Bruno Peruqui Guidio

Postdoctoral Researcher

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Education

The Catholic University of America — *Washington, DC, USA*
Ph.D., Civil and Environmental Engineering — *October 2020*

The Catholic University of America — *Washington, DC, USA*
M.Sc., Civil and Environmental Engineering — *May 2019*

University of Western Sao Paulo — *Presidente Prudente, SP, Brazil*
B.Eng., Civil Engineering — *June 2017*

Professional Experience

2020-2022 **Postdoctoral Researcher**, School of Engineering & Technology, Central Michigan University
2019-2020 **Graduate Student Researcher**, Dept. of Civil and Environment Eng., Catholic University of America
2017-2020 **Graduate Teaching Assistant**, Dept. of Civil and Environment Eng., Catholic University of America

Research Experience

Central Michigan University - School of Engineering & Technology — *Mount Pleasant, MI*
Postoctoral Researcher — *Sept. 2020 - Present*

- Solids, Waves, Intelligence, and Mechanics (SWIM) Lab.
- Research supported by National Science Foundation (NSF) under Award CMMI-2044887 and CMMI-2053694.
- Working on wave propagation analyses, computational mechanics, and large-scale inverse problems.
- Developing computational algorithms to analyze the impact of earthquakes on the built environment.
- Solving inverse problems by using machine learning.
- Mentoring undergraduate and graduate students.

Catholic University of America, Dept. of Civil and Environment Engineering — *Washington, DC*
Graduate Student Researcher — *Aug. 2019-Aug. 2020*

- Advisor: Dr. Chanseok Jeong
- Dissertation: "Full-Waveform Inversion of Seismic Input Motions in a Near-Surface Domain"
- Work supported by National Science Foundation (NSF) under Award CMMI-1855406.
- Mathematical and computational modeling for wave propagation analyses and inverse problems.

Publications

Published Journal Papers

1. **Guidio, B.**, Goh, H., Jeong, C. 2023. Effective Seismic Force Retrieval from Surface Measurement for SH-Wave Reconstruction. *Soil Dynamics and Earthquake Engineering*. 165 (2023): 107682. [DOI] [PDF]
2. **Guidio, B.**, Nam, B.H., Jeong, C. 2023. Multilevel Genetic Algorithm–based Acoustic Elastodynamic Imaging of Coupled Fluid–solid Media to Detect an Underground Cavity. *Journal of Computing in Civil Engineering*. 37.1 (2023): 04022047. [DOI] [PDF]
3. Maharjan, S., **Guidio, B.**, Fathi, A., Jeong, C. 2022. Deep and Convolutional Neural Networks for identifying vertically-propagating incoming seismic wave motion into a heterogeneous, damped soil column. *Soil Dynamics and Earthquake Engineering*. 162 (2022): 107510. [DOI] [PDF]
4. **Guidio, B.**, Jeremić, B., Guidio, L., Jeong, C. 2022. Passive Seismic Inversion of SH Wave Input Motions in a Truncated Domain. *Soil Dynamics and Earthquake Engineering*. 158 (2022): 107263. [DOI] [PDF]

5. **Guidio, B.P.**, Jeong, C. 2021. Full-waveform inversion of incoherent dynamic traction in a bounded 2D domain of scalar wave motions. *Journal of Engineering Mechanics*. 147.4 (2021): 04021010. [DOI] [PDF]
6. **Guidio, B.**, Jeong, C. 2021. On the feasibility of simultaneous identification of a material property of a Timoshenko beam and a moving vibration source. *Engineering Structures*. 227 (2021): 111346. [DOI] [PDF]

Journal Papers In Preparation

1. **Guidio, B.**, Goh, H., Kallivokas, L.F., Jeong, C. Effective Seismic Forces Inversion and Reconstruction of Seismic Motions in a PML-truncated 2D Plane-strain Domain.
2. **Guidio, B.**, Kim, B., Jeong, C. Passive Full-waveform Inversion in a Truncated Domain using Scalar Waves.
3. Maharjan, S, **Guidio, B.**, Jeong, C. Machine Learning to Identify Structural Defects of a Bridge and a Moving Vibration Source in Real-Time.
4. **Guidio, B.**, Jeong, C. Reconstruction of Seismic Wave Responses inside a Domain Reduction Method Boundary using Wave-suppressing Regularization.
5. **Guidio, B.**, Jeong, C. Seismic Meta Force for Vibration Isolation of Structures.

Conference Papers

1. **Guidio, B.**, Goh, H., Jeong, C. Full-Waveform Inversion of Seismic Input Motions at a Domain Reduction Method Boundary in a PML-truncated domain. *In Proceedings of the 15th World Congress on Computational Mechanics (WCCM)*. Tokyo, Japan. July 31-August 5, 2022.
2. **Guidio, B.**, Goh, H., Jeong, C. Reconstruction of Seismic Ground Motions inside a Domain Reduction Method Boundary in a PML-truncated domain. *In Proceedings of the 12th National Conference on Earthquake Engineering*. Salt Lake City, Utah, USA. June 27-July 01, 2022.
3. **Guidio, B.P.**, Jeong, C. Identification of Seismic Ground Motions in a Near-Surface 2D Domain Subject to Unknown SH Incident Waves. *In Proceedings of the Geo-Congress 2022*. Charlotte, North Carolina, USA. March 20-23, 2022.
4. **Guidio, B.P.**, Jeong, C. Inversion of an Effective Seismic Force at a Domain Reduction Method (DRM) Boundary and Reconstruction of Wave Responses inside the DRM Boundary. *In Proceedings of the 42nd Ibero-Latin-American Congress on Computational Methods in Engineering (CILAMCE) and 3rd Pan-American Congress on Computational Mechanics (PANACM)*. Rio de Janeiro, Brazil. November 9-12, 2021.
5. **Guidio, B.P.**, Jeong, C. Full-Waveform Inversion of SH-Wave Input Motions in a Near-Surface 2D Domain. *In Proceedings of the 14th World Congress on Computational Mechanics (WCCM)*. Paris, France. July 11-15, 2021.

Presentations

** presenting author; [+] mentored undergraduate*

Oral Presentations in Conferences

1. **Guidio, B.**, Jeong, C. 2022. Full Waveform Inversion of Seismic Input Motions at a Domain Reduction Method Boundary in a PML-truncated domain. *The 15th World Congress on Computational Mechanics (WCCM)*. Yokohama, Japan. July 31-August 5, 2022.
2. **Guidio, B.**, Goh, H., Jeong, C. 2022. Full-Waveform Inversion of Seismic Input Motions at a Domain Reduction Method Boundary in a Domain Truncated by PML. *The Engineering Mechanics Institute (EMI) Conference 2022*. Baltimore, Maryland, USA. May 31–June 3, 2022.
3. **Guidio, B.P.**, Jeong, C. 2021. Inversion of an Effective Seismic Force at a Domain Reduction Method (DRM) Boundary and Reconstruction of Wave Responses inside the DRM Boundary. *The 42nd Ibero-Latin-American Congress on Computational Methods in Engineering (CILAMCE) and 3rd Pan-American Congress on Computational Mechanics (PANACM)*. Rio de Janeiro, Brazil. November 9-12, 2021.
4. **Guidio, B.P.**, Jeong, C. 2021. Full-waveform Inversion of Seismic Input Motions in a Truncated, Near-surface Domain. *The Engineering Mechanics Institute Conference (EMI) 2021*. New York City, New York, USA. May 25–28, 2021.
5. **Guidio, B.P**, Jeong, C. 2021. Full-Waveform Inversion of Seismic Input Motions in a Near-surface Domain Truncated by Wave-Absorbing Boundary Conditions. *The 2021 Seismological Society of America Annual Meeting*. April 19-23, 2021.
6. **Guidio, B.P.**, Jeong, C. 2021. Full-Waveform Inversion of SH-Wave Input Motions in a Near-Surface 2D Domain. *The 14th World Congress on Computational Mechanics (WCCM)*. Paris, France. July 11-15, 2021.

Poster Presentations in Conferences

1. Maharjan, S.*+, **Guidio, B.**, Jeong, C. 2022. Smart Bridge: Machine Learning to Identify Structural Defects of a Bridge and a Moving Vibration Source in Real-Time. *International Mechanical Engineering Congress & Exposition (IMECE)* 2022. Columbus, Ohio, USA. October 30-November 2, 2022.
2. Maharjan, S.*+, **Guidio, B.**, Jeong, C. 2021. Artificial Neural Network Approaches for the Identification of Dynamic Input Motions in a Heterogeneous Solid. *International Mechanical Engineering Congress & Exposition (IMECE)* 2021. November 1-5, 2021.

Teaching Experience

2020	**Lecturer**, CEE 419: Applied Computational Methods in Civil Engineering	*CUA*
2020	**Teaching Assistant**, ENGR 201: Engineering Mechanics I	*CUA*
2020	**Teaching Assistant**, ENGR 301: Mechanics of Solids	*CUA*
2017, 2019	**Teaching Assistant**, CEE 426/526 & ME 504: Introduction to Finite Elements	*CUA*
2018-2019	**Teaching Assistant**, ENGR 516: Computational Methods for Graduate Students	*CUA*
2017-2019	**Teaching Assistant**, CEE 312: Theory of Structures	*CUA*
2019	**Teaching Assistant**, ENGR 222: Engineering Mathematics I	*CUA*
2018	**Teaching Assistant**, ENGR 518: Experimental Techniques for Graduate Students	*CUA*

Mentoring

2021-2022 **Shashwat Maharjan**, Undergraduate student, Central Michigan University
- Most Enthusiastic Presenter, NSF Student Research Poster Competition, *International Mechanical Engineering Congress & Exposition (IMECE) 2022.*
- Outstanding Undergraduate Students of the Year 2022, *The Engineering Society of Detroit.*
- Undergraduate President's Award for research, *Central Michigan University.*
- Third Place, NSF Student Research Poster Competition, *IMECE 2021.*

2021-2022 **Fazle Mahdi Pranto**, Graduate student, Central Michigan University
- Finalist of Student Paper Competition, *Engineering Mechanics Institute (EMI) Dynamics Committee.*

Awards, Fellowships, & Grants

2019-2020 **Graduate Scholarship**, Dept. of Civil and Environment Eng., Catholic University of America, Tuition waiver and an annual stipend supported by National Science Foundation (NSF).

2017-2019 **Teaching Assistantship**, Dept. of Civil and Environment Eng., Catholic University of America, Tuition waiver and an annual stipend.

2014-2015 **Science Without Borders Fellowship**, Coordination for the Improvement of Higher Education Personnel, Federal Government of Brazil, Tuition waiver and an annual stipend to study in the USA.

2012-2017 **University for All Program Fellowship**, Federal Government of Brazil, Tuition waiver during undergraduate studies.

Outreach & Professional Development

Service

2021 **Technical Session Reviewer and Moderator**, 42nd Ibero-Latin-American Congress on Computational Methods in Engineering (CILAMCE)

2018-2019 **Graduate Student Association**, Committee Member, Catholic University of America

Peer Review

2022 **Reviewer**, Applied Sciences, Buildings, International Journal of Environmental Research and Public Health

Professional Memberships

2021-2022 **Member**, American Society of Civil Engineers (ASCE)