

Patricia Díaz de Alba

Personal information

Name **Patricia Díaz de Alba.**
Nationality
Date of birth
Place of birth
Gender
E-mail
Home page

Education

Studies

- 20/04/2017 **PhD in Mathematics and Computer Science**, *University of Cagliari, Cagliari (Italy)*.
Thesis title: Numerical treatment for inverse problems in applied Geophysics.
Supervisors: Prof. Giuseppe Rodriguez and Prof. Luisa Fermo
- 22/10/2012 **MS Degree in Mathematics (Inter-university programme with the Universities of Cádiz, Málaga, Granada and Almería)**, *University of Cádiz, Cádiz (Spain)*.
Thesis title: Modelo de Gopalsamy-Ladas y el efecto Allee.
Supervisor: Prof. Elena Medina.
- 25/06/2011 **BS Degree in Mathematics**, *University of Cádiz, Cádiz (Spain)*.

Abroad experience

- 06/09/2009–28/02/2010 **Erasmus exchange students programme**, *University Joseph Fourier, Grenoble (Francia)*.

Participation to summer and training schools

1. **Scientific School Advanced numerical techniques for inverse problems, with applications in imaging science and applied Geophysics**, Cagliari (Italy), July 17–21, 2017.
2. **Scientific Computing for X-Ray CT**, Copenhagen (Denmark), January 9–20, 2017.

3. **Exploiting Hidden Structure in Matrix Computations. Algorithms and Applications**, Cetraro (Italy), June 22–27, 2015.

4. **Computational Electromagnetism**, Cetraro (Italy), June, 9–14 2014.

Languages

Spanish **Mothertongue**

English **Advance (B2 Certificate)**

Italian **Advance (B2 Certificate)**

French **Basic (A2 Certificate)**

Computer skills

User Linux, Microsoft Windows, OpenOffice, LaTeX and Cinderella. Basic knowledge of web design, Moodle.

Programming and calculation MATLAB, Mathematica, FreeFem++ and wxMaxima.

and

Data analysis Statgraphics.

Database HeidiSQL.

Geomatics gvSIG.

Academic positions

20/06/2017– **Research fellow.**

19/06/2018 Research project: Dynamic permeability of porous media, full-waveform inversion of seismic and electromagnetic data, and nonlinear inversion of electromagnetic data.

Affiliation: Department of Civil, Environmental Engineering and Architecture, University of Cagliari, Cagliari (Italy).

Scientific activity

Research interests

1. Inverse problems in Geoscience.
2. Regularization methods.
3. Ill-posed problems.
4. Numerical solution of integral and partial differential equations.

Scientific and professional collaborations

01/02/2016– **Emory University**, Atlanta, (USA).

26/04/2016 Collaboration with Prof. James Nagy on inverse problems.

07/2015– **Centro di Ricerca, Sviluppo e Studi Superiori in Sardegna (CRS4)**, Santa Margherita di Pula, (Italy).

09/2015 Collaboration to the parallelization of a calculation code for electromagnetic data inversion.

–01/05/2012– **Aguas de Cádiz, S.A.**, Cádiz (Spain).

27/09/2012 Modelling the water supply network of Cádiz, conducted by the Engines Department at University of Cádiz. (200 hours).

15/11/2011– **University of Cádiz, Cádiz (Spain).**
14/05/2012 Database management with MySQL for the diffusion of the Mathematics degree.

Organization of conferences and schools

1. **International Workshop on Analysis and Numerical Approximation of Singular Problems IWANASP18**, Cagliari (Italy), September 4–6, 2018.

Website: <http://bugs.unica.it/iwanasp18/>

2. **Scientific School Advanced numerical techniques for inverse problems, with applications in imaging science and applied Geophysics**, Cagliari (Italy), July 17–21, 2017.

Website: <http://bugs.unica.it/cana/antip17/>

Projects

2018 **Project INdAM–GNCS 2018.**

Research project: Metodi di regolarizzazione non lineare: aspetti teorici, computazionali, applicativi.

Responsible: Federico Benvenuto.

Role: Participant.

2017 **Project INdAM–GNCS 2017.**

Research project: Metodi numerici non lineari per problemi inversi e applicazioni.

Responsible: Claudio Estatico.

Role: Participant.

2016 **Project INdAM–GNCS 2016.**

Research project: Inverse Problems in Geophysics.

Responsible: Giuseppe Rodriguez.

Role: Participant.

Scientific communications

Invited talks

1. **Ninth International Conference “Inverse Problems: Modeling and Simulation” (IPMS 2018)**, Malta, May 21–25, 2018.

A regularized Gauss-Newton algorithm for electromagnetic data inversion.

2. **SIMAI 2016**, Milan (Italy), September 13–16, 2016.

Identifying the magnetic permeability in multi-frequency FDEM data inversion.

Conferences

1. **International Workshop on Analysis and Numerical Approximation of Singular Problems IWANASP18**, Cagliari (Italy), September 4–6, 2018.

Recovering the electrical conductivity of the soil via a linear integral model.

2. **Numerical Analysis and Scientific Computation with Applications (NASCA18)**, Kalamata (Greece), July 2–6, 2018.

Recovering the electrical conductivity of the soil via linear integral equations.

3. **International Workshop on Applied Mathematics & Quantum Information (AMQI 2016)**, Cagliari (Italy), November 3–4, 2016.

Reconstructing the magnetic permeability of the soil by a multi-frequency FDEM data inversion.

4. **21th International Conference Mathematical Modelling and Analysis (MMA 2016)**, Tartu (Estonia); June 1–4, 2016.
Multi-frequency data inversion in Geophysical applications.
5. **Workshop DENIS**, Cagliari (Italy), November 30, 2015.
Numerical processing of electromagnetic data in Geophysics.
6. **New Trends in Numerical Analysis (NETNA 2015)**, Falerna (Italy), June 18–21, 2015.
An algorithm for data inversion in electromagnetic sounding.
7. **XXIV Congress on Differential Equations and Applications / XIV Congress on Applied Mathematics (CEDYA 2015)**, Cádiz (Spain), June 8–12, 2015.
Regularized solution of a nonlinear problem in applied Geophysics.
8. **Two days in Applied Mathematics in Cagliari**, Cagliari (Italy), April 9–10, 2015.
Numerical method for a nonlinear problem in applied Geophysics.

Posters

1. **Scientific School Advanced numerical techniques for inverse problems, with applications in imaging science and applied Geophysics**, Cagliari (Italy), July 17–21, 2017.
Identifying the magnetic permeability in multi-frequency EM data inversion.
 2. **Georgia Scientific Computing Symposium**, Atlanta (USA), February 20, 2016.
Numerical method for data inversion in Geophysics.
 3. **Workshop DENIS**, Cagliari (Italy), November 30, 2015.
Numerical processing of electromagnetic data in Geophysics.
- Participation to conferences
1. **Workshop Trends in Non Linear Analysis**, Cagliari (Italy), March 21–22, 2014.

Theses Direction Experience

- 2017–2018 **Un'interfaccia grafica per l'inversione di dati EMI in geofisica applicata.**
Author: Gabriele Lovicu.
BSc Electronic and Electronical Engineering.
Co-supervised with Prof. Giuseppe Rodriguez.
- 2014–2015 **Influenza delle caratteristiche magnetiche del terreno nell'elettromagnetic sounding a bassa frequenza.**
Author: Rita Delussu.
BSc Electronic and Electronical Engineering.
Co-supervised with Prof. Giuseppe Rodriguez.

Teaching

- Present **Teaching assistant, 30 hours.**
Applied Mathematics for Biomedical Engineering, University of Cagliari (Italy).
- 2017–2018 **Teaching assistant, 26 hours.**
Applied Mathematics for Electrical, and electronic Engineering, and Computer Science, University of Cagliari (Italy).
- 2016–2017 **Teaching assistant, 30 hours.**
Applied Mathematics for Biomedical Engineering, University of Cagliari (Italy).

- 2016–2017 **Teaching assistant, 48 hours.**
Applied Mathematics for Electrical and electronic Engineering, and Computer Science, University of Cagliari, (Italy).
- 2015–2016 **Teaching assistant, 30 hours.**
Applied Mathematics for Biomedical Engineering, University of Cagliari (Italy).
- 2014–2015 **Teaching assistant, 30 hours.**
Applied Mathematics for Biomedical Engineering, University of Cagliari (Italy).
- 2007–2009 **Assistant Student.**
Geometric exercises treatment with Cinderella and LaTeX, University of Cádiz (Spain).

Publications

PhD Thesis

- [1] P. Díaz de Alba
Numerical treatment for inverse problems in applied Geophysics. PhD Thesis book, 2017. <http://bugs.unica.it/gppe/did/tesi/17diazdealba>

Papers

- [1] G. P. Deidda, P. Díaz de Alba, C. Fenu, and G. Rodriguez
A MATLAB package for EMI data inversion. arXiv:1808.04779 [math.NA], 2018.
- [3] P. Díaz de Alba, C. Van der Mee, L. Fermo and G. Rodriguez
Recovering the electrical conductivity of the soil via a linear integral model. Submitted.
- [4] G.P. Deidda, P. Díaz de Alba and G. Rodriguez
Identifying the magnetic permeability in multi-frequency EM data inversion. Electron. Trans. Numer. Anal., 47:1-17, 2017.

Book chapters

- [1] P. Díaz de Alba and G. Rodriguez
Regularized inversion of Multi-frequency EM Data in Geophysical Applications. In F. Ortegón Gallego, M.V. Redondo Neble, and J.R. Rodríguez Galván, editors, Trends in Differential Equations and Applications, volume 8 of SEMA SIMAI Springer Series, pages 357-369. Springer, Switzerland, 2016. DOI 10.1007/978-3-319-32013-7.

Proceedings

- [1] G.P. Deidda, P. Díaz de Alba, G. Rodriguez and G. Vignoli
Smooth and sparse inversion of EMI data from multi-configuration measurements. IEEE Research and Technologies for Society and Industry (RTSI) 2018. ISBN: CFP18C29-ART
- [2] P. Díaz de Alba and G. Rodriguez

Regularized solution of a nonlinear problem in applied Geophysics. In J.M. Díaz Moreno, J.C. Díaz Moreno, C. García Vázquez, J. Medina Moreno, F. Ortegón Gallego, M.V. Pérez Martínez, C. Redondo Neble, and J.R. Rodríguez Galván, editors, *Proceedings of the XXIV Congress on Differential Equations and Applications / XIV Congress on Applied Mathematics - Cádiz, June 8-12, 2015*, pages 821-826, Cadiz, Spain, 2015. Editorial UCA. ISBN: 978-84-9828-527-7.

Book of abstracts

[1] P. Díaz de Alba and G. Rodríguez

An algorithm for data inversion in electromagnetic sounding. Book of Abstracts of the congress *New Trends in Numerical Analysis - Falerna, June 18-21, 2015.*