Allan Gurwicz

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EDUCATION

Ph.D. in Industrial Engineering, advised in Petroleum Engineering & Data Science, **Texas A&M University** August 2021 - Present

- Research focus on machine learning for reservoir simulation and optimization.
- Advisors: Dr. David Huckleberry Gutman and Dr. Eduardo Gildin.

Master of Electrical Engineering, concentration in Decision Support Methods, **Pontifical Catholic University of Rio de Janeiro** March 2018 - January 2020

- Thesis: Deep Generative Models for Reservoir Data: An Application in Smart Wells. DOI: 10.17771/PUCRio.acad.48317.
- Advisors: Dr. Marco Aurélio Cavalcanti Pacheco, Dr. Ana Carolina Alves Abreu and Dr. Smith Arauco Canchumuni.

Bachelor of Petroleum Engineering, minor in Entrepreneurship, **Pontifical Catholic University of Rio de Janeiro** March 2013 - December 2017

PROFESSIONAL EXPERIENCE

Research Assistant, **Industrial & Systems Engineering, Texas A&M University** – College Station, TX September 2023 - Present

- Conceived and authored work that led to $103k grant from the *Crisman Institute for Petroleum Research*.
- Created a framework for long-term risk assessment in CCS projects with interpretable AI surrogates and frugal reservoir simulations.
- Applied methodology to a proof-of-concept case study of long-term CO_2 storage in a saline aquifer. The machine learning models achieved a 500× training speedup in relation to CMG's GEM while obtaining prediction errors around 2%.

Research Intern, **CNPC USA** – Houston, TX June 2025 - August 2025

- Ongoing project on exploring drill bit dynamics simulation, with the goal of deepening industry understanding and improving design and performance.

Research and Software Development Intern, **CNPC USA** – Houston, TX June 2024 - August 2024

- Advanced development of a research tool for drilling dynamics that processes and facilitates visualization and analysis of data coming from sources such as computer simulations, laboratory experiments and field sensors.
- Converted tool to *pip install*-based installation through use of GitHub Actions and deployed across company.
- Created corporation's GitHub organization and gave company-wide sessions on how to use the platform and migrate existing workflows.

Research Assistant, **Industrial, Manufacturing & Systems Engineering, Texas Tech University** – Lubbock, TX August 2021 - August 2023

- Engaged with General Motors to model and optimize assembly line throughput via statistical methods and machine learning, leading to pilot program in the General Motors Wentzville Assembly plant.

Researcher, **Applied Computational Intelligence Laboratory (ICA/PUC-Rio)** – Rio de Janeiro, Brazil March 2018 - July 2021

- Built custom genetic algorithms and software to optimize subsea production systems.
- Created Python libraries for communication with reservoir and flow simulation software, including parsing and writing models, as well as running simulations and interpreting results, in both local computers and HPC clusters.
- Conceived a GAN-LSTM coupled simulator surrogate in the context of reservoir optimization and value of information and flexibility brought by smart wells. The novel coupling reduced prediction error from 18.93% to 9.71%.
- Spearheaded introduction of deep learning and explainable AI into established workflows for subsea object detection and classification.

Intern, **Applied Computational Intelligence Laboratory (ICA/PUC-Rio)** – Rio de Janeiro, Brazil May 2017 - February 2018

- Carried out research, translation and formatting of technical papers in oil & gas and AI domains.

Consultant, **RBNA Consult** – Rio de Janeiro, Brazil November 2017

- Took part in valuation of two Petrobras rigs before being led to bidding. Implemented the discounted cash flow method to find a suitable sale value, then compared to research done on rig market to ascertain an acceptable price range.

Intern, **Brazilian National Agency of Petroleum, Natural Gas and Biofuels** – Rio de Janeiro, Brazil October 2016 - April 2017

- Analyzed oil & gas fields' cash flow, development plans and related documents, with close contact to operator companies.

PUBLICATIONS & WORKING PAPERS

Gurwicz, A., Chen, J., Gutman, D. H., Gildin, E. (2025). Assessing Risk in Long-term CO_2 Storage Under Uncertainty via Survival Analysis-based Surrogates. *SPE Journal* **30** (05): 2837–2854. DOI: 10.2118/220737-PA.

Gurwicz, A., Abreu, A. C. A., Gutman, D. H., Gildin, E., Pacheco, M. A. C. (2025). Multi-objective Optimization with Survival-Analysis Surrogates for Geological CO_2 Storage. *Submitted to SPE Abu Dhabi International Petroleum Exhibition and Conference (ADIPEC).*

Gurwicz, A., Gutman, D. H., Gildin, E. (2025). Advancing Risk Assessment For CO_2 Storage Through Cutting-edge Survival Analysis Models. *In preparation for submission to International Petroleum Technology Conference (IPTC).*

Cardoso, I., **Gurwicz, A.**, Validi, H., Gutman, D. H. (2025). Solving the Substitution-tolerant Subgraph Isomorphism Problem. *In preparation for submission to INFORMS Journal on Optimization.*

PATENTS

Carroll, D. J., Wiley, C. A., Danda, S. R. K., Jeet, V., Remutula, P., Clark, K. A., Morrow, M., Gutman, D. H., **Gurwicz, A.**, Fernandes, G. L. N. Systems and Methods for Identifying and Alerting of Footprint Over-Cycle Risks on Multi-Product General Assembly Lines. *Patent filed with the USPTO on 03/13/2023 and published on 09/19/2024 under no. US 2024/0308781 A1. Pending.*

Carroll, D. J., Wiley, C. A., Jeet, V., Finnin, A., Clark, K. A., Morrow, M., Gutman, D. H., Chen, L., **Gurwicz, A.**, Fernandes, G. L. N., Zaman, M., Nguyen, N. Methods for Simulating Conveyor Cycles on Multi-Product General Assembly Lines. *Patent filed with the USPTO on 03/13/2023 and published on 09/19/2024 under no. US 2024/0311730 A1. Pending.*

PROCEEDINGS (∗ denotes presenting author)

Gurwicz, A.*, Chen, J., Gutman, D. H., Gildin, E. (2024). Assessing Risk in Long-term CO_2 Storage Under Uncertainty via Survival Analysis-based Surrogates. *SPE Annual Technical Conference and Exhibition (ATCE)*, New Orleans, Louisiana, USA. DOI: 10.2118/220737-MS.

Gurwicz, A.*, Canchumuni, S. A., Pacheco, M. A. C. (2019). Smart Well Data Generation via Boundary-Seeking Deep Convolutional Generative Adversarial Networks. *International Conference on Artificial Intelligence and Soft Computing (ICAISC)*, Zakopane, Poland. DOI: 10.1007/978-3-030-20912-4_7.

Calvette, T., **Gurwicz, A.***, Abreu, A. C. A., Pacheco, M. A. C. (2019). Forecasting Smart Well Production via Deep Learning and Data Driven Optimization. *Offshore Technology Conference (OTC) Brasil*, Rio de Janeiro, Brazil. DOI: 10.4043/29861-MS.

Nunes, A., da Conceição, L., Mendoza, L. F., de Mello Jr., H. D.*, **Gurwicz, A.**, Figueiredo, K. (2019). LSTM Networks and Box-Jenkins Models Applied to Load Forecasting for a Southeastern Brazil Giant Energy Consumer (in Portuguese). *14th Brazilian Congress on Computational Intelligence (CBIC)*, Belém, Brazil. DOI: 10.21528/CBIC2019-100.

da Silva, M., dos Santos, P., Mendoza, L. F., de Mello Jr., H. D.*, **Gurwicz, A.** (2019). Hourly Load Forecasting as a Parameter for a Short-Term Pricing and Hydrothermal Dispatch Model (in Portuguese). *14th Brazilian Congress on Computational Intelligence (CBIC)*, Belém, Brazil. DOI: 10.21528/CBIC2019-96.

INVITED TALKS

Survival Analysis Framework for CO_2 Risk Assessment March 2025

- *Computational Reservoir Engineering (CoRE) Consortium meeting* at Texas A&M University.

Assessing Risk in Long-term CO_2 Storage Under Uncertainty via Survival Analysis-based Surrogates February 2025

- *INFORMS student chapter seminar* at Texas Tech University.

A Smart-Well-Centered Investigation into Deep Generative Models for Reservoir Data November 2020

- *II Seminar of Artificial Intelligence Applied to the Oil & Gas Industry* at the Brazilian Association of Petroleum Geologists.

Optimization of Offshore Oil and Gas Production Systems During Design Phase November 2019

- *I Seminar of Artificial Intelligence Applied to the Oil & Gas Industry* at the Brazilian Association of Petroleum Geologists.

AWARDS

1st Place, *ISEN Poster Competition* operations research and data science track. March 2025

- Organized by the INFORMS Student Chapter at Texas A&M University.

2nd Place, *Data Science Convention* poster competition. March 2025

- Organized by the Society of Petroleum Engineers Gulf Coast Section data analytics study group.

1st Place, *Zorich's Reliability Workshop* poster competition. September 2024

- Hosted by the Departments of Statistics and Industrial & Systems Engineering at Texas A&M University.

Fellowship, Brazilian National Council for Scientific and Technological Development (CNPq). 2018 - 2019

- Awarded for master's program at the Pontifical Catholic University of Rio de Janeiro.

Fellowship, Chevron's university partnership program. 2016 - 2017

- Awarded for undergraduate research at the Pontifical Catholic University of Rio de Janeiro.

TEACHING

Grader for Dr. Eduardo Gildin's PETE 656, "Advanced Numerical Methods for Reservoir Simulation". Spring 2025, TAMU

"Introduction to Git and GitHub" workshop for Petroleum Engineering graduate students. December 2024, TAMU

"Git and GitHub for Portfolio Creation" course in the "Business Intelligence Master" extension program. 2020 - 2021, PUC-Rio

SKILLS

· Python · MATLAB · LaTeX · CMG · Gurobi · Git/TFS · Docker · Windows/macOS/Linux · Microsoft Office

OTHER INFO

Fluent in English and Portuguese, working knowledge of Spanish and Hebrew. Brazilian and Polish citizenship.

MEMBERSHIPS

Society of Petroleum Engineers March 2013 - Present