Eliseu Venites Filho

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Education

Universidade Federal do Rio Grande do Sul — Porto Alegre - Brazil
Ph.D. in Phyisics (Computational Statistical Physics) — *Jul. 2021 - Present*

- Analysis of the ensemble correlations of observables of complex systems in order to predict their critical behavior
- Systems from different Universality Classes considered
- Both systems with and without a defined Hamiltonian considered
- The simulations were implemented in Rust while the data analysis was done in the Julia ecosystem

Universidade Federal do Rio Grande do Sul — Porto Alegre - Brazil
M.Sc. in Physics (Computational Statistical Physics) — *Mar. 2019 - May 2021*

- Scored higher than 99.42% of candidates on the EUF 2-2018 (National graduate programs entrance exam)
- Performance evaluation of the Simulated Annealing applied to different configurations of the Traveling Salesman Problem
- Analysis of the stochastic optimization algorithm applied to problems at the boundary between P and NP complexity classes
- The optimization algorithm was implemented in C++ while the data analysis was done in the Python ecosystem

Institut d'Optique Graduate School — Palaiseau - France
M.Sc. in Optical Engineering — *Sep. 2015 - Sep. 2017*

- Double degree in the context of BRAFITEC program
- Courses included: Optical Instrumentation, Automation, Lasers and Quantum Optics

Université ParisSud — Orsay - France
L3 and M1 in Fundamental Physics — *Sep. 2015 - Sep. 2017*

- Double degree magistère offered to engineering students
- Courses included: Analyitical Mechanics, Statistical Physics, Plasma Physics and Atomic and Molecular Physics

Universidade Federal do Rio Grande do Sul — Porto Alegre - Brazil
B.Sc. in Engineering Physics — *Mar. 2013 - Dec. 2018*

- Scientific Initiation (CAPES) on Quantum Information in 2013 and 2014
- Presentation at the UFRGS XXVI Scientific Initiation Meeting (2014): Shor's Algorithm for Integer Factorization
- Summa Cum Laude with final grade 9.54/10.0

Experience

Optical Engineering Internship — Paris, France
Télécom ParisTech — *Jun. 2017 - Sep. 2017*

- As part of the "Information Quantique et Applications" research group
- Worked with polarization-entangled photon pairs source
- Stabilization and count optimization of the entangled photon pair source to be used in experiments testing Quantum Key Distribution protocols

Publications

Revisiting the Contact Model with Diffusion Beyond the Conventional Methods — *2025*
Symmetry
R. da Silva, E. Venites Filho, H, A. Fernandes, P. F. Gomes

Efficient computational method using random matrices describing critical thermodynamics — *2025*
International Journal of Modern Physics C
R. da Silva, E. Venites Filho, S. D. Prado, J. R. D. de Felício

A Spectral Investigation of Criticality and Crossover Effects in Two and Three Dimensions: Short Timescales with Small Systems in Minute Random Matrices *2024*

Entropy

E. Venites Filho, R. da Silva, J. R. Drugowich de Felício

Mean-Field Criticality Explained by Random Matrices Theory *2023*

Brazilian Journal of Physics

R. da Silva, H. C. M. Fernandes, E. Venites Filho, S. D. Prado, J. R. Drugowich de Felicio

A Thorough Study of the Performance of Simulated Annealing in the Traveling Salesman Problem under Correlated and Long Tailed Spatial Scenarios *2021*

Physica A: Statistical Mechanics and its Applications

R. da Silva, E. Venites Filho, A. Alves

Projects

tsp-sa | *C++, Python*

- Developed in the context of the M.Sc. research
- Modular C++ library to perform optimization through Simulated Annealing
- Supports Generalized Simulated Annealing and Tsallis Entropy statistics
- Optimization logic works for arbitrary Markov chains, completely decoupled from the TSP implementation
- Data analysis and plotting done in Python

artificial-systems | *Rust (ndarray, serde)*

- Developed in the context of the Ph.D. research
- Computational models of artificial systems implemented in Rust
- Simulation of Spin Systems (Ising and Blume-Capel models)
- Investigation of the Contact Process with diffusion

ts-cov-matrix | *Julia (DataFrames.jl, Makie.jl)*

- Developed in the context of the Ph.D. research
- Analysis of time series covariance matrices using Random Matrix Theory
- Study of spectral properties and comparison with Marchenko-Pastur distribution
- Analyzed data from NOAA temperature records, Spin Systems, and Contact Processes
- Full data analysis pipeline implemented in the Julia ecosystem

json-parser | *Haskell*

- Strict JSON parser implemented in Haskell using Megaparsec
- Adheres closely to JSON standards
- Can be used as a library or a standalone command-line tool

sternhalma-server | *Rust (tokio)*

- Asynchronous game server for Sternhalma (Chinese Checkers) built with Rust and Tokio
- Actor-like architecture with decoupled game logic and connection handling
- Client-agnostic design supporting CLI, GUI, and AI agents
- Supports both Raw TCP and WebSocket connections using a CBOR-based protocol

sternhalma-agent (WIP) | *Python (PyTorch)*

- Reinforcement learning agent implementing AlphaZero from scratch
- Uses Monte Carlo Tree Search (MCTS) for planning and Deep Neural Networks (ResNet) for evaluation
- Designed to master Sternhalma through self-play without human knowledge

Skills

Languages: Portuguese (native), English (fluent), French (advanced)
Programming: C, C++, Rust, Python, Julia, Haskell
Libraries: tokio, ndarray, serde, faer-rs, Pandas, NumPy, SciPy, scikit-learn, matplotlib, PyTorch, TensorFlow, DataFrames.jl, Plots.jl, Makie.jl
Tools: Linux, Git, Docker, SQL
Typesetting: LaTeX, Typst