Leonardo Uieda

Department of Earth, Ocean and Ecological Sciences School of Environmental Sciences University of Liverpool Jane Herdman Building, 4 Brownlow Street L69 3GP, Liverpool, United Kingdom Last updated: May, 2020 ORCID: 0000-0001-6123-9515 email: uieda@liverpool.ac.uk Research group: compgeolab.org Website: leouieda.com

PROFESSIONAL APPOINTMENTS

2019- Lecturer

Department of Earth, Ocean and Ecological Sciences School of Environmental Sciences University of Liverpool, UK

2018- Affiliate Researcher

Department of Earth Sciences School of Ocean and Earth Science and Technology University of Hawai'i at Mānoa, USA

2017–2018 Visiting Research Scholar

Department of Earth Sciences School of Ocean and Earth Science and Technology University of Hawai'i at Mānoa, USA

2014–2018 Assistant Professor

Departamento de Geologia Aplicada Faculdade de Geologia Universidade do Estado do Rio de Janeiro, Brazil

EDUCATION

2016	PhD in Geophysics, Observatorio Nacional, Brazil
2011	MSc in Geophysics, Observatório Nacional, Brazil
2009	BSc in Geophysics , Universidade de São Paulo, Brazil
2008	International Exchange, York University, Canada

GRANTS & FELLOWSHIPS

2020 – 2023	NSF-EAR: "A Sustainable Plan for the Future of the Generic Mapping Tools". PI:
	Wessel, P, co-PI : Uieda, L . <i>University of Hawai'i at Mānoa</i> . Award ID: 1948602.
2020	Software Sustainability Institute Fellowship. University of Liverpool. Amount:
	£3000. More information: leouieda.com/research/ssi2020.html

- 2019–2020 ESRG Research Support: "Geophysical inversion of GRACE satellite time-lapse gravity". Internal fund to support the research visit of PhD student Santiago R. Soler. *University of Liverpool.* Amount: £1000.
- 2018–2020 NSF-EAR: "The EarthScope/GMT Analysis and Visualization Toolbox". PI: Wessel, P, **co-PI**: **Uieda, L**, co-PI: Smith-Konter, B. *University of Hawai'i at Mānoa*. Amount: \$174,975. Award ID: 1829371.

AWARDS & HONORS

- 2017 Brazilian Geophysical Society (SBGf) Award for **Best PhD Thesis** of 2015 2017
- Universidade do Estado do Rio de Janeiro, Brazil, School of Geology **Teaching**Award given by the graduating class of 2016
- 2014–2018 QUALITEC/UERJ Grant for training a technician for the Laboratory of Exploration Geophysics Universidade do Estado do Rio de Janeiro
- 2011–2015 Brazilian Ministry of Education CAPES PhD Research Scholarship
- 2011 SEG Near Surface Geophysics Section **Student Travel Grant** to present at the SEG Annual Meeting, San Antornio, TX, USA
- 2011 EAGE **PACE Student Travel Grant** to present at the 73rd EAGE Conference & Exhibition, Vienna, Austria
- 2010–2011 Brazilian Ministry of Education CAPES Masters Research Scholarship
- 2008 Brazilian Geophysical Society (SBGf) Undergraduate Research Scholarship
- 2005 São Paulo Research Foundation (FAPESP) **Undergraduate Research** Scholarship

PUBLICATIONS

PEER-REVIEWED

- 2020 Uieda, L, Soler, SR, Rampin, R, van Kemenade, H, Turk, M, Shapero, D, Banihirwe, A, Leeman, J. Pooch: A friend to fetch your data files. *Journal of Open Source Software*. doi:10.21105/joss.01943.
- Wessel, P, Luis, J, **Uieda, L**, Scharroo, R, Wobbe, F, Smith, WHF, Tian, D. The Generic Mapping Tools, Version 6. *Geochemistry, Geophysics, Geosystems*. doi:10.1029/2019GC008515.
 - Soler, SR, Pesce, A, Gimenez, ME, **Uieda, L**. Gravitational field calculation in spherical coordinates using variable densities in depth. *Geophysical Journal International*. doi:10.1093/gji/ggz277. preprint: doi.org/10.31223/osf.io/3548g

- Zhao, G, Chen, B, **Uieda, L**, Liu, J, Kaban, MK, Chen, L, Guo, R. Efficient 3D large-scale forward-modeling and inversion of gravitational fields in spherical coordinates with application to lunar mascons. *Journal of Geophysical Research:* Solid Earth. doi:10.1029/2019jb017691. preprint: doi.org/10.31223/osf.io/dzf9j
- 2018 **Uieda, L.** Verde: Processing and gridding spatial data using Green's functions. Journal of Open Source Software. doi:10.21105/joss.00957.
- 2017 **Uieda, L**, Barbosa, VCF. Fast non-linear gravity inversion in spherical coordinates with application to the South American Moho, *Geophysical Journal International*, doi:10.1093/gji/ggw390. preprint: doi.org/10.31223/osf.io/9ba4m
- 2016 **Uieda, L**, Barbosa, VCF, Braitenberg, C. Tesseroids: forward modeling gravitational fields in spherical coordinates, *Geophysics*, doi:10.1190/geo2015-0204.1.
 - Carlos, DU, **Uieda, L**, Barbosa, VCF. How two gravity-gradient inversion methods can be used to reveal different geologic features of ore deposit A case study from the Quadrilátero Ferrífero (Brazil), *Journal of Applied Geophysics*, doi:10.1016/j.jappgeo.2016.04.011.
- Oliveira Jr, VC, Sales, DP, Barbosa, VCF, **Uieda, L**. Estimation of the total magnetization direction of approximately spherical bodies, *Nonlinear Processes in Geophysics*, doi:10.5194/npg-22-215-2015.
- Carlos, DU, **Uieda, L**, Barbosa, VCF. Imaging iron ore from the Quadrilátero Ferrífero (Brazil) using geophysical inversion and drill hole data, *Ore Geology Reviews*, doi:10.1016/j.oregeorev.2014.02.011.
- Melo, FF, Barbosa, VCF, **Uieda, L**, Oliveira Jr, VC, Silva, JBC. Estimating the nature and the horizontal and vertical positions of 3D magnetic sources using Euler deconvolution, *Geophysics*, doi:10.1190/geo2012-0515.1.
 - Oliveira Jr, VC, Barbosa, VCF, **Uieda**, **L**. Polynomial equivalent layer, *Geophysics*, doi:10.1190/geo2012-0196.1.
- 2012 **Uieda, L**, Barbosa, VCF. Robust 3D gravity gradient inversion by planting anomalous densities, *Geophysics*, doi:10.1190/geo2011-0388.1.

PEER-REVIEWED CONFERENCE PROCEEDINGS

- Melo, FF, Barbosa, VCF, **Uieda, L**, Oliveira Jr, VC, Silva, JBC. A Single Euler Solution Per Anomaly, 76th EAGE Conference and Exhibition 2014, doi:10.3997/2214-4609.20140891.
- 2013 **Uieda, L**, Oliveira Jr, VC, Barbosa, VCF. Modeling the Earth with Fatiando a Terra, *Proceedings of the 12th Python in Science Conference*. doi:10.25080/Majora-8b375195-010.
- 2012 **Uieda, L**, Barbosa, VCF. Use of the "shape-of-anomaly" data misfit in 3D inversion by planting anomalous densities, *SEG Technical Program Expanded Abstracts*, doi:10.1190/segam2012-0383.1.

Carlos, DU, **Uieda, L**, Li, Y, Barbosa, VCF, Braga, MA, Angeli, G, Peres, G. Iron ore interpretation using gravity-gradient inversions in the Carajás, Brazil. *SEG Technical Program Expanded Abstracts*, doi:10.1190/segam2012-0525.1.

Uieda, L, Bomfim, EP, Braitenberg, C, Molina, E. Optimal forward calculation method of the Marussi tensor due to a geologic structure at GOCE height, *Proceedings of the 4th International GOCE User Workshop*. doi:10.6084/m9.figshare.92624.

Uieda, L, Barbosa, VCF. Robust 3D gravity gradient inversion by planting anomalous densities, SEG Technical Program Expanded Abstracts, doi:10.1190/1.3628201.

Uieda, L, Barbosa, VCF. 3D gravity inversion by planting anomalous densities. 12th International Congress of the Brazilian Geophysical Society, doi:10.1190/sbgf2011-179.

Uieda, L, Barbosa, VCF. 3D gravity gradient inversion by planting density anomalies. 73th EAGE Conference and Exhibition incorporating SPE EUROPEC, doi:10.3997/2214-4609.20149567.

Carlos, DU, **Uieda, L**, Barbosa, VCF, Braga, MA, Gomes, AAS. In-depth imaging of an iron orebody from Quadrilatero Ferrifero using 3D gravity gradient inversion, SEG Technical Program Expanded Abstracts, doi:10.1190/1.3628219.

Carlos, DU, Barbosa, VCF, **Uieda, L**, Braga, MA. Inversão de Dados de Aerogradiometria Gravimétrica 3D-FTG Aplicada a Exploração Mineral na Região do Quadrilátero Ferrífero, 12th International Congress of the Brazilian Geophysical Society, doi:10.1190/sbgf2011-243.

PREPRINTS

Barba, LA, Bazan, J, Brown, J, Guimera, RV, Gymrek, M, Alex Hanna, Heagy, LJ, Huff, KD, Katz, DS, Madan, CR, Moerman, KM, Niemeyer, KE, Poulson, JL, Prins, P, Ram, K, Rokem, A, Smith, AM, Thiruvathukal, GK, Thyng, KM, **Uieda**, L, Wilson, BE, Yehudi, Y. Giving software its due through community-driven review and publication. *OSF Preprints*. doi:10.31219/osf.io/f4vx6

OPEN DATASETS

Uieda, L, Barbosa, VCF. A gravity-derived Moho model for South America: source code, data, and model results from "Fast non-linear gravity inversion in spherical coordinates with application to the South American Moho". doi:10.6084/m9.figshare.3987267

OPEN-SOURCE SOFTWARE

2017- **PyGMT** - www.pygmt.org

A Python interface for the Generic Mapping Tools.

Creator and main developer.

2017- The Generic Mapping Tools (GMT) – www.generic-mapping-tools.org

A data processing and mapping toolbox for the Earth, Ocean, and Planetary Science. Core development team.

2010- Fatiando a Terra – www.fatiando.org

Python tools for geophysical data processing, forward modeling, and inversion.

Creator and main developer.

2009–2016 **Tesseroids** – www.tesseroids.org

Forward modeling of gravitational fields in spherical coordinates.

Creator and sole developer.

TEACHING

UNDERGRADUATE

2020- ENVS398: Advanced Geodynamics

University of Liverpool

2020- ENVS258: Environmental Geophysics

University of Liverpool

2019– ENVS363: Geophysical Exploration Techniques [field]

University of Liverpool

2014–2016 Special Mathematics I: Introduction to Programming and Numerical Analysis

BSc in Oceanography, Universidade do Estado do Rio de Janeiro

2014–2016 Geophysics I: Gravity and magnetic methods

BSc in Geology, Universidade do Estado do Rio de Janeiro

2014–2016 Geophysics II: Exploration Seismology

BSc in Geology, Universidade do Estado do Rio de Janeiro

2015 Introduction to Geology

BSc in Oceanography, Universidade do Estado do Rio de Janeiro

WORKSHOPS & SHORT COURSES

future From scattered data to gridded products using Verde

 $Transform \ 2020$

2019 Best Practices for Developing and Sustaining Your Open-Source Research Software

AGU Fall Meeting 2019

Become a Generic Mapping Tools Contributor Even If You Can't Code

AGU Fall Meeting 2019

The Generic Mapping Tools for Geodesy Scripps Institution of Oceanography

InSAR Processing and Theory with GMTSAR

Scripps Institution of Oceanography

2018 Best Practices for Modern Open-Source Research Codes

AGU Fall Meeting 2018

InSAR Processing and Theory with GMTSAR

Scripps Institution of Oceanography

Git and Github: What are their uses? Are they worth the effort? Let's find out!

ASPRS UHM Student Chapter, University of Hawai'i at Mānoa

2017 Introduction to Python

Department of Geology and Geophysics, University of Hawai'i at Mānoa

2016 Python for Geologists

Faculdade de Geologia, Universidade do Estado do Rio de Janeiro

Python for Earth Scientists

Departamento de Geofísica, Universidade de São Paulo

2014 Introduction to Geophysical Inversion

Instituto de Geociências, Universidade de Brasília

2011 Introduction to Geophysical Inversion

Departamento de Geofísica, Universidade de São Paulo

STUDENT SUPERVISION

PhD

2017– Santiago R. Soler (co-Advising)

Universidad Nacional de San Juan, Argentina.

Advisor: Mario E. Gimenez

UNDERGRADUATE

2019–2020 Final year project cohort: Lottie Cooper, Steven Heer, Charles Thomson, and

Alexander Borges. University of Liverpool, UK.

2015–2017 Vinicius V. Riguete

Universidade do Estado do Rio de Janeiro, Brazil.

OUTREACH

I maintain a blog about my research, geoscience, and programming at leouieda.com/blog

- Interviewed by the geoscience podcast *Don't Panic Geocast*, episode 166 "You are headed to a warm and sunny place": dontpanicgeocast.com/?p=638
- Volunteer for the *Hour of Code* at Salt Lake Elementary School, Honolulu, USA.
- Interviewed by the geoscience podcast *Undersampled Radio*, episode "Open Sourcery": undersampledrad.io/home/2016/7/open-sourcery

Geophysical tutorials for the SEG publication *The Leading Edge*:

- 2017 **Uieda, L.** Step-by-step NMO correction, *The Leading Edge*, doi:10.1190/tle36020179.1.
- 2014 **Uieda, L**, Oliveira Jr, VC, Barbosa, VCF. Geophysical tutorial: Euler deconvolution of potential-field data, *The Leading Edge*, doi:10.1190/tle33040448.1.

PRESENTATIONS

- future [Invited] Uieda, L. Geophysical research powered by open-source, *Technische Universität Bergakademie Freiberg*, Freiberg, Germany.
- 2020 **Uieda, L**, Soler, SR. Evaluating the accuracy of equivalent-source predictions using cross-validation, *EGU 2020*, Vienna, Austria. doi:10.5194/egusphere-egu2020-15729. doi:10.6084/m9.figshare.12245372.
 - [Invited] Uieda, L. Geophysical research powered by open-source, Geographic Data Science Lab, University of Liverpool, Liverpool, UK. leouieda.com/liverpool-gdsl-2020.
- 2019 **Uieda, L**, Wessel, P. PyGMT: Accessing the Generic Mapping Tools from Python, *AGU 2019*, San Francisco, USA. doi:10.6084/m9.figshare.11320280.
 - **Uieda, L.** Building the foundations for open-source geophysics, *Department of Earth, Ocean and Ecological Sciences, University of Liverpool*, UK. doi:10.6084/m9.figshare.10255832.
- 2018 **Uieda, L**, Xu, X, Wessel, P, Sandwell, DT. Coupled Interpolation of Three-component GPS Velocities, *AGU 2018*, Washington DC, USA. doi:10.6084/m9.figshare.7440683.
 - **Uieda, L.** Machine Learning Lessons for Geophysics, *Department of Earth Sciences*, *University of Hawai'i at Mānoa*, Honolulu, USA. doi:10.6084/m9.figshare.7203344.
 - **Uieda, L**, Wessel, P. Building an object-oriented Python interface for the Generic Mapping Tools, *Scipy 2018*, Austin, USA. doi:10.6084/m9.figshare.6814052. recording: youtu.be/6wMtfZXfTRM
 - **Uieda, L**, Sandwell, DT, Wessel, P. Joint Interpolation of 3-component GPS Velocities Constrained by Elasticity, *AOGS* 15th *Annual Meeting*, Honolulu, USA. doi:10.6084/m9.figshare.6387467.

- **Uieda, L**, Wessel, P. Integrating the Generic Mapping Tools with the Scientific Python Ecosystem, *AOGS* 15th Annual Meeting, Honolulu, USA. doi:10.6084/m9.figshare.6399944.
- 2017 [Invited] Uieda, L, Wessel, P. Nurturing reliable and robust open-source scientific software, AGU Fall Meeting 2017, New Orleans, USA. recording: youtu.be/0GO4ZZ5Ry6M
 - **Uieda, L**, Wessel, P. A modern Python interface for the Generic Mapping Tools, *AGU Fall Meeting 2017*, New Orleans, USA. doi:10.6084/m9.figshare.5662411.
 - **Uieda, L**, Wessel, P. Bringing the Generic Mapping Tools to Python, *Scipy 2017*, Austin, USA. doi:10.6084/m9.figshare.7635833. recording: youtu.be/93M4How7R24
 - **Uieda**, **L**. Inverting gravity to map the Moho: A new method and the open source software that made it possible, *Department of Geology and Geophysics*, *University of Hawai'i at Mānoa*, Honolulu, USA. doi:10.6084/m9.figshare.4779766.
- 2016 [Invited] Uieda, L. Fatiando a Terra: construindo uma base para ensino e pesquisa de geofísica, *Observatório Nacional*, Rio de Janeiro, Brazil.
- 2015 [Invited] Uieda, L. Fatiando a Terra: construindo uma base para ensino e pesquisa de geofísica, *Universidade de São Paulo*, São Paulo, Brazil. doi:10.6084/m9.figshare.1381870.
- Uieda, L, Oliveira Jr, VC, Barbosa, VCF. Using Fatiando a Terra to solve inverse problems in geophysics, *Scipy 2014*, Austin, USA. doi:10.6084/m9.figshare.1089987.
 - **Uieda, L**, Barbosa, VCF. Gravity inversion in spherical coordinates using tesseroids, *EGU General Assembly 2014*, Vienna, Austria. doi:10.6084/m9.figshare.1155457.
- 2013 **Uieda, L**, Oliveira Jr, VC, Barbosa, VCF. Modeling the Earth with Fatiando a Terra, *Scipy 2013*, Austin, USA. doi:10.25080/Majora-8b375195-010. recording: youtu.be/Ec38h1oB8cc
 - **Uieda, L**, Barbosa, VCF. 3D magnetic inversion by planting anomalous densities, *AGU Meeting of the Americas*, Cancun, Mexico. doi:10.6084/m9.figshare.703651.
- Carlos, DU, **Uieda, L**, Li, Y, Barbosa, VCF, Braga, MA, Angeli, G, Peres, G. Iron ore interpretation using gravity-gradient inversions in the Carajás, Brazil, *SEG Annual Meeting 2012*, Las Vegas, USA. doi:10.6084/m9.figshare.156865.
 - **Uieda, L**, Barbosa, VCF. Use of the "shape-of-anomaly" data misfit in 3D inversion by planting anomalous densities, *SEG Annual Meeting 2012*, Las Vegas, USA. doi:10.6084/m9.figshare.156864.
 - **Uieda, L**, Barbosa, VCF. Rapid 3D inversion of gravity and gravity gradient data to test geologic hypotheses, *International Symposium on Gravity, Geoid and Height Systems*, Venice, Italy. doi:10.6084/m9.figshare.156859.

- 2011 **Uieda, L**, Barbosa, VCF. Robust 3D gravity gradient inversion by planting anomalous densities, *SEG Annual Meeting 2011*, San Antonio, USA. doi:10.6084/m9.figshare.156863.
 - **Uieda, L**, Barbosa, VCF. 3D gravity inversion by planting anomalous densities, *Internation Congress of the Brazilian Geophysical Society*, Rio de Janeiro, Brazil. doi:10.6084/m9.figshare.156861.
 - **Uieda, L**, Bomfim, EP, Braitenberg, C, Molina, E. Optimal forward calculation method of the Marussi tensor due to a geologic structure at GOCE height, 4th International GOCE User Workshop, Munich, Germany. doi:10.6084/m9.figshare.92624.
 - **Uieda, L**, Barbosa, VCF. 3D gravity gradient inversion by planting density anomalies, 73th EAGE Conference and Exhibition incorporating SPE EUROPEC, Vienna, Austria. doi:10.6084/m9.figshare.91511.
- 2010 **Uieda, L**, Ussami, N, Braitenberg, C. Computation of the gravity gradient tensor due to topographic masses using tesseroids, *AGU Meeting of the Americas*, Foz do Iguaçu, Brazil. doi:10.6084/m9.figshare.156858.
- 2008 **Uieda, L**, Ussami, N. Utilização de tesseróides na modelagem de dados de gradiometria gravimétrica, XIII Simpósio de Iniciação Científica do IAG-USP, São Paulo, Brazil. doi:10.6084/m9.figshare.4779760.
- 2006 **Uieda, L**, D'Agrella-Filho, MS. Paleomagnetismo e mineralogia magnética dos diques cambrianos de Maravilhas e Prata (PB), XI Simpósio de Iniciação Científica do IAG/USP, São Paulo, Brazil. doi:10.6084/m9.figshare.4779769.

ACADEMIC SERVICE & AFFILIATIONS

EDITOR

2019– Topic editor for the Journal of Open Source Software

REVIEWER

Geophysical Journal International – Journal of Geodesy – Pure and Applied Geophysics – Journal of Applied Geophysics – Geophysical Prospecting – Geophysics – Central European Journal of Geosciences – Computers & Geosciences – Journal of Open Source Software

COMMITTEES

- 2015 Chairman of the Election Committee for the deans of the University and the School of Geology, Universidade do Estado do Rio de Janeiro
- 2015–2017 Faculty Advisor for the Student Chapter of the Socienty of Exploration Geophysicists (SEG) at the Universidade do Estado do Rio de Janeiro.

CONVENER

2019 Townhall: Update and Future Directions of the Open-Source Software Initiative.

Uieda, L, Heagy, LJ, Krischer, L, Gassmoeller, R, Sullivan, CB.

AGU 2019, San Francisco, USA.

Session: NS21A - A Tour of Open-Source Software Packages for the Geosciences.

Heagy, LJ, Gassmoeller, R, Uieda, L, Klump, JF.

AGU 2019, San Francisco, USA.

2018 Townhall: The role of an open-source software initiative within the AGU.

Heagy, LJ, Krischer, L, **Uieda, L**.

 $AGU\ 2018,$ Washington DC, USA.

AFFILIATIONS

2010– American Geophysical Union

2011– Society of Exploration Geophysicists

2014– European Geosciences Union

2014– Software Underground

OTHER

2019– Member of the EarthArXiv Advisory Council

LANGUAGES

Portuguese Native

English IELTS: CEFR Level C2 (mastery or proficiency) obtained in 2019