Mateus Gheorghe de Castro Ribeiro

Education

- **Stanford University** — Sep 2022 - Current
  Ph.D. in Civil and Environmental Engineering - Sustainable Design and Construction — *Stanford CA, United States*
- **Pontifical Catholic University of Rio de Janeiro (PUC-Rio)** — Mar 2019 - Dec 2020
  M.Sc. in Mechanical Engineering - Applied Mechanics — *Rio de Janeiro, Brazil*
- **Federal University of Juiz de Fora (UFJF)** — Mar 2014 - Dec 2018
  B.Sc. in Mechanical Engineering — *Juiz de Fora, Brazil*

Professional Experience

- **Stanford University** — Oct 2022 - Current
  Research Assistant - Stanford Sustainable Systems Lab — *Stanford CA, USA*
  - Work on research projects focused on optimizing systems merging EV charging, renewables, and storage.
  - Main activities: deliver presentations; write technical/progress reports; implement code for numerical tests; and write scientific documents (papers, patents, and research proposals).
- **X, the Moonshot Factory (formerly Google X)** — Jul 2024 - Sep 2024
  AI/Optimization Resident at Tapestry — *Mountain View CA, USA*
  - Worked on AI/Optimization models for Tapestry – a moonshot project aimed at decarbonizing the electrical grid.
- **Pontifical Catholic University of Rio de Janeiro** — Aug 2019 - Jul 2022
  Researcher at the Laboratório de Sensores a Fibra Óptica (Optical Fiber Sensors Lab) — *Rio de Janeiro, Brazil*
  - Worked on research and development projects focused on ultrasonic guided-waves jointly with machine learning in industrial applications.
  - Main activities: delivered presentations; wrote technical/progress reports; implemented code for numerical tests; and wrote scientific documents (papers, patents and research proposals).

Research Experience

- **24/7 Carbon-Free Electrified Campus Bus Fleet** — Oct 2022 - Current
  Research Project — *Stanford CA, USA*
  - The project is part of the Sustainability Accelerator grant of the new Stanford Doerr School of Sustainability
  - Data analytics and optimization team - 24/7 Carbon-Free Electrified Stanford Campus Fleet aims to achieve a scalable platform that intelligently coordinates solar, storage, electric bus route assignments, and bus charging.
- **NeuralProphet Initiative** — Jun 2021 - Aug 2022
  Research Project - Working Remotely — *Stanford CA, USA*
  - Main activities - Developed, tested, and merged new code for the anomaly detection and global modeling modules.
  - Worked closely with the leader of the initiative Oskar Triebe (Stanford University) who is advised by Prof. Ram Rajagopal (Stanford University).
- **Supervision of undergraduate students.** — Jul 2020 - Jul 2022
  Coadvising undergraduate students. — *Rio de Janeiro, Brazil*
  - Coadvising undergraduate thesis - Fault detection in rotating machines based on mechanical vibration measurements and instance-based methods.
  - Coadvising research project - Structural health monitoring through machine learning and guided waves.

- **Through-Tubing Logging Tool for Cement Quality Evaluation in Multistring Wells.** Aug 2019 - Jul 2022
  Research and development project. *Rio de Janeiro, Brazil*
  - Joint project with Ouronova and Repsol Sinopec led by Prof. Arthur Braga (PUC-Rio).
  - Main goal of the project was to propose solutions for the cement quality evaluation in multistring wells.
  - Research focused on ultasonic-guided waves jointly with machine learning and signal processing techniques.

- **Evaluation of faults in aeronautical gas turbines engines.** Jan 2017 - Dec 2018
  Research project. *Juiz de Fora, Brazil*
  - Detection and classification of faults in aeronautical engines using neural networks and fuzzy logic systems.
  - Project developed at the Laboratory of Industrial Automation and Computational Intelligence (LAIIC) at UFJF.

Teaching Experience

Stanford University Mar 2024 - Jun 2024
Teaching Assistant *Stanford CA, USA*

- CEE272R - Engineering Future Electricity Systems - Design and grade homework and exam; conduct discussion sessions; and assist and advise on final projects.

Federal University of Juiz de Fora Mar 2015 - Aug 2018
Teaching Assistant *Juiz de Fora, Brazil*

- General Physics Lab Classes for Engineering (2015 - 2016) - Assisted during laboratory classes and bench experiments; evaluated and graded experiments reports.
- PLC and Automation Lab Classes for Mechanical and Industrial Engineering (2017 - 2018) - Assisted during and after classes. Solved practical exercises with small electric circuit benches (PLC and sensors training) and software (FluidSIM) jointly with the class; aided students with ladder logic practices; evaluated and graded class reports.

Journal Publications

- Prada, D. P., Ferreira, G. R. B., Díaz, J. G., **Ribeiro, M. G. C.**, & Braga, A. M. B. (2024). Supervised Machine Learning Models for Mechanical Properties Prediction in Additively Manufactured Composites. *Applied Sciences*, (2076-3417), 14(16).
- **Ribeiro, M. G. C.**, Ferreira, G. R. B., Parente, L. E. R., Batista, J. H. G., Kubrusly, A. C., Ayala, H. V. H., & Braga, A. M. B. (2023). Machine learning-based evaluation of eccentricity and acoustic impedance in oil well using VDL data. *Geoenergy Science and Engineering*, 212288.
- de Souza, L. P. B., Ferreira, G. R. B., Camerini, I. G., de Magalhães, T., **Ribeiro, M. G. C.**, Hidalgo, J. A. S., ... & Batista, J. H. G. (2023). Machine learning-based cement integrity evaluation with a through-tubing logging experimental setup. *Geoenergy Science and Engineering*, 227, 211882.
- Ferreira, G. R. B., **Ribeiro, M. G. C.**, Kubrusly, A. C., & Ayala, H. V. H. (2022). Improved feature extraction of guided wave signals for defect detection in welded thermoplastic composite joints. *Measurement*, 111372.
- Calderano, P. H. S., **Ribeiro, M. G. C.**, Teixeira, R. S., Amaral, R. P. F., & de Menezes, I. F. M. (2022). Type-1 and Singleton Fuzzy Logic System Binary Classifier Trained by the BFGS Optimization Method. *Fuzzy Optimization and Decision Making*, 1-20.
- **Ribeiro, M. G. C.**, Kubrusly, A. C., Ayala, H. V. H., & Dixon, S. (2021). Machine Learning-Based Corrosion-Like Defect Estimation With Shear-Horizontal Guided Waves Improved by Mode Separation. *IEEE Access*, 9, 40836-40849.
- Chainok, P., de Jesus, K., Coelho, L., & Ayala, H. V. H., **Ribeiro, M. G. C.**, Fernandes, R. J., & Vilas-Boas, J. P. (2021). Modeling and predicting the backstroke to breaststroke turns performance in age-group swimmers. *Sports Biomechanics*, 1-22.
- Calderano, P. H., **Ribeiro, M. G. C.**, Amaral, R. P., Vellasco, M. M., Tanscheit, R., & de Aguiar, E. P. (2019). An enhanced aircraft engine gas path diagnostic method based on upper and lower singleton type-2 fuzzy logic system. *Journal of the Brazilian Society of Mechanical Sciences and Engineering*, 41(2), 70.

Conference Proceedings

- **Ribeiro, M. G. C.**, Luke, J., Martin, S., Balogun, E., Cezar, G. V., Pavone, M. & Rajagopal, R. (2020, December). Towards a 24/7 Carbon-Free Electric Fleet: A Digital Twin Framework. In 2023 *International Conference on Applied Energy (ICAE)* (preprint)
- **Ribeiro, M. G. C.**, Kubrusly, A. C., & Ayala, H. V. H. (2020, December). Damage Detection in Composite Plates with Ultrasonic Guided-waves and Nonlinear System Identification. In 2020 *IEEE Symposium Series on Computational Intelligence (SSCI)* (pp. 2039-2046). IEEE.
- Correia, T. M., de Souza, L. P. B., Hidalgo, J. A. S., **Ribeiro, M. G. C.**, ... & de Almeida, R. V. (2020). Analytical and numerical modeling of through-tubing acoustic logging. In 2020 *Rio Oil Gas Expo and Conference.*
- **Ribeiro, M. G. C.**, Calderano, P. H. S., Amaral, R. P. F., de Menezes, I. F. M., Tanscheit, R., Vellasco, M. M. B. R., & de Aguiar, E. P. (2018, July). Detection and classification of faults in aeronautical gas turbine engine: a comparison between two fuzzy logic systems. In 2018 *IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)* (pp. 1-7). IEEE.

Pending Patents

- **Ribeiro, M. G. C.**, Ferreira, G. R. B., Ayala, H. V. H., Kubrusly, A. C., et al. (2022). "Plataforma Computacional com Interface Gráfica Baseada em Aprendizado de Máquina Ativo para a Visualização, Inferência e Interpretação Assistida de Dados Obtidos em Operações de Perfilagem do Cimento em Poços de Petróleo e Gás e Método de sua Utilização" - (pending) Brazillian Application Number: BR1020220146888 – Date of Application: July 25, 2022.

  **title free translation - " Computational Platform with Graphical Interface Based on Active Learning for Visualization, Inference and Assisted Interpretation of Logging Data Obtained in Oil and Gas Wells and Method of Use"

- Ferreira, G. R. B., **Ribeiro, M. G. C.**, Ayala, H. V. H., Kubrusly, A. C., et al. (2022). "Método para Avaliação de Defeitos na Camada de Cimento de Poços Baseado em Processamento de Imagem Originária da Perfilagem e Auxiliada por Aprendizado de Máquina" - (pending) Brazillian Application Number: BR1020220146861 – Date of Application: July 25, 2022.

  **title free translation - "Method for Assessing Defects in the Cement Layer of Oil Wells Based on Image Processing Originated from Logging and Assisted by Machine Learning"

- **Ribeiro, M. G. C.**, Ayala, H. V. H., Kubrusly, A. C., et al. (2021). "Computing method for detecting and estimating cementing faults in oil well linings by acquiring acoustic profiling signals through the production tubing on the basis of machine learning and high-fidelity simulations" - (pending) Brazillian Patent Application Number: BR1020210185813 – Date of Application: Sep 17, 2021 - Publication of WO2023039653A1 - Mar 03, 2023.

  **original title - "*Método Computacional de Detecção e Estimação de Falhas de Cimentação em Revestimentos de Poços de Petróleo pela Aquisição de Sinais de Perfilagem Acústica Através da Coluna de Produção com base no Aprendizado de Máquina e em Simulações de Alta Fidelidade*"

Scholarships and Awards

- **Scholarship** - Awarded the CAPES Fulbright Full Doctorate Scholarship (2022)
- **Scholarship** - Awarded the CNPq (Brazilian National Council for Scientific and Technological Development) M.Sc. Scholarship (2019).
- **Placed 1st** - Selection process of Computational Modeling Master's Program from Federal University of Juiz de Fora (2019).

Events Participation/Presentation

- Oral Paper Presentation - **2023 International Conference on Applied Energy.** Doha, Qatar (2023).
- Participation (Online) - **International Symposium on Forecasting 2022.** Oxford, England (2022).
- Participation (Online) - **Facebook Forecasting Summit 2021.** Menlo Park CA, USA (2021).
- Oral Paper Presentation (Online) - **2020 IEEE Symposium Series on Computational Intelligence (SSCI).** Camberra, Australia (2020).
- Oral Paper Presentation - **2018 IEEE World Congress on Computational Intelligence.** Rio de Janeiro, Brazil (2018).
- Participation - **13th National Formula SAE Competition (Brazil).** Piracicaba, Brazil (2016).

Other Projects and Activities

- **Escuderia UFJF - Formula SAE Team** May 2014 - Dec 2016
  Formula SAE vehicle design and development. *Juiz de Fora, Brazil*
  - First participation of the team in the national competition.
  - Structural project of the vehicle chassis.

Additional Certifications

- **Futuros Engenheiros Program** Jul 2016 - Dec 2016
  Technicals skills certificate program
  - Certificate program funded by FIEMG (Federation of Industries of the state of Minas Gerais - Brazil). The training aims to educate and complement engineering undergraduate students in technical skills.
  - Practical skills (Machining; Metrology; Welding; Maintenance; Design and Modeling of Machines; Computerized Numerical Control; Refrigeration; and Pneumatic and Hydraulic Circuits)
  - Management skills (Quality Management; Social Responsibility; Environmental Management; Ecology; Workplace Safety; 5S Program; Creativity and Innovation; PDCA and SWOT Analysis).

Volunteer Work

- **Brazil at Silicon Valley (BSV)** Oct 2023 - Apr 2024
  Operations Team member *Stanford CA, USA*
  - BSV is an annual conference organized and led by Stanford and Berkeley students to boost Brazil's tech competitiveness, connecting leaders and experts in technology and innovation.

- **Pontifical Catholic University** Jul 2021 - Jul 2022
  Academic service *Rio de Janeiro, Brazil*
  - Reviewed for Journal: Measurement - Journal of the International Measurement Confederation

- **Federal University of Juiz de Fora** Jul 2016 - Sep 2016
  Attaché *Juiz de Fora, Brazil*
  - Supported foreign athletes during their stay in Juiz de Fora for the 2016 Summer Olympics. The main activities were focused on communication, Portuguese-English translation.

Skills

- **Languages**: Portuguese (native speaker), English (Advanced), and German (Basic).
- **Programming Languages**: Matlab, Python (most used libraries - Scikit-Learn, TensorFlow, NumPy, Pandas), C, and R (beginner).
- **Technical**: MS Office, SolidWorks, Ladder Logic, LaTeX, COMSOL (beginner).