Workshops/Minisymposia

- 25 January – 29 January 2021 Co-organizer with L. Mindrinos of the Mini-symposium "New trends in tomography: From microscopy to astronomy", to the National Congress SIMAI 2020, to be held in Parma (Italy), 25 – 29 January, 2021.
- 28 September – 18 December 2020 (postponed to 2021 due to Covid-19) Local organizer with R. Ramlau, O. Scherzer and S. Hubner of the Special Semester on Inverse Problems, titled "Tomography Across the Scales", to be held in RICAM (Linz).
- 8 July – 12 July 2019 Co-organizer with E. Beretta and A. Mazzucato of the Mini-symposium "Inverse Problems in Elastic Media" to Applied Inverse Problems (AIP) conference, held in Grenoble, 8 – 12 July, 2019.
- 28 May – 1 June 2018 Co-organizer with E. Beretta, M. de Hoop, E. Francini, and O. Scherzer of the INdAM workshop "Reconstruction Methods for Inverse Problems" held in Rome 28 May – 1 June, 2018.

### Upcoming conferences (invited talks)

- 16-22 May 2021 **Data driven regularization**, 10th International Conference "Inverse Problems: Modeling and Simulation", Minisymposium M14 "Mathematical Methods in Tomography Across the Scales", Malta, 16-22 May 2021.

- 1-5 March 2021 **Regularization by projection driven by data**, SIAM Conference on Computational Science and Engineering (CSE21), Minisymposium "Using data to drive iterative methods: subspace recycling and other techniques", Fort Worth, Texas (U.S.), 1–5 March 2021.

### Conference/Workshop Invited Talks

- 2 September 2020 **Updates on data driven regularization by projection**, 4rd SFB workshop "Tomography Across the Scales", online meeting, 1-2 September 2020.
- 15 January 2020 **A data-driven iteratively regularized Landweber iteration**, American Mathematical Society (AMS) Special Session on "Interactions of Inverse Problems, Computational Harmonic Analysis, and Imaging", Denver, Colorado, 15-18 January 2020.
- 2 December 2019 **Data driven regularization by projection**, 3rd SFB workshop "Tomography Across the Scales", Obergurgl (Austria), 1-5 December 2019.
- 25 June 2019 **Analysis of a model of elastic dislocations in geophysics**, Reconstruction Methods for Inverse Problems, Banff International Research Station for Mathematical Innovation and Discovery (BIRS), Canada, 24-28 June 2019.
- 4 December 2018 **A data-driven iteratively regularized Landweber iteration**, 2nd SFB workshop "Tomography Across the Scales", Obergurgl (Austria), 3 – 6 December 2018.
- 23 May 2018 **On the inverse problem of determining a pressurized cavity in a half-space**, Minisymposium M10 of the 9th International Conference "Inverse Problems: Modeling and Simulation", Malta, 21 – 25 May 2018.
- 22 March 2018 **On an elastic model arising from volcanology: an analysis of the direct and inverse problem**, workshop "Inverse Problems in the Alps II", Obergurgl (Austria), 21 – 23 March 2018.
- 27 March 2017 **A linear elastic model to detect magma chamber**, conference "100 Years of the Radon Transform", RICAM – Linz, 27 – 31 March 2017.

### Seminars

- 10 June 2020 *Data Driven regularization by projection*. Selected as speaker by the director of RICAM (Prof. Ronny Ramlau) for the first of the joint seminars between RICAM (Linz) and Fudan University (Shanghai), 10 June 2020.
- 7 January 2020 *Data Driven regularization*, Department of Mathematics "Guido Castelnuovo", Sapienza University of Rome, Seminars of Numerical Differential Modeling, 7 January 2020.
- 16 December 2019 *Topological higher order derivatives with applications in quantitative photoacoustic tomography*, Mathematics Department "Renato Caccioppoli", University Federico II of Naples, Naples, Italy.
- 23 May 2019 *Inverse Problems and Mathematical Imaging*, ÖAW Betriebsausflug, RICAM (Johann Radon Institute for Computational and Applied Mathematics), Linz.
- 4 July 2018 *A modified Landweber driven by expert knowledge*, First SFB Internal Meeting, Computational Science Center, Vienna.
- 20 July 2017 *On the direct and inverse problem of a linear elastic model coming from volcanology*, RICAM - Inverse Problems and Mathematical Imaging Group, Linz.
- 8 May 2017 *Analysis of a linear elastic model relative to a small pressurized cavity in the half-space*, A.MA.CA. (Analisi Matematica al Castelnuovo) Mathematics Department "Guido Castelnuovo", Sapienza Università di Roma.
- 31 May 2016 *A linear elastic model to detect magma chamber*, Mathematics Department "Guido Castelnuovo", Sapienza Università di Roma, Seminars of Numerical Differential Modeling, 31 May 2016.
- 5 May 2015 *Harmonic functions in the half-space with a pressurized cavity*, Mathematics Department "Guido Castelnuovo", Sapienza Università di Roma, Seminars of Numerical Differential Modeling, 5 May 2015.

### Poster Presentations

- 25 – 29 May 2015 **Asymptotic expansion of the solution of a Neumann problem for harmonic functions in the half-space with a small cavity**, conference "Applied Inverse Problems (AIP 2015)", Helsinki.

- 26 – 28 August 2014 **On detecting a magma chamber from deformation and gravity measurements on the boundary of the half-space**, conference "Inverse problems - from theory to application (IPTA 2014)", Institute of Physics, Bristol.
- 19 – 23 May 2014 **On detecting a magma chamber from deformation and gravity measurements on the boundary of the half-space**, conference "Recent progress in mathematical and numerical analysis of inverse problems", CIRM, Luminy, Marseille.

## TEACHING ACTIVITY

### 1. THESIS SUPERVISIONS

#### Second advisor for Master Thesis

- Candidate: Frischauf Leon (Mathematics Department, University of Vienna);
- First advisor: Scherzer Otmar (University of Vienna);
- Title: Regularization by orthogonalization and frames;
- Defence date: August 21, 2020.

Legend for Departments (and related Universities) which appear in the sections below.

**University Unitelma Sapienza:** CS-Unitelma-Sapienza = Computer Science dept. Unitelma-Sapienza;

**Sapienza, University of Rome:** CS = Computer Science dept., EE = Energy Engineering dept., AE = Aerospace Engineering dept., CE = Chemistry Engineering dept. .

### 2. GIVEN COURSES

- 24.02.2020 – present Integral Calculus (CS), telematic course
- 23.09.2019 – present Differential Calculus (CS), telematic course.
- 25.02.2019 – 23.02.2020 Integral Calculus (CS), telematic course
- 24.09.2018 – 22.09.2019 Differential Calculus (CS), telematic course.

### 3. TUTORING

1.03.2020 – present	Integral Calculus (CS-Unitelma-Sapienza)
1.10.2019 – present	Differential Calculus (CS-Unitelma-Sapienza)
1.03.2019 – 29.02.2020	Integral Calculus (CS-Unitelma-Sapienza)
1.10.2018 – 23.09.2019	Differential Calculus (CS-Unitelma-Sapienza)
1.10.2017 – 30.09.2018	Differential Calculus (CS-Unitelma-Sapienza)
2.10.2016 – 10.02.2017	Mathematical Analysis 1 (EE)
1.10.2016 – 30.09.2017	Differential Calculus (CS-Unitelma-Sapienza)
04.2016 – 09.2016	Mathematical Analysis 2 (EE)
10.2015 – 07.2016	Mathematical Analysis 1 (EE 50 hours, AE 50 hours, CE 50 hours)
1.02.2015 – 31.01.2016	Integral Calculus (CS-Unitelma-Sapienza)
1.10.2015 – 30.09.2016	Differential Calculus (CS-Unitelma-Sapienza)
1.10.2014 – 30.09.2015	Differential Calculus (CS-Unitelma-Sapienza)

### 4. PRECALCULUS COURSES

22.09.2014 – 31.12.2014	Faculty of Mathematics, Physics and Natural Sciences (Sapienza University of Rome).
8.09.2014 – 19.09.2014	Faculty of Information Engineering, Informatics and Statistics (Sapienza University of Rome).

### 5. HIGH SCHOOL

20.06.2017 – 07.07.2017	Examiner of Mathematics and Physics and vice-president of the X committee - RMLI01010 - Classics high school "A. Mancinelli", Velletri (Rome).
-------------------------	--

### PERSONAL SKILLS

Mother tongue Italian

Other languages	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	B2	B2	C1
German	A1	A2	A1	A1	A2

Levels: A1/A2: Basic user – B1/B2: Independent user – C1/C2: Proficient user  
[Common European Framework of Reference \(CEF\) level](http://www.cedefop.europa.eu)

Computer skills – Competent with most Microsoft Office programmes.  
 – Good knowledge of C++, Matlab, Mathematica and Fortran90.  
 – Good knowledge of Cisco WebEx platform.

**ADDITIONAL INFORMATION**

- Referee Activity**
- Applicable Analysis.
  - Boundary Value Problems.
  - International Journal on Geomathematics (GEM);
  - Journal of Inverse and Ill-Posed Problems;
  - SIAM Journal on Mathematical Analysis;
  - SIAM Journal on Imaging Sciences.
- Memberships**
- Partner of SIMAI "Società Italiana di Matematica Applicata e Industriale" from 23-12-2013.
  - Member of GNAMPA "Gruppo Nazionale per l'Analisi Matematica, la Probabilità e le loro Applicazioni" from January 2014.
- Research projects**
- Member of the projects:
- Associate member of the SFB project "Tomography across the scales" (<https://tomography.univie.ac.at/>). Principal investigators: Otmar Scherzer (University of Vienna - Mathematics Department), Ronny Ramlau (RICAM Linz), Wolfgang Drexler (Center for Medical Physics and Biomedical Engineering), Peter Elbau (University of Vienna - Mathematics Department), Monika Ritsch-Marte (Medical University of Innsbruck), Gerhard Schütz (TU Wien - Institute of Applied Physics).
  - "Mathematical modeling for the identification of magma reservoirs from gravitation and deformation data", Sapienza Università di Roma, 2013. Principal investigator: Mascia Corrado.
  - "Modelli Differenziali Non Lineari: Analisi, Approssimazione ed Applicazioni", Sapienza Università di Roma, 2015. Principal investigator: Falcone Maurizio.
  - "Modelli Differenziali Non Lineari: Analisi, Approssimazione ed Applicazioni", Sapienza Università di Roma, 2016. Principal investigator: Finzi Vita Stefano.