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1 Research Interests

- Structural-Acoustics and Wave Propagation Analysis
 - Wave propagation analyses in solid
 - Wave propagation analyses in coupled (e.g., solid-fluid) media
 - Wave-absorbing boundary
 - Perfectly-matched-layers (PML)
 - Inverse Problems and Optimization:
 - Inverse-source problems
 - Inverse-medium problems
 - Non-destructive evaluation (NDE)
 - Optimization problems
 - Partial-differential-equation-constrained optimization method
 - Computational Mechanics
 - Finite element method (FEM)
 - Extended finite element method (XFEM)
 - Spectral Element Method (SEM)
 - Machine Learning
 - Earthquake Engineering
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2 Teaching Interests

Teaching interests are closely connected with, but not limited to, my research focuses. My main teaching interests are related to theoretical, computational, and applied aspects of mechanics on both undergraduate and graduate levels. In particular, recent teaching activities and interests include:

- Fundamental aspects of theoretical, computational, and applied mechanics
 - Theoretical and computational elastic-plastic mechanics
 - Static and dynamic finite element methods
 - Application of computational modeling and simulation system to engineering problems
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3 Education

Doctor of Philosophy in Civil and Environmental Engineering at the Catholic University of America, Washington, DC. October 2020. Dissertation title: "Full-Waveform Inversion of Seismic Input Motions in a Near-Surface Domain". Advisor: Dr. Chanseok Jeong.

Master of Science in Civil and Environmental Engineering at the Catholic University of America, Washington DC. May 2019. Thesis title: "Genetic Algorithm-based Investigation on the Feasibility of Simultaneous Identification of a Material Property of a Timoshenko Beam and a Moving Vibration Source". Advisor: Dr. Chanseok Jeong.

Bachelor of Engineering in Civil Engineering at University of Western Sao Paulo, Presidente Prudente SP, Brazil. June 2017.

4 Academic Experience

5 Teaching Experience

Teaching Assistant at Catholic University of America. Sept 2017 - Sept 2020

- **CEE 426/526 & ME 504: Introduction to Finite Elements.** Graduate course. Fall 2017, Fall 2019. Course instructor: Dr. Chanseok Jeong.
- **ENGR 516: Computational Methods for Graduate Students.** Graduate course. Fall 2018, Course instructor: Dr. Chanseok Jeong. Summer 2019, Course instructor: Dr. Joseph Vignola
- **ENGR 518: Experimental Techniques for Graduate Students.** Graduate course. Spring 2018, Course instructor: Dr. Chanseok Jeong.
- **ENGR 301: Mechanics of Solids.** Undergraduate course.
- **CEE 312: Theory of Structures.** Undergraduate course.
- **ENGR 201: Engineering Mechanics I.** Undergraduate course.
- **ENGR 222: Engineering Mathematics I.** Undergraduate course.

6 Publications

Papers in Peer-Reviewed Journals

Papers under review are available upon request.

9. **Bruno Guidio**, Chanseok Jeong. Seismic Meta Force for Vibration Isolation of Structures. 2022. [Manuscript in preparation]

8. **Bruno Guidio**, Chanseok Jeong. Reconstruction of Seismic Wave Responses inside a Domain Reduction Method Boundary using Wave-suppressing Regularization. 2022. [Manuscript in preparation]
7. **Bruno Guidio**, Heedong Goh, Chanseok Jeong. Effective Seismic Forces Inversion and Reconstruction of Seismic Motions in a PML-truncated 2D Plane-strain Domain. 2022. [Manuscript in preparation]
6. **Bruno Guidio**, Heedong Goh, Chanseok Jeong. Effective Seismic Force Retrieval from Surface Measurement for SH-Wave Reconstruction. *Soil Dynamics and Earthquake Engineering*. 2022. [Under Review]
5. **Bruno Guidio**, Boo Hyun Nam, Chanseok Jeong. Elastodynamic Imaging of Coupled Fluid Solid Media to Detect an Underground Cavity. *Journal of Computing in Civil Engineering*. 2022. [Under Review]
4. Shashwat Maharjan, **Bruno Guidio**, Arash Fathi, Chanseok Jeong. Deep and Convolutional Neural Networks for identifying incoming seismic wave motion into heterogeneous soil columns. *Soil Dynamics and Earthquake Engineering*. 2022. [Under Review - Revision submitted]
3. **Bruno Guidio**, Boris Jeremić, Leandro Guidio, Chanseok Jeong. Passive Seismic Inversion of SH Wave Input Motions in a Truncated Domain. *Soil Dynamics and Earthquake Engineering*. 158 (2022): 107263. [link]
2. **Bruno Guidio**, Chanseok Jeong. On the feasibility of simultaneous identification of a material property of a Timoshenko beam and a moving vibration source. *Engineering Structures*. 227 (2021): 111346. [link]
1. **Bruno P. Guidio**, Chanseok Jeong. Full-waveform inversion of incoherent dynamic traction in a bounded 2D domain of scalar wave motions. *Journal of Engineering Mechanics*. 147.4 (2021): 04021010. [link]

Papers in Peer-Reviewed Conference

5. **Bruno Guidio**, Heedong Goh, Chanseok Jeong. Full-Waveform Inversion of Seismic Input Motions at a Domain Reduction Method Boundary in a PML-truncated domain. *Abstract Accepted for the 15th World Congress on Computational Mechanics (WCCM)*. Tokyo, Japan. July 31-August 5, 2022.
4. **Bruno Guidio**, Heedong Goh, Chanseok Jeong. Reconstruction of Seismic Ground Motions inside a Domain Reduction Method Boundary in a PML-truncated domain. *Abstract Accepted for the 12th National Conference on Earthquake Engineering*. Salt Lake City, Utah, USA. June 27-July 01, 2022.
3. **Bruno P. Guidio**, Chanseok Jeong. Identification of Seismic Ground Motions in a Near-Surface 2D Domain Subject to Unknown SH Incident Waves. *In Proceeding of the Geo-Congress 2022*. Charlotte, North Carolina, USA. March 20-23, 2022.
2. **Bruno P. Guidio**, Chanseok Jeong. Inversion of an Effective Seismic Force at a Domain Reduction Method (DRM) Boundary and Reconstruction of Wave Responses inside the DRM Boundary.

In Proceeding 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.

1. **Bruno P. Guidio**, Chanseok Jeong. 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.

Technical Presentations

5. **Bruno Guidio**, Heedong Goh, Chanseok Jeong. 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.
4. **Bruno P. Guidio**, Chanseok Jeong. 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
3. **Bruno P. Guidio**, Chanseok Jeong. 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.
2. **Bruno P. Guidio**, Chanseok Jeong. 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.
1. **Bruno P. Guidio**, Chanseok Jeong. 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.

Dissertation and Thesis

2. **Bruno P. Guidio**. Full-Waveform Inversion of Seismic Input Motions in a Near-Surface Domain. *PhD Dissertation*, The Catholic University of America, Washington, DC, USA. October 2020.
1. **Bruno P. Guidio**. Genetic Algorithm-based Investigation on the Feasibility of Simultaneous Identification of a Material Property of a Timoshenko Beam and a Moving Vibration Source. *Master's thesis*, The Catholic University of America, Washington, DC, USA. May 2019.