Benjamin Czaja

+31643653217 | benjamin.czaja@surf.nl | https://benczaja.github.io/

Experience

High Performance Computing Advisor May 2021 – Present

Dutch National Supercomputer - HPCV group, SURF B.V.

- Software and System (CPU/GPU/Network/GPFS) performance analysis, benchmarking, and regression testing on Dutch (tier-1) and European (tier-0) supercomputers.
- Energy efficiency analysis of HPC/AI applications on large scale CPU and GPU resources as well as emerging accelerators.
- HPC/AI Software stack installation, maintenance, and contributor to EasyBuild open-source community.
- Teacher: "High Performance Computing in Python" and "Energy Efficient Computing"

Ph.D. Research Jan. 2017 – Dec. 2020

University of Amsterdam

- Core developer for HemoCell, two open-source cell resolved blood flow solvers. Both models are developed for deployment on high performance distributed computing facilities.
- Pursued and organized collaboration with two external experimental groups (one in U.S.A. and the other in Canada).
- Lead author on three peer reviewed scientific journal articles and co-author on three additional articles.

Visiting Scholar March 2019 – June 2019

University of Michigan - College of Chemical Engineering

- Designed/conducted in-vitro blood flow experiments using the HemoCell software. Lead author on the resulting publication in PLOS computational biology.
- Designed cover image of the research project using Blender, which was selected for the March 2020 issue cover.

Projects

Energy Aware Runtime | *C, SQL, NVML* Jul. 2022 – Present

- Contributed to the development and stability of the code base as it was deployed on the Dutch supercomputer (AMD Rome/Genoa CPUs, NVIDIA A100/H100 GPUs). Application Characterization.

HemeLB | *C++, MPI, CUDA* Sept. 2023 – Nov. 2024

- System scale benchmarking of CUDA-aware MPI Lattice Boltzmann code base on AMD Zen2/3/4 generation CPUs (EPYC 7H12/EPYC 7763/EPYC 9654), as well as NVIDIA (A100, H100) and AMD (MI250x) GPUs.

GiSmo | *C++, OpenMP, MPI* Jul. 2023 – Jan. 2024

- Benchmarking hybrid (OpenMP-MPI) GiSmo code base on AMD Rome (EPYC 7H12) and AMD Genoa (EPYC 9654) Compute architectures.

MercuryDPM | *C++, MPI, Subversion* Feb. 2022 – May 2022

- Ported the MPI C++ bindings (which were deprecated in MPI-3.0 standard) to C bindings of the code base.

HemoCell | *C/C++, Python, HDF5, Fortran, Slurm, HTML, CSS, MPI, Singularity* Jan. 2017 – Dec 2020

- Core developer for multiple HPC applications focused on solving physiological blood flow problems.

Education

Ph.D., Computational Science Amsterdam, the Netherlands

University of Amsterdam *Jan. 2017 – Dec 2020*

Master of Science, Astronomy and Astrophysics Innsbruck, Austria

University of Innsbruck – University of Padua – University of Göttingen *Aug. 2014 – Sep. 2016*

Bachelor of Science, Physics Salt Lake City, U.S.A.

University of Utah *Aug. 2007 – Dec. 2012*

Technical Skills

Languages: Python, C/C++, Bash, Fortran
Frameworks/Libraries: OpenMP, MPI, CUDA, NumPy, pandas, Numba, concurrent.futures, mpi4py, HDF5
Tools: Git, Slurm, Apptainer, EasyBuild, ReFrame, Jenkins, AMDuProf, LIKWID