Kristian D. Torres Bautista

Geophysicist (BSc, MSc, PhD candidate)
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Geophysicist with a background in seismic imaging and signal processing. Passionate for programming and technology. Enthusiast of analytical and problem-solving challenges.

Experience

Halliburton Landmark Software & Services Intern March - August, 2023
Developing machine learning and data science algorithms to practically and efficiently improve applications in the oil and gas industry.

Research assistant: Signal Analysis and Imaging Group (SAIG) 2019 - present
Design of supervised and unsupervised deep learning methods to enhance seismic inversion, imaging, and processing algorithms, resulting in two papers accepted for publication in peer-reviewed journals, and several expanded abstracts published in conferences.
Research interests: (Deep) Neural networks, FWI and LSM imaging, HPC, and seismic processing.

Research assistant in Laboratory of Modeling Methods and Computational Geophysics 2017 - 2019
My research focused on developing more efficient parametrization and regularization techniques for full-waveform inversion and HPC strategies for reducing the computational burden of wave-equation-based forward and inverse problems; resulting in the publication of two peer-reviewed papers.

Teaching assistant for the course "Mathematical Methods in Civil Engineering" COPPE/UFRJ
I broadened and shared my knowledge by teaching the theory and practice of linear algebra, Laplace and Fourier transforms, initial and boundary value problems and other core topics in engineering to more than 40 graduate students. First term, 2018

Land Seismic QC Geophysicist Intern – PDVSA Sísmica Bielovenezolana Monagas, Venezuela
Designed 2D and 3D seismic acquisition survey, preprocessing seismic data, visualization of seismic data and 3D surveys. Summer 2013

Education

Ph.D. in Geophysics Edmonton, Canada
University of Alberta. Supervisor: Dr. Mauricio Sacchi. 2019–2024
Deep learning solutions for seismic inverse problems. GPA: 4/4

MSc. in Computational Geophysics Rio de Janeiro, Brazil
Federal University of Rio de Janeiro. Supervisor: Dr. Webe Mansur. 2017–2019
Least-squares migration and full-waveform inversion in the time domain via adjoint-state methods. GPA: 3/3

Exchange Student in Geophysics São Paulo, Brazil
University of São Paulo – Institute of Astronomy, Geophysics and Atmospheric Sciences 2014

BSc. Geophysical Engineering Caracas, Venezuela
Simon Bolivar University 2010–2015
Honors senior thesis: Feasibility study of water and steam injection monitoring via time-lapse seismic refraction in heavy oil reservoirs. GPA: 4.15/5

Publications

Torres, K., and M. Sacchi, 2024, Improving reflection waveform inversion reflectivity with extended least-squares migration: submitted to IMAGE 2024.

Torres, K., and M. Sacchi, 2024, Sparse vector reflectivity inversion with full-wavefield inversion: submitted to the 85th EAGE Annual Conference & Exhibition, European Association of Geoscientists & Engineers, 1–5.

Torres, K., M. Belonosov, F. Jiang, K. Osypov, 2023, How thin is a thin bed? an uncertainty perspective: 2nd EAGE Workshop on Quantifying Uncertainty in Depth Imaging, Nov 2023, p.1 - 5.

Torres, K., and M. Sacchi, 2023, A deep-learning inverse Hessian preconditioning for iterative least-squares migration: 84th EAGE Annual Conference & Exhibition.

Torres, K., and M. Sacchi, 2023, Deep decomposition learning for reflectivity inversion, Geophysical Prospecting, 00, 00– 00.

Torres K, and M. Sacchi, 2022, Least-squares reverse time migration via deep learning-based updating operators, Geophysics 87.6 (2022), pp. 1–80.

Torres, K., and M. Sacchi, 2022, Deep learning decomposition for null and active space estimation for thin-bed reflectivity inversion: Second International Meeting for Applied Geoscience & Energy (pp. 1905-1909).

Torres, K., and M. Sacchi, 2022, Deep Null Space Regularization for Seismic Inverse Problems: 83rd EAGE Annual Conference & Exhibition, European Association of Geoscientists & Engineers, 1–5.

Torres, K., and M. Sacchi, 2021, Deep-learning based least-squares reverse time migration: SEG Technical Program Expanded Abstracts, 2021-September, 2709–2713.

De Souza, R., Torres, K., Mansur, W., et al., 2019, GII regularization technique for seismic data inversion: Jornal of Applied Geophysics, v.160, pp. 229-235.

Fernandes, G., Torres, K., Peters, F., Mansur, W., 2018, Sensitivity analysis of 2D frequency domain wave propagation modelling with respect to Perfectly Matched Layers absorbing parameters: VII Brazilian Symposium on Geophysics, SBGf.

Torres, K., Diogo, L., Garcia, I., 2015, Feasibility study of monitoring time-lapse seismic refraction in Junín and Boyacá Blocks: Third South American Oil & Gas Congress. Society of Petroleum Engineers.

Honors and Awards

Recipient of the prestigious Alberta Innovates Graduate Student Scholarship 2023

FGSR University of Alberta Doctoral Recruitment Scholarship 2019

David Bartel Scholarship granted by the Society of Exploration Geophysicist (SEG) 2018

FAPERJ "Nota 10" Scholarship for outstanding academic achievement 2018
Special scholarship awarded to the best graduate students in the state of Rio de Janeiro

SEG/Chevron Student Leadership Symposium (SLS) Travel Grant Award 2017
Travel Grant to attend SLS 2017 program and SEG's 87th Annual Meeting

SEG/Exxon Mobil Student Education Program (SEP) Travel Grant Award 2016
Travel Grant to attend SEP 2016 program and SEG's 86th Annual Meeting

1st Place–Imperial Barrel Award 2015
Latin American and Caribbean Region. Through this prospective basin evaluation competition, I worked with 3D Danish North Sea seismic and well-log data, conducting seismic sequence stratigraphy and horizon interpretation, seismic-well tie, time-to-depth conversion, petrophysical analysis and basin modelling using Petrel software.

2nd Place–Society of Petroleum Engineers (SPE) Student Paper Competition 2015

Honorific Mention for outstanding undergraduate senior thesis 2015

Human Languages

English: Full professional proficiency
TOEFL iBT score: 108/120

Portuguese: Full professional proficiency
CELPE-Bras certified (B2 level)

Spanish: Native language

Programming Languages and Frameworks

Programming: Fortran, C, Python, Matlab, Julia.
Toolboxes: Tensorflow, Pytorch, Git, Docker, OpenACC, OpenMP, MPI, Dask.

Seismic Softwares: Seismic Unix, Petrel, OpendTect, HampsonRussel, Madagascar, Devito.
OS: Linux, Windows, MacOS.

Certificates

First EAGE/SBGF Workshop on Least-Squares Migration. 2018

Advanced GPU Computing for Geophysics. 15th International Congress SBGf 2017

SEG DISC - Geophysical Electromagnetics: Fundamentals and Applications. 2017

Introduction to VSP interpretation. Simon Bolivar University 2016

Special Topics in AVO Attributes and Analysis. Simon Bolivar University 2016

Extracurricular

Invited speaker to present my latest research work to recognized groups from industry including Shell, Halliburton, BP, Total-Energy, GeoSoftware, and TGS. 2021–present

Teaching Assistant for Undergraduate Physics Labs at the University of Alberta 2020 - 2022
I was a TA for first and second-year undergraduate physics labs, giving in-class support to more than 200 students with different backgrounds, covering topics such as electro-magnetism, mechanics, and gravity.

Executive member of the University of Alberta Geophysical Graduate Society 2019–present

President of the Federal University of Rio de Janeiro SEG Student Chapter 2017–2019

SEG Wiki Spanish Translation Project 2017–2019
I volunteered to translate Sheriff's Geophysical Encyclopedia into Spanish for the SEG Wiki translation project.