

Verónica Rodríguez Tribaldos

POSTDOCTORAL RESEARCH SCHOLAR · PH.D., M.Sc., B.Sc.

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Education

Ph.D. in Geophysics

Cambridge, United Kingdom

UNIVERSITY OF CAMBRIDGE

Oct. 2013 - Nov. 2017

- Thesis title: *Epeirogeny of South America and Evolution of Parnaíba Cratonic Basin of NE Brazil*

Advisor: Prof. Nicholas J. White.

The thesis work involves the investigation of long-term landscape evolution of South America, with focus on long-wavelength uplift and subsidence potentially caused by convective currents within the Earth's mantle (i.e. dynamic topography). My initial work has consisted in constraining vertical motions affecting the South American continent in recent geological times. Applying inverse modelling of the continent's drainage networks, I have reconstructed a Cenozoic uplift history of South America. Results have been integrated with geological observations of uplift. The second objective of my thesis has been the investigation of the formation and evolution of the Parnaíba cratonic basin in NE Brazil. As a part of a collaborative and multidisciplinary project, I integrate observations from a deep seismic reflection profile acquired across the basin, receiver functions from teleseismic earthquakes, shallow seismic reflection profiles and subsidence analysis of well data. The principal aim is to constrain the subsidence history of the basin in the context of crustal structure and basin architecture.

M. Sc. in Applied Geophysics

Delft, The Netherlands

Zurich, Switzerland

Aachen, Germany

TU DELFT, ETH ZURICH, RWTH AACHEN

Aug. 2010 - Oct. 2012

- Thesis title: *Application of GPR for the detection and characterization of sinkholes in the mantled evaporite karst of Zaragoza area (NE Spain)*

Advisors: Prof. Francisco Gutiérrez Santolalla (University of Zaragoza, Zaragoza, Spain), Prof. Alan G. Green (ETH Zurich, Zurich, Switzerland)

The thesis work consisted in the identification and characterization of sinkholes developed in the evaporitic karst of the city of Zaragoza by means of Ground Penetrating Radar (GPR). The advantages and limitations of this geophysical technique for the identification of sinkhole edges and the characterization of its internal geometry were investigated. The project involved acquisition and processing of GPR data followed by a joint interpretation in combination with geological and geomorphological information.

B. Sc. in Geology

Barcelona, Spain

UNIVERSITAT AUTÒNOMA DE BARCELONA

Oct. 2006 - Jul. 2010

- Awarded with the Department of Geology Extraordinary Final Degree Award

Work Experience

Research Scientist

Berkeley, CA, USA

LAWRENCE BERKELEY NATIONAL LABORATORY

June 2020 - present

- Development and application of ambient noise interferometry processing schemes for analysis of Distributed Acoustic Sensing (DAS) for near-surface imaging and process monitoring
- Analysis of low-frequency DAS datasets for long-term monitoring of ground deformation and geomechanical processes
- Survey design and analysis of ambient seismic noise in urban settings with conventional seismic sensors and DAS
- Analysis of Distributed Temperature Sensing (DTS) data
- Collaborating in the development of advanced array processing flows and machine learning algorithms for processing of large DAS datasets

Postdoctoral Research Scholar

Berkeley, CA, USA

LAWRENCE BERKELEY NATIONAL LABORATORY

June 2018 - May 2020

- Development and application of ambient noise interferometry processing schemes for analysis of Distributed Acoustic Sensing (DAS) for near-surface imaging
- Development and application of coda wave interferometry techniques to DAS datasets for aquifer monitoring
- Analysis of low-frequency DAS datasets for long-term monitoring of ground deformation resulting from permafrost degradation
- Survey design and analysis of ambient seismic noise in urban settings with conventional seismic sensors and DAS
- Analysis of Distributed Temperature Sensing (DTS) data
- Collaborating in the development of advanced array processing flows and machine learning algorithms for processing of large DAS datasets

Postdoctoral Research Scholar

Cambridge, United Kingdom

UNIVERSITY OF CAMBRIDGE

Nov. 2017 - May 2018

- Interpretation of seismic reflection profiles in combination with well-log information for sedimentary basin characterization
- Subsidence analysis of well-log data
- Modeling of gravity data
- Servicing and recovery of seismometers in Brazil

Research Technician

UNIVERSITY OF ZARAGOZA

- Survey design, acquisition, processing and interpretation of Ground Penetrating Radar (GPR) data for sinkhole characterization
- Geomorphological mapping

Zaragoza, Spain

March. 2012 - Sep. 2013

Field Geologist

INSTITUT GEOLÒGIC DE CATALUNYA (IGC)

- Geological field mapping and data management using geographic information systems (GIS)

Tarragona, Spain

July. 2007 - Aug. 2007

Grants, Awards & Scholarships

GRANTS

- 2019 - **EESA Early Career Development Grant**
2020 Project title: Exploring the Subsurface of Urban Areas with Distributed Acoustic Sensing Deployed on Dark Fiber Networks Berkeley, CA

SCHOLARSHIPS

- 2014, **Royal Astronomical Society Grant** San Francisco, USA;
2016, 2017 Award made by the Royal Astronomical Society (RAS) to support attending the AGU Fall Meeting. New Orleans, USA
Downing College's Graduate Vacation Study/Travel Expenses - Seton Cavendish Fund Grant
2016 Travel Grant awarded by Downing College (University of Cambridge) to support attending the European Geosciences Union Assembly. Vienna, Austria
Fall Meeting General Student Travel Grant
2014, Scholarship awarded by the American Geophysical Union (AGU) to provide students with travel assistance to attend the AGU Fall Meeting San Francisco, USA;
2016, 2017 New Orleans, USA
2010 - **M.Sc. tuition fee scholarship**
2012 Awarded by Society of Petroleum Engineers (SPE), section of The Netherlands

AWARDS

- Extraordinary Final Degree Award**
2010 Award made by the Department of Geology of the Autonomous University of Barcelona to the first graduated student of the Geology degree in the 2009/2010 academic year

Fieldwork Experience

- Deployment and servicing of broadband seismic stations in remote locations.
- Deployment and recovery of seismic instruments in a large-scale refraction experiment in NE Brazil.
- Acquisition of DAS datasets in dark fiber networks.
- Acquisition of geophysical data in the Swiss Alps, including ground penetrating radar, electrical resistivity tomography, seismic tomography, electromagnetics and magnetics.
- Geomorphological analysis of shallow trenches through subsidence structures.
- Geological Mapping in the Spanish Pyrenees and Catalan Coastal Ranges.

Computer Skills

- OS** Windows, Linux
Programming Awk, Bash, Matlab, Python, LaTeX
Scientific ArcGis, Surfer
Geophysics ProMax, Seismic Unix, SAC, Computer Programs in Seismology (CPS), ObsPy, Petrel, Reflexw, OpenDtect
Graphics Adobe Illustrator, Inkscape, Generic Mapping Tools (GMT)

Languages

- Spanish** Native
Catalan Native
English Proficient
German Basic

Teaching Experience

Co-supervisor of Student Intern

Berkeley, USA

LAWRENCE BERKELEY NATIONAL LABORATORY

2018

- Co-supervision of a Berkeley Lab Undergraduate Research (BLUR) program intern in a fiber-optic sensing project focused on using Distributed Temperature Sensing (DTS) measurements to obtain background temperature of a rock formation within an Enhanced Geothermal System experiment.

Teaching Assistant

Cambridge, United Kingdom

UNIVERSITY OF CAMBRIDGE

2015–2017

- Assistance in practical work of the Sedimentary Basins course taught during the 2nd year of the Geology degree.

Teaching Assistant

Cambridge, United Kingdom

UNIVERSITY OF CAMBRIDGE

2014–2017

- Assistance in Practical work of the Basin Dynamics course taught during the 3rd year of the Geology degree.

Co-supervision of M.Sc Projects

Cambridge, United Kingdom

UNIVERSITY OF CAMBRIDGE

2014–2016

- Co-supervision of two M.Sc. projects involving application of river inverse modeling in Central America and Greece, and one project involving the analysis of the stratigraphic architecture of a sedimentary basin in NE Brazil and investigation of its subsidence history.

Teaching Assistant

Cambridge, United Kingdom

UNIVERSITY OF CAMBRIDGE

2014

- Assistance in Practical work of the Geophysics core course taught during the 3rd year of the Geology degree.

Teaching Assistant

Barcelona, Spain

UNIVERSITAT AUTÒNOMA DE BARCELONA

2010

- Assistance in Practical work of the Petrology course taught during the 4th year of the Geology degree.

Teaching Assistant

Barcelona, Spain

UNIVERSITAT AUTÒNOMA DE BARCELONA

2008–2009

- Assistance in Practical work of the Geological Data Processing course taught during the 2nd year of the Geology degree.

Outreach and Invited Presentations

Invited Virtual Seminar

DAS VIRTUAL WORKSHOP AND TUTORIAL

2020

- Low-frequency Distributed Acoustic Sensing for Deformation Monitoring

Invited Virtual Seminar

AIR FORCE RESEARCH LABORATORY (AFRL), AIR FORCE TECHNICAL APPLICATIONS CENTER GROUP

2020

- Exploring the Subsurface with Distributed Acoustic Sensing Deployed on Dark Fiber Networks.

Invited Virtual Seminar

AIR FORCE RESEARCH LABORATORY (AFRL), NUCLEAR EXPLOSION MONITORING (NEM) GROUP

2020

- Exploring the Subsurface with Distributed Acoustic Sensing Deployed on Dark Fiber Networks.

Invited oral presentation at Pre-AGU Distributed Acoustic Sensing Workshop

San Francisco, USA

AGU FALL MEETING 2019 WORKSHOP

2019

- Presentation at pre-AGU Workshop: Distributed Acoustic Sensing: Principles, Data Processing, and Application in Earth Sciences. Presentation title: Using Low-Frequency Fiber-optic DAS for Monitoring Long-term Subsidence in an Induced Permafrost Warming Experiment.

Invited oral presentation at Pre-AGU Distributed Acoustic Sensing Workshop

Washington DC, USA

AGU FALL MEETING 2018 WORKSHOP

2018

- Presentation at pre-AGU Workshop: Distributed Acoustic Sensing: Principles and Case Studies. Presentation title: Surface Wave Imaging at Intermediate Depth using DAS Deployed on Dark Fiber.

Invited oral presentation at the Basins Research Group Seminar Series

London, United Kingdom

IMPERIAL COLLEGE LONDON

2017

- Presentation title: Structure and Evolution of the Parnaíba Basin, NE Brazil

Oral and poster presentations at the Seminar on Frontiers in Earth Sciences

Cambridge, United Kingdom

UNIVERSITY OF CAMBRIDGE

2015–2017

- Presentation of PhD research to industry representatives in an annual meeting of the Department of Earth Sciences of the University of Cambridge with industry partners and sponsors.

Oral presentations at the BP-Cambridge Margins Project Steering Committee and Technical Progress Meetings

Sunbury and Cambridge, United

Kingdom

BP OFFICES AND UNIVERSITY OF CAMBRIDGE

2013–2017

- Presentation of PhD project to researchers and project managers at BP in a bi-annual meeting of the Basin Analysis Group of the Department of Earth Sciences of the University of Cambridge with BP representatives.

Professional Association

- Reviewer** Geophysical Research Letters, Nature Communications, Journal of Applied Geophysics, Seismological Research Letters, AGU Books
- Member** American Geophysical Union (AGU), Seismological Society of America (SSA), Society of Exploration Geophysics (SEG), European Geosciences Union (EGU)

First-author Publications

Rodríguez Tribaldos, V., Ajo-Franklin, J., Dou, S., Lindsey, N., Ulrich, C., Robertson, M., Freifeld, B., Daley, T., Monga, I., Tracy, C. (accepted), Surface Wave Imaging using Distributed Acoustic Sensing Deployed on Dark Fiber: Moving Beyond High-Frequency Noise. *American Geophysical Society Books*

Rodríguez-Tribaldos, V. and White, N., Implications of a Preliminary Subsidence Analysis of the Parnaíba Cratonic Basin (2018), in Daly, M. C., Fuck, R. A., Julià, J., Macdonald, D. I. M. and Watts, A. B. (eds) *Cratonic Basin Formation: A Case Study of the Parnaíba Basin of Brazil*, Geological Society, London, Special Publication, 472.

Rodríguez-Tribaldos, V., White, N., Roberts, G.G. and Hoggard, M. (2017) Spatial and Temporal Uplift History of South America from Calibrated Drainage Analysis, *Geochemistry, Geophysics, Geosystems*, 18.

Rodríguez, V., Gutiérrez, F., Green, A.G., Carbonel, D., Horstmeyer, H. and Schmelzbach, C. (2014) Characterizing Sagging and Collapse Sinkholes in a Mantled Karst by Means of Ground Penetrating Radar (GPR), *Environmental and Engineering Geoscience*, 20(2), pp. 109–132.

Co-authored Publications

Klöcking, M., Hoggard, M.J., **Rodríguez-Tribaldos, V.**, Richards, F.D., Guimarães, A., Maclennan, J., White, N.J. (2020), A tale of two domes: Neogene to recent volcanism and dynamic uplift in northeast Brazil and southwest Africa, *Earth Surface Processes and Landforms*, 547.

Victor, T., Julià, J., White N.J., **Rodríguez Tribaldos, V.** (2020), Joint inversion of high-frequency receiver functions and surface-wave dispersion: Case study in the Parnaíba Basin of NE Brazil, *Bulletin of the Seismological Society of America*.

Dong, B., **Rodríguez Tribaldos, V.**, Xing, X., Byna, S., Ajo-Franklin, J., Wu, K. (2020), DASSA: Parallel DAS Data Storage and Analysis for Sub-surface Event Detection, *IEEE 34th International Parallel and Distributed Processing Symposium*.

Ajo-Franklin, J.B., Dou, S., Lindsey, N.J., Monga, I., Tracy, C., Robertson, M., **Rodríguez Tribaldos, V.** (2019), Ulrich, C., Freifeld, B., Daley, T., Li, X., Distributed Acoustic Sensing Using Dark Fiber for Near-Surface Characterization and Broadband Seismic Event Detection. *Scientific Reports* 9(1328).

Coelho, D.L.O., Julià, J., **Rodríguez-Tribaldos, V.** and White, N., Deep crustal architecture of the Parnaíba basin of NE Brazil from receiver function analysis: Implications for basin subsidence (2018), in Daly, M. C., Fuck, R. A., Julià, J., Macdonald, D. I. M. and Watts, A. B. (eds) *Cratonic Basin Formation: A Case Study of the Parnaíba Basin of Brazil*, Geological Society, London, Special Publication, 472.

McKenzie, D. and **Rodríguez-Tribaldos, V.**, The formation of cratonic basins by crustal thickening and erosion (2018), in Daly, M. C., Fuck, R. A., Julià, J., Macdonald, D. I. M. and Watts, A. B. (eds) *Cratonic Basin Formation: A Case Study of the Parnaíba Basin of Brazil*, Geological Society, London, Special Publication, 472.

Carbonel, D., **Rodríguez-Tribaldos, V.**, Gutiérrez, F., Galve, J.P., Guerrero, J., Zarroca, M., Roqué, C., Linares, R., McCalpin, J.P. and Acosta, E. (2015) Investigating a damaging buried sinkhole cluster in an urban area (Zaragoza city, NE Spain) integrating multiple techniques: Geomorphological surveys, DInSAR, DEMs, GPR, ERT, and trenching, *Geomorphology*, 229, pp. 3–16.

Carbonel, D., **Rodríguez, V.**, Gutiérrez, F., McCalpin, J.P., Linares, R., Roqué, C., Zarroca, M., Guerrero, J. and Sasowsky, I. (2014) Evaluation of trenching, ground penetrating radar (GPR) and electrical resistivity tomography (ERT) for sinkhole characterization, *Earth Surface Processes and Landforms*, 39(2), pp. 214–227.

Carbonel, D., Gutiérrez, F., Linares, R., Roqué, C., Zarroca, M., McCalpin, J.P., Guerrero, J. and **Rodríguez, V.** (2013) Differentiating between gravitational and tectonic faults by means of geomorphological mapping, trenching and geophysical surveys. The case of the Zenzano Fault (Iberian Chain, N Spain), *Geomorphology*, 189, pp. 93–108.

First-author Proceedings

Rodríguez Tribaldos, V., Dou, S., Lindsey, N.J., Monga, I., Tracy, C., Ajo-Franklin, J. (2019) Monitoring Aquifers Using Relative Seismic Velocity Changes Recorded with Fiber-optic DAS, *AGU Fall Meeting 2019*, San Francisco, *Oral Presentation*

Rodríguez Tribaldos, V., Dou, S., Lindsey, N., Ulrich, C., Robertson, M., Freifeld, B., Daley, T., Monga, I., Tracy, C., Ajo-Franklin, J.B. (2019) Distributed Acoustic Sensing (DAS) for Continuous Monitoring of Near-Surface Properties Using Coda Wave Interferometry, *Seismological Society of America Annual Meeting 2019*, Seattle, *Oral Presentation*

Rodríguez Tribaldos, V., Lindsey, N., Titov, A., Wagner, A.M., Gelvin, A., Ekblaw, I., Ulrich, C., Freifeld, B.M., Ajo-Franklin, J.B., (2018) Observations of Long-term Subsidence in an Induced Permafrost Warming Experiment Using Distributed Acoustic Sensing (DAS), *AGU Fall Meeting 2018*, Washington DC, *Poster Presentation*

Rodríguez-Tribaldos, V., White, N.J., Coelho, D. and Julià, J. (2017) Evolution of Parnaíba Cratonic Basin, NE Brazil, *AGU Fall Meeting 2017*, New Orleans. *Oral presentation*

Rodríguez-Tribaldos, V., White, N.J., Coelho, D. and Julià, J. (2017) Deep Structure and Subsidence History of Parnaíba Cratonic Basin, NE Brazil, *EGU General Assembly 2017*, Vienna. *Poster presentation*

Rodríguez-Tribaldos, V., White, N.J., Coelho, D. and Julià, J. (2016) Deep Structure and Subsidence of Parnaíba Cratonic Basin, NE Brazil, *AGU Fall Meeting 2016*, San Francisco. *Oral presentation*

Rodríguez-Tribaldos, V., White, N.J., and Julià, J. (2016) Subsidence and Deep Structure of Parnaíba Cratonic Basin, *48 Congresso Brasileiro de Geologia*, Porto Alegre. *Oral presentation*

Rodríguez-Tribaldos, V., White, N.J. and Roberts G.G. (2016) Drainage Analysis of the South American Landscape and its Tectonic Implications, *EGU General Assembly 2016*, Vienna. *Oral presentation*

Rodríguez-Tribaldos, V., White, N.J. and Roberts G.G. (2014) Cenozoic Uplift Rate History of South America from Inversion of River Profiles, *AGU Fall Meeting 2014*, San Francisco. *Poster presentation*

Rodríguez-Tribaldos, V., Carbonel, D., Gutiérrez, F., Galve, J.P., Zarroca, M., Linares, R., Roqué, C., Guerrero, J., and McCalpin, J.P. (2013) Investigating a damaging buried sinkhole cluster in an urban area integrating geomorphological surveys, geophysics and trenching, *VIII Reunión de Cuaternario Ibérico*, La Rinconada, Sevilla. *Oral presentation*

Co-author Proceedings

Schoenball, M., Ajo-Franklin, J., Wood, T., Robertson, M., Cook, P., Rodríguez Tribaldos, V., Crowe, D., Hao, Z., Kneafsy, T., and the EGS Collab Team (2020), Lessons learned from passive seismic monitoring of EGS Collab Experiment 1, *45th Workshop on Geothermal Reservoir Engineering*, Stanford University.

Li, D., Huang, L., Chi, B., Ajo-Franklin, J., **Rodríguez Tribaldos, V.**, Schoenball, M., Kneafsy, T., and the EGS Collab Team (2020), Distributed Acoustic Sensing Monitoring at the First EGS Collab Testbed, *45th Workshop on Geothermal Reservoir Engineering*, Stanford University.

Coelho, D.L.O., Julià, J., White, N.J., **Rodríguez Tribaldos, V.** (2019), Mantle Transition Zone Topography Beneath the Parnaíba Basin of NE Brazil: New Constraints on Deep Mantle Dynamics, *AGU Fall Meeting 2019*, San Francisco.

McNab, White, N., **Rodríguez Tribaldos, V.** (2019), Lithospheric and asthenospheric controls on the evolution of intracratonic basins: comparing Congo, Taoudeni and Parnaíba, *AGU Fall Meeting 2019*, San Francisco.

Klöcking, M., **Rodríguez Tribaldos, V.**, Hoggard, M.J., Richards, F., Guimarães, A.R., MacLennan, J., White, N. (2019), Mechanisms for Dynamic Support in Northeast Brazil and Southwest Africa, *AGU Fall Meeting 2019*, San Francisco.

Titov, A., Lindsey, N., **Rodríguez Tribaldos, V.**, Wagner, A.M., Gelvin, A., Ekblaw, I., Ulrich, C., Freifeld, B.M., Ajo-Franklin, J.B. (2018), Permafrost Monitoring with Brillouin Nased Fiber-Optic Distributed Strain and Temperature Sensing: Findings from a Controlled Thaw Experiment, *AGU Fall Meeting 2018*, Washington DC.

Lindsey N., Martin, E.R., Lisabeth, H.P., Wagner, A., **Rodríguez Tribaldos, V.**, Titov A., Ekblaw, I., Ulrich, C., Dou, S., James, S.R., Gelvin, A., Saari, S., Ajo-Franklin, J.B. (2018), Time-lapse imaging of a controlled permafrost thaw experiment with strongly non-stationary vehicle noise and a 4,000 component distributed acoustic sensing (DAS) array, *AGU Fall Meeting 2018*, Washington DC.

Julià, J., Schimmel, M., White, N.J., **Rodríguez Tribaldos, V.** (2018), Reflection seismic imaging under the Parnaíba basin (NE Brazil) with ambient seismic noise, *AGU Fall Meeting 2018*, Washington DC.

da Cunha Víctor, T.S., Julià, J., White N.J., **Rodríguez Tribaldos, V.** (2018), Joint inversion of high-frequency receiver functions and surface-wave dispersion for sedimentary structure: Case study in the Parnaíba Basin of NE Brazil, *AGU Fall Meeting 2018*, Washington DC.

Coelho, D., Julià, J., **Rodríguez-Tribaldos, V.** and White, N.J. (2017), Characterizing the crustal architecture of the Parnaíba basin with passive-source seismology, *EGU General Assembly 2017*, Vienna.