Mateus Gheorghe de Castro Ribeiro

Education

- **Stanford University** — Sep 2022 - Current
  Ph.D. in Civil and Environmental Engineering — *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

- **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*
  - Work on research and development projects focused on ultrasonic guided-waves jointly with machine learning in industrial applications.
  - Main activities: deliver presentations; write technical/progress reports; implement code for numerical tests; and write scientific documents (papers, patents and research proposals).
- **Movimec Industrial Automation** — Nov 2017 - Mar 2018
  Mechanical Engineering Intern — *Juiz de Fora, Brazil*
  - Assisted on maintenance projects in hydraulic systems of small hydropower plants.
  - Assisted on maintenance and replacement projects in the hydraulic systems of the blast furnace of the Companhia Siderurgica Nacional (CSN).
  - Main activities: prepared maintenance service quotation; planned project schedule; and wrote progress reports.

Research Experience

- **NeuralProphet Initiative** — Jun 2021 - Current
  Research Project - Working Remotely — *Stanford CA, USA*
  - Develop, test, and merge new code for the anomaly detection and global modeling modules.
  - Working 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 projects - 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 Ouro Negro and Repsol Sinopec led by Prof. Arthur Braga (PUC-Rio).
  - Main goal of the project is to propose solutions for the cement quality evaluation in multistring wells.
  - Research is focused on ultasonic-guided waves jointly with machine learning and signal processing techniques. It already resulted in a pending patent.
- **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

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

- 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.**, 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). "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" - (pending) Brazillian Patent Application Number: BR1020210185813 – Date of Application: Sep 17, 2021.

  **title free translation - "Computational Method of Detection and Estimation of Cement Layer Faults in Oil Wells by the Acquisition of Acoustic Logging Signals through the Production Column based on Machine Learning and High Fidelity Simulations"

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

- 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

- **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).