Tiago Carneiro Pessoa

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Researcher and software engineer specializing in high-performance computing (HPC), distributed systems, and combinatorial optimization. Extensive experience designing and implementing scalable, performance-critical software for large-scale and heterogeneous systems, using technologies such as CUDA, OpenMP, MPI, and Chapel. Strong background in parallel algorithm design, performance analysis, and collaborative applied research at the intersection of software and hardware.

SKILLS

HPC & Programming	C/C++, CUDA, Python, Chapel, OpenMP, MPI, HIP, Vectorization
Performance Profiling & Analysis	NVIDIA Nsight Systems, NVProf, PERF, Intel VTune, LIKWID
Platforms & Tools: Linux/Unix	Git, Build Systems (CMake, Make), Containers (Docker, Singularity)
Domain Expertise	HPC, Distributed Systems, GPU computing, combinatorial optimization

LANGUAGES

· Portuguese (Native), English (full professional proficiency), French (professional working proficiency).

EDUCATION

PhD in Computer Science 2013 - 2017
Federal University of Ceará (UFC). Fortaleza - CE, Brazil

Master's Degree in Computer Science 2010 - 2012
State University of Ceará (UECE). Fortaleza - CE, Brazil

Bachelor's Degree in Computer Science 2004 - 2009
State University of Ceará (UECE). Fortaleza - CE, Brazil

AWARDS AND HONORS

Outstanding Paper Award Awarded 2021

The International Conference on High Performance Computing & Simulation - HPCS 2020

Certification of Outstanding Contribution in Reviewing 2016

Journal of Parallel and Distributed Computing (JPDC)

WORK EXPERIENCE - FROM PHD

Researcher | Imec - Leuven, Belgium Sep 2022 - Jan 2025

· Contributed to the development of a distributed PGAS-based programming library and associated profiling/benchmarking tools for novel HPC/AI hardware.
· Designed and implemented a robust Bash-based distributed process management system for cluster-wide application deployment.
· Collaborated with interdisciplinary teams to program and analyze critical benchmarks (e.g., BLAS, HPCG) to evaluate scalability and validate hardware design choices.

Research associate | University of Luxembourg - Belval, Luxembourg Mar 2021 - Sep 2022

· Designed and implemented large-scale distributed optimization algorithms, addressing CPU-GPU heterogeneity for enhanced productivity and parallel efficiency.
· Contributed to community knowledge by organizing workshops and developing tutorial content focused on HPC.

Postdoctoral researcher | INRIA Lille - Nord Europe - Lille, France Nov 2018 - Jun 2020

· Co-created the Chapel-based Optimization Project (ChOP), a recognized initiative for its contributions to high-performance, distributed Branch-and-Bound algorithms.
· Pioneered research in distributed large-scale applications, balancing productivity and parallel efficiency using high-productivity languages (Chapel, Julia, Python/Numba) and HPC (C/C++, OpenMP, MPI).
· Authored multiple papers in top-tier journals and conferences; shared expertise by teaching Master's courses and organizing HPC/optimization workshops.

Postdoctoral researcher | IFCE - Fortaleza, Brazil Mar 2018 - Oct 2018

· Researched, developed, and optimized parallel deep learning models for computer vision applications, accelerating image processing and inference tasks.
· Leveraged CUDA, OpenCV, and cloud-based computing for high-performance model training and experimentation.

Doctoral Researcher | Federal University of Ceará - Fortaleza, Brazil Mar 2013 - Dec 2017

· Developed and implemented exact parallel and heterogeneous algorithms for combinatorial optimization problems within the ParGO group.
· Achieved significant performance enhancements in permutation combinatorial optimization by leveraging CUDA Dynamic Parallelism (CDP) for GPUs, and MPI and OpenMP for CPU parallelism.

International mobility | INRIA Lille - Nord Europe - Lille, France Sep 2015 - Aug 2016

· Conducted parallel optimization research with the Dolphin team as part of PhD studies.

SELECTED PUBLICATIONS:

[1] Carneiro, T.; Melab, N.; Hayashi, A.; Sarkar, V. Towards Chapel-based Exascale Tree Search Algorithms: dealing with multiple GPU accelerators. In: The International Conference on High Performance Computing & Simulation - HPCS 2020 - held in March 2021. **Outstanding Paper Award - HPCS 2020**.

[2] Carneiro, T.; Kayraklioglu, E.; Helbecque, G.; Melab, N. Investigating Portability in Chapel for Tree-based Optimization on GPU-powered Clusters. The 30th International European Conference on Parallel and Distributed Computing - Europar 2024. doi 10.1007/978-3-031-69583-4_27.

[3] Carneiro, T.; Gmys, J.; Melab, N.; Tuyttens, D. Towards Ultra-scale Branch-and-Bound Using a High-productivity Language. Future Generation Computer Systems, 105: 196-209 (2020). doi 10.1016/J.future.2019.11.011.

More information about my publication record and citations can be found in my Google Scholar, Orcid (0000-0002-6145-8352) and Web Of Science (J-3061-2019) profiles.