

PROFESSIONAL EXPERIENCE

Principal Data Scientist

March 2022 – present

Allstate, Chicago, IL (Remote – NJ based)

- Established strategic plan, directed external projects, and researched approaches for assessing the overall safety risk of driver-assistance and autonomous driving systems.
- Developed tools for automated extraction of structured information from customer interactions using LLM prompt optimization methods and AI-agentic frameworks.
- Developed models for extraction of property insights from aerial images.

Advanced Data Analytics Researcher

Aug. 2015 – March 2022

ExxonMobil, Annandale, NJ

- Led research projects on deep learning probabilistic models, geophysical uncertainty quantification, and occupational safety data analytics.
- Developed framework for preventative occupational safety interventions.
- Developed machine learning models for fault detection in industrial systems.

Technical Team Lead

Jan. 2014 – Jul. 2015

ExxonMobil Upstream Research Company, Houston, TX

- Managed research deployment and Agile software development and deployment.
- Commercialized two software products and initiated development of 3 new projects.

Pattern Recognition Researcher

Oct. 2010 – Dec. 2013

ExxonMobil, Houston, TX

- Developed pattern recognition and signal processing methods for analysis of geophysical (i.e., seismic) image volumes. Innovations included in 8 patents.
- Contributions include algorithm that produced 100x speed-up of previous approach, enabling the analysis to be deployed and performed on user's workstations.

Post-Doctoral Fellow, Scientific Computing and Imaging Institute
University of Utah, Salt Lake City, UT

Aug. 2008 – Sept. 2010

- Developed neural network and image pattern recognition methods, with applications in cell detection, identification, and reconstruction from electron microscope image volumes.

Research Assistant

Aug. 2004 – July 2008

University of Florida, Gainesville, FL

- Developed new kernel machine learning framework for point processes.
- Applied new kernel methods for neurophysiological signal data analysis.

EDUCATION

Ph.D., Electrical & Computer Engineering
University of Florida, Gainesville, FL, USA

Aug. 2008

M.S., Electrical & Computer Engineering
University of Florida, Gainesville, FL, USA

Dec. 2005

Licentiate, Electronics & Telecommunications Engineering
University of Aveiro, Aveiro, Portugal

Sept. 2003

TECHNICAL SKILLS	<p>Artificial Intelligence: AI (LLM-based) Agents; Prompt Engineering and Optimization; Large Language Models (LLMs)</p> <p>Machine Learning: Deep Learning/Neural Networks (e.g., Transformers, CNNs, RNNs, VAEs, Normalizing Flows), Probabilistic Graphical Models, Kernel Methods, Signal Processing, Image Processing, Computer Vision</p> <p>Programming: Python (incl. Numpy, Scikit-learn, PyTorch, TensorFlow, Keras, Pandas), Bash/shell scripting, Matlab, PyStan, C/C++, web development (HTML, CSS, PHP, SQL)</p>	
PROFESSIONAL ACTIVITIES	<p>IEEE Senior Member <i>Jan. 2005 – present</i></p> <p>Associate Editor, IEEE Transactions on Neural Networks and Learning Systems <i>Jan. 2017 – Dec. 2022</i></p> <p>Associate Editor, IEEE Signal Processing Journal <i>July 2016 – June 2020</i></p>	
PATENTS	10 granted patents and 1 pending patent application.	
PUBLICATIONS	<p>Summary:</p> <ul style="list-style-type: none"> • 4 book chapters, • 17 journal articles, • 28 articles in (refereed) conference proceedings, <p>Selected publications:</p> <ul style="list-style-type: none"> • Hossein N. Z. Matin, Yuneil Yeo, Amelie J.-K. Ngo, Antonio R. Paiva, Jean Utke, and Maria Laura Delle Monache. Second-Order Time-to-Collision with Non-Static Acceleration. <i>Technical Report</i>, Feb. 2025, arXiv: 2502.08066. • Zhonghua Zheng, Arlene M. Fiore, Daniel M. Westervelt, George P. Milly, Jeff Goldsmith, Alexandra Karambelas, Gabriele Curci, Cynthia A. Randles, Antonio R. Paiva, Chi Wang, Qingyun Wu, and Sagnik Dey. Automated Machine Learning to Evaluate the Information Content of Tropospheric Trace Gas Columns for Fine Particle Estimates Over India: A Modeling Testbed. <i>Journal of Advances in Modeling Earth Systems</i>, 15(3), March 2023. • Antonio R. Paiva and Giovanni Pilloni. Inferring Microbial Biomass Yield and Cell Weight using Probabilistic Macrochemical Modeling. <i>IEEE/ACM Transactions on Computational Biology and Bioinformatics</i>, 20(1), 2023. • Antonio R. Paiva and Ashutosh Tewari. Methodology for Testing and Evaluation of Safety Analytics Approaches. <i>Safety Science</i>, 152, Aug. 2022. • Weike Sun, Antonio R. Paiva, Peng Xu, Anantha Sundaram, and Richard Braatz. Fault detection and identification using Bayesian recurrent neural networks. <i>Computers & Chemical Engineering</i>, 141, October 2020. • Antonio R. Paiva. Information-theoretic dataset selection for fast kernel learning. <i>IEEE International Joint Conference on Neural Networks</i>, Anchorage, AK, USA, May 2017. • Elizabeth Jurrus, Antonio R. Paiva, Shigeki Watanabe, James Anderson, Bryan Jones, Ross Whitaker, Erik M. Jorgensen, Robert Marc, and Tolga Tasdizen. Detection of neuron membranes in electron microscopy images using a series of neural networks. <i>Medical Image Analysis</i>, 14(6):770–783, December 2010. • Antonio R. Paiva, Il Park, and José C. Príncipe. A reproducing kernel Hilbert space framework for spike train signal processing. <i>Neural Computation</i>, 21(2):424–449, February 2009. 	
LANGUAGES	English and Portuguese	