

VÍTOR VIEIRA | Computational Physicist

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SUMMARY

Computational Physicist with 3+ years of experience in AI/ML infrastructure, performance optimization, and scientific software development. Built and deployed AI/ML and speech-to-text pipelines on Azure and AWS, optimized parallel workloads with CUDA/OpenMP+MPI on HPC clusters, and developed graph simulation frameworks. Currently researching on-device LLM and ML inference for projection mapping, computer graphics and music information retrieval applications.

EDUCATION

UNIVERSITY OF AVEIRO

09/2016 - 06/2019

MSc in Physics

Aveiro, Portugal

- Researched phase transitions of small world networks based on classic and quantum Ising models.
- Implemented network bipartitioning algorithms based on graph theory and Monte Carlo methods.

UNIVERSITY OF MINHO

09/2019 - 06/2025

BA in Music - Instrument

Braga, Portugal

EXPERIENCE

FREELANCE R&D ENGINEER

08/2023 - 12/2025

Resonant Research Unipessoal Lda

Portugal

- On-device GPU compute for graphics and ML inference, researching kernel optimization across Vulkan and CUDA backends.
- Real-time 3D Gaussian splatting and surfel pipelines for surface reconstruction and projection mapping (Vulkan, OpenGL, SPIR-V).

AI R&D ENGINEER

08/2023 - 08/2024

Swoove Studios

Antwerp, Belgium

- Developed and deployed AI backend infrastructure integrating LLM and speech-to-text pipelines (OpenRouter, Whisper, custom models).
- Investigated a physics-aware animation system in IsaacGym using reinforcement learning and analytical methods to create custom training metrics.
- Implemented emotional analysis from voice input for automated animation selection, building a signal processing pipeline with ML classification.

APPSEC R&D ENGINEER

05/2021 - 07/2023

Checkmarx

Braga, Portugal

- Researched emerging vulnerabilities and prototyped an end-to-end automated scanner (Source to DevOps), complementing static analysis with runtime detection.
- Improved detection accuracy of vulnerability findings through algorithm refinement and custom rule development for high-profile deployments.

RESEARCHER

09/2018 - 09/2019

University of Aveiro

Aveiro, Portugal

- Developed novel software for network bipartitioning and topological analysis using graph theory and Monte Carlo methods (Fortran, Python, C++).
- Optimized large-scale parallel workloads on CentOS HPC cluster using hybrid OpenMP+MPI and CUDA parallelization strategies.
- Built data analysis and visualization suite for research group usage using R, NumPy, Pandas, and Julia.

PROJECTS

MEDWRITE

WIP

Medical History Analysis

- Researching handwriting recognition for Portuguese clinical histories, combining ML-based detection with local LLM inference (llama.cpp/ExecuTorch).
- Fine-tuning foundation models for structured clinical output (llguidance), evaluating local vs. cloud compute tradeoffs.
- Optimizing agentic workflows for on-device inference under mobile hardware constraints.

RIPPER

WIP

Audio reverse engineering

- Researching audio source separation and sound reconstruction using Transformer architectures and Differentiable Digital Signal Processing.
- Converting models for on-device inference with Rust framework.
- Implementing Vulkan compute shaders for platform agnostic processing.

SKILLS

PROGRAMMING FRAMEWORKS & TOOLS

Experienced: Python | C/C++ **Familiar:** Rust | Julia | Fortran | Golang
Git | CLI | Azure | AWS | Podman | Docker | Github Actions | CUDA | OpenMP/MPI |
SLURM | PyTorch | Tensorflow

LIBRARIES LANGUAGES

Pandas | matplotlib | scikit-learn | NumPy | BLAS | CuBLAS
Native: Portuguese | **Fluent:** English | **Beginner:** German | French

CERTIFICATIONS

AWS CERTIFIED CLOUD PRACTITIONER

valid until 10/2028

VOLUNTEERING

ABRA

Animal foster

2024 - Present

Braga

REFOOD

Food delivery and preparing for underprivileged peoples

2017 - 2019

Aveiro

UNIVERSITY MENTAL HEALTH HOTLINE

Crisis support volunteer

2014 - 2016

University of Aveiro

HOBBIES

MARTIAL ARTS | READING | COOKING | KITESURFING | MUSIC PRODUCTION