Rodrigo Chi Durán

Personal Information

Full Name Rodrigo Kimyen Chi Durán
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Education

2018 - Present **University of California, Berkeley**. Ph.D. Earth and Planetary Sciences.
2008-2014 **Universidad de Chile**. B.S. Electrical Engineering.

Academic Appointments

August 2018 - Present **Graduate Student Researcher - University of California, Berkeley**
- Developed and implemented advanced data-driven techniques, as Complex Empirical to analyze Earth's geomagnetic field observations, resulting in the discovery of short-period waves that align with theoretical models of Earth's outer core. (Supervisor: Prof. Bruce Buffett)
- Created and implemented a joint inversion technique using seismic waveform and ground deformation data based on satellite radar observations induced by the 2016 and 2017 North Korea nuclear tests. This new technique enabled us to re-estimate the magnitude of the events, relocate the sources, and propose a new geological model of the nuclear test site (Supervisor: Prof. Douglas Dreger).

July 2017 - May 2018 **Beauchef Proyecta - Universidad de Chile**
- Coordinated a new multidisciplinary projects area for the Faculty of Physical and Mathematical Sciences, as part of the project "A new Engineering for 2030". This involved developing new collaborations with other departments and facilitating communication among team members.
- Gained experience in project management, team leadership, and interdisciplinary collaboration (Supervisor: Prof. Viviana Meruane).

May 2015 - June 2017 **Advanced Mining Technology Center - Universidad de Chile**
- Conducted research on new techniques for analysis of seismic signals, as part of Project FONDECYT 1130071. This involved developing new algorithms for seismic tomography and testing their effectiveness.
- Gained experience in research, data analysis, and algorithm development (Supervisor: Prof. Diana Comte).

July 2016 - December 2016 **Biomedical Neuroscience Institute - Universidad de Chile**
- Analyzed and reviewed cardiac signals for a new technological device for cardiac measurement and arrhythmia detection, as part of Project InnovaCorfo 16COTE-60088. This involved coordinating test execution and ensuring high signal quality.
- Gained experience in signal analysis, test coordination, and quality assurance (Supervisor: Prof. Pedro Maldonado).

Publications

Refereed Publications

[6] **Chi-Durán, R.**, Dreger, D. S., & Rodgers, A. J. (in prep) Joint regional waveform, first motion polarity, and surface displacement inversion using a layered elastic model with topography for North Korean Nuclear explosions.

[5] **Chi-Durán, R.**, & Buffett, B. A. (2023). Extracting spatial–temporal coherent patterns in geomagnetic secular variation using dynamic mode decomposition. Geophysical Research Letters. https://doi.org/10.1029/2022gl101288

[4] **Chi-Durán, R.**, Dreger, D. S., Rodgers, A. J., & Nayak, A. (2021). Joint regional waveform, first-motion polarity, and surface displacement moment tensor inversion of the 3 September 2017 North Korean nuclear test. The Seismic Record, 1(2), 107–116. https://doi.org/10.1785/0320210022

[3] **Chi-Durán, R.**, Avery, M. S., & Buffett, B. A. (2021). Signatures of high-latitude waves in observations of geomagnetic acceleration. Geophysical Research Letters. https://doi.org/10.1029/2021gl094692

[2] **Chi-Durán, R.**, Avery, M. S., Knezek, N., & Buffett, B. A. (2020). Decomposition of Geomagnetic Secular Acceleration Into Traveling Waves Using Complex Empirical Orthogonal Functions. Geophysical Research Letters, 47(17), 1. https://doi.org/10.1029/2020GL087940

[1] **Chi-Durán, R.**, Comte, D., Díaz, M., & Silva, J. F. (2017). Automatic detection of P-and S-wave arrival times: new strategies based on the modified fractal method and basic matching pursuit. Journal of Seismology, 21(5), 1171–1184. https://doi.org/10.1007/s10950-017-9658-0

Open Access Documents

Chi Durán, R.. Problemas Propuestos y Resueltos de Electromagnetismo (in Spanish). Open Access - Available online: `https://goo.gl/noeJu3`

Fellowships and Awards

December 2015 Ph.D. Fulbright Fellowship. Beca Igualdad de Oportunidades.

Teaching Experience

Lecturer

Spring 2020, 2021, 2022 **Interdisciplinary module: Geoscience Data**
Faculty of Physical and Mathematical Sciences, Universidad de Chile.

Spring 2017, Fall 2018 **Proyect I: Development of Projects**
Faculty of Physical and Mathematical Sciences, Universidad de Chile.

Fall 2016, 2017, 2018 **Project Workshop: Projects in Arduino**
Faculty of Physical and Mathematical Sciences, Universidad de Chile.

Teaching Assistant

Spring 2023 **Geodynamics**
Department of Earth and Planetary Science, UC Berkeley.

2011-2016 **Electromagnetism**
Physics Department, Faculty of Physical and Mathematical Sciences, Universidad de Chile.

Conference Presentations

June 2022 "Extracting spatial–temporal coherent patterns in geomagnetic secular variation using dynamic mode decomposition". SEDI, Zurich, Switzerland.

December 2021 "Signatures of High-Latitude Waves in Observations of Geomagnetic Acceleration". AGU Fall Meeting. New Orleans, Louisiana, USA.

April 2021 "Developing a Joint Regional Waveform-INSAR Moment Tensor Inversion: Application to 6th North Korean Nuclear Test". SSA Annual Meeting. Remote.

December 2020 "Joint regional waveform and surface displacement inversion for the seismic moment tensor: Application to September 3, 2017 declared North Korean nuclear test". AGU Fall Meeting. Remote.

December 2019 "Complex wave decomposition of geomagnetic secular acceleration in the equatorial region Earth's core". AGU Fall Meeting. San Francisco, California, USA.

December 2017 "Automatic detection of P-and S-wave arrival times: new strategies based on the modified fractal method and basic matching pursuit". AGU Fall Meeting. New Orleans, Louisiana, USA.

Invited Talks

October 2021 "Joint Moment Tensor Inversion of Regional Waveforms, First-motion Polarity and SAR Deformation for the September 3, 2017 DPRK Declared Nuclear Test". Atmospheric, Earth and Energy Division/Geophysical Monitoring Program, Guest Seminar. Lawrence Livermore National Laboratory. Livermore, California, USA.

Service

Paper reviews Geophysical Journal International

Software

Operating Systems Windows, Mac OS X, Linux
Progr. Languages C++, Java, Python, R.
Scientific Matlab, Eagle, Latex

Office Microsoft Office

Languages

Spanish (native) and English (advanced)

Leadership and Outreach

2021 - 2022 **The Latino/a Association of Graduate Students in Engineering and Science (LAGSES)**
Communications Chair.

2011 - 2016 **NGO La Ruta Solar**
Organizer, observer and judge for solar car competition that takes place in the Atacama desert.

2011 **Centro de Desarollo Estudiantil**
Voluntary work in Coronel de Maule, Chile. Reconstruction and social assistance after the 2010 Maule Earthquake.

Other Interests

Swiming, biking and traveling.