Moises Silva, Ph.D.
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Education

2017 - 2020 Ph.D., Electrical Engineering - Federal University of Pará, Belém, Brazil
Ph.D. Thesis: "*Machine Learning and Computer Vision Techniques for Damage Detection and Modal Analysis*"

2016 - 2017 M.S., Electrical Engineering - Federal University of Pará, Belém, Brazil
M.S. Dissertation: "*Machine Learning Algorithms for Damage Detection in Structures under Changing Normal Conditions*"

2012 - 2016 B.S., Computer Science - Federal University of Pará, Belém, Brazil

Research Interests

1. Event-driven data processing and neuromorphic computing.
2. Neural rendering.
3. Imagery-based 3D scanning and scene reconstruction.
4. Video-based structural dynamics.
5. Intelligent failure detection and prognostics.
6. Intelligent automation of software-defined networks for fault management in 5/6G environments.
7. Federated learning and privacy preserving machine learning.

Research Experience

1. Los Alamos National Laboratory, NSEC – NM, USA
2022 - Present Postdoctoral Research Associate

2. Sant'Anna School of Advanced Studies – Pisa, Italy
2020 - 2022 Postdoctoral fellow

3. Los Alamos National Laboratory, NSEC – NM, USA
2018 - 2019 Graduate Visiting Student

4. Systems Engineering Institute - INESC R&D, BRAZIL
2016 - 2019 Graduate Researcher

Awards/Honors

2023 Challenge Coin for "Strength and Agility on Duty during the Pandemic", Los Alamos National Laboratory
2016 Magna Laude, Bachelor in Computer Science, Federal University of Pará
2009 Distinction in Math, Medal Winner, State Educational Agency, Pará, Brazil
2008 Regional Championship of Checkers, First Place, State Cultural Agency, Pará, Brazil
2007 Regional Championship of Chess, First Place, State Cultural Agency, Pará, Brazil

Technical Awards

1. ANDRE GREEN; MOISÉS SILVA; ALESSANDRO CATTANEO; DAVID MASCARENAS. 3D Mode Shape Extraction through Event-based Light Fields. *IMAC 2nd Place: Best Paper Award in the Computer Vision and Laser Vibrometry, Technical Division: XLI International Modal Analysis Conference (2024)*

2. MOISÉS SILVA; ANDRE GREEN; JOHN MORALES; PETER MEYERHOFER; YONGCHAO YANG; ELOI FIGUEIREDO; DAVID MASCARENAS. Full-Field 3D Experimental Modal Analysis from Dynamic Point Clouds Measured Using a Time-of- Flight Imager. *IMAC Best Paper Award: Computer Vision and Laser*

Vibrometry, Technical Division: XXXIX International Modal Analysis Conference (2021)

3. FAGERT, J.; FLANIGAN, K.; SILVA, M.; JONKO, A. BONI: (BO)tanical (N)atural Frequency (I)maging for Wildfire Modeling. Best Project Proposal: LANL's Advanced Studies Institute (2019), USA

Technical Skills

Topics: Signal processing, optimization algorithms, applied machine learning, neural networks, evolutionary computing, computer vision, modeling (e.g., SimPy, OWL, GLSL), interactive visualization.
Languages: Python, MATLAB/Octave, C, C++, C#, Java, Java Web, Bash.
Additional experience: Robot Operating Systems (ROS), High-performance computing (Numba), Unix-based systems.

Citations

Google Scholar Citations: 801, h-index 14, i10-index 17 (March 30, 2024)
Journal papers: 24
Conference papers: 33
Book chapters: 1
Provisional patent: 1

Most Relevant Scientific Production

Journal Papers (Earliest to oldest)

1. MOISÉS SILVA; ALESSANDRO PACINI; ANDREA SGAMBELLURI; LUCA VALCARENGHI. Learning Long- and Short-Term Temporal Patterns for ML-driven Fault Management in Optical Communication Networks. *IEEE Transactions on Network and Service Management (TNSM), 2023* **Citations: 14**

2. MOISÉS SILVA; ANDRE GREEN; JOHN MORALES; PETER MEYERHOFER; YONGCHAO YANG; ELOI FIGUEIREDO; JOÃO COSTA; DAVID MASCARENAS. 3D Structural Vibration Identification from Dynamic Point Clouds. *Mechanical Systems and Signal Processing, 2022* **Citations: 13**

3. MOISÉS SILVA; ADAM SANTOS; REGINALDO SANTOS; ELOI FIGUEIREDO; CLAUDOMIRO SALES; COSTA, JOÃO C. W. A, Deep principal component analysis: A new paradigm for damage identification, *Structural Health Monitoring (SHM)*, v. 18, p. 1444-1463, 2019 **Citations: 61**

4. MOISÉS SILVA; ADAM SANTOS; REGINALDO SANTOS; ELOI FIGUEIREDO; CLAUDOMIRO SALES; JOÃO C. W. A. COSTA, Agglomerative concentric hypersphere clustering applied to structural damage detection, *Mechanical Systems and Signal Processing (MSSP)*, v. 92, p. 196-212, 2017 **Citations: 31**

5. MOISÉS SILVA; ADAM SANTOS; ELOI FIGUEIREDO; REGINALDO SANTOS; CLAUDOMIRO SALES; JOÃO COSTA, A novel unsupervised approach based on a genetic algorithm for structural damage detection in bridges, *Engineering Applications of Artificial Intelligence (EAAI)*, v.52, p.168 - 180, 2016 **Citations: 119**

6. ADAM SANTOS; MOISÉS SILVA; ELOI FIGUEIREDO; CLAUDOMIRO SALES; JOÃO COSTA. Machine learning algorithms for damage detection: Kernel-based approaches, *Journal of Sound and Vibration (JSV)*, v. 363, p.584 - 599, 2015 **Citations: 203**

Book Chapter

1. MOISÉS SILVA; ELOI FIGUEIREDO; ADAM SANTOS. Chapter 1: Damage Detection for Structural Health Monitoring of Bridges as a Knowledge Discovery in Databases Process. *Data Mining in Structural Dynamic Analysis*, p. 1-24, Springer, Singapore, 2020 **Citations: 11**

Provisional Patent

1. DAVID MASCARENAS; ANDRE GREEN; MOISÉS SILVA; ALESSANDRO CATTANEO. Neuromorphic Event-based light-field imager. *Los Alamos National Laboratory, 2024*