

# Mateus Gheorghe de Castro Ribeiro



## EDUCATION

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- **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

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- **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).
- **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

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- **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 - Develop, test, and merge 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 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 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 ultrasonic-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

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### 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

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- **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

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- **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

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- **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 Perfuração 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 Perfuração 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 Perfuração Acústica Através da Coluna de Produção com base no Aprendizado de Máquina e em Simulações de Alta Fidelidade*”

## SCHOLARSHIPS AND AWARDS

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- **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

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- 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

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- **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

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- **Futuros Engenheiros Program** Jul 2016 - Dec 2016  
*Technical 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

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- **Brazil at Silicon Valley (BSV)** Oct 2023 - Current  
*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

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- **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, L<sup>A</sup>T<sub>E</sub>X, COMSOL (beginner).