Filippo Barbari

Phone: +39 327 2207037

Email address: filippo.barbari@gmail.com
Institutional email address: f.barbari@cineca.it

Born: 24/08/1999, Rimini (RN), Italy
Nationality: Italian

Italian: C2 level
English: FCE B2 (2017), ETS TOEIC C1 (2024)

References

Prof. Moreno Marzolla

- Associate professor at the Department of Computer Science and Engineering (DISI), University of Bologna, Italy.
- Mail: moreno.marzolla@unibo.it
- ⋆ Phone: +39 0547 338861
- ○ Website: www.moreno.marzolla.name

Prof. Marzolla was the supervisor for my bachelor thesis and has been the academic tutor for my internship.

Work experiences

November 2022 - today

Currently employed as **HPC Technology Specialist junior** at CINECA, my job mainly consists of benchmarking and optimization of scientific applications on ARM and RISC-V architectures within projects financed by the European Union such as European Processor Initiative[1] and EUropean Pilot for EXascale[2].

July - August 2022

I've been selected to take part in the Summer School of HPC 2022, organized by PRACE. I worked on the CUDA implementation of LibRSB together with my project mentor, Dr. Ezhilmathi Krishnasamy from the PCOG department, at the University of Luxembourg. The source code of this project is available here.

March - June 2022

Tutor of the Algorithms and Data Structures course, held by prof. Moreno Marzolla, at Alma Mater Studiorum University of Bologna, Campus of Cesena, Italy.

Education

2018 - 2021

Bachelor's Degree in Computer Science and Engineering awarded with 106/110 on 7/10/2021 at Alma Mater Studiorum University of Bologna, Campus of Cesena, Italy.

2013 - 2018

High school diploma awarded with 90/100 at Liceo Scientifico A. Volta, Riccione (RN), Italy.

[1] https://www.european-processor-initiative.eu/
[2] https://eupex.eu/

Bachelor's Degree Thesis

- Title: CUDA implementation of the Bellman-Ford algorithm.
- ⋆ Supervisor: Prof. Moreno Marzolla
- • At: Department of Computer Science and Engineering (DISI), University of Bologna, Italy
- ○ Grade: 106/110

  Design, development and performance evaluation of three different parallel implementations of the Bellman-Ford algorithm on CUDA-capable GPUs.

  Thesis available here (only in italian).

  Source code available here.

Internship

- Title: Development and perfomance evaluation of a parallel application designed for technical-scientific simulations.
- ⋆ Tutor: Prof. Moreno Marzolla
- • At: Department of Computer Science and Engineering (DISI), University of Bologna, Italy

  Development of an optimal sphere packing simulation regarding fuel particles inside a rocket's tank.

Skills

Skill self-evaluation scale

●○○○○○	No experience
●○○○○○	Can read a program and use most basic features
●●○○○○	Know some advanced features and can apply small changes to existing programs
●●●○○○	Can develop simple programs without help and solve most common problems
●●●●○○	Can integrate new features into existing systems
●●●●●○	Can design and develop a system from scratch
●●●●●●	Complete and deep knowledge

Programming languages

Bash	●●●●○○	C	●●●●●○	C++	●●●●○○
C#	●●●○○○	Java	●●●●●○	Python	●●●●○○

Libraries/Frameworks

CUDA	●●●●○○	Highway	●●●○○○	MPI	●●●●○○
OpenGL	●●●○○○	OpenMP	●●●●○○	SYCL	●●○○○○

Other languages

CSS	●●●○○○	HTML	●●○○○○	JSON	●●●○○○
Markdown	●●●●○○	SQL	●●●○○○	LaTeX	●●●●○○

Software

Docker	●●●●○○	Git	●●●●○○	GitLab	●●●●○○
Gradle	●●●○○○	Intellij IDEA	●●●○○○	TEXStudio	●●●○○○
likwid	●●●○○○	perf	●●●○○○		

Operating Systems

Red Hat	●●●○○○	Ubuntu	●●●●○○	Windows 10	●●●○○○
Windows 7	●○○○○○				

CPU Architectures

ARM	●●○○○○	RISC-V	●●●○○○	x86	●●●●○○

Publications

F. Barbari, F. Ficarelli, and D. Cesarini, "High-throughput drug discovery on the fujitsu a64fx architecture," in *Proceedings of the International Conference on High Performance Computing in Asia-Pacific Region Workshops*, ser. HPCAsia '24 Workshops, Nagoya, Japan: Association for Computing Machinery, 2024, pp. 17–23, ISBN: 9798400716522. DOI: 10.1145/3636480.3637095.

Contributions to open source projects

My most relevant contributions concern the following projects:

- **Google Highway**[3]: a C++ library which provides a unified API for intrinsics SIMD functions of various CPU architectures including x86, ARM, RISC-V and PowerPC. I helped with bugfixing and other improvements of the ARM implementation.
- **JITWatch**[4]: an application to visualize and explore the bytecode and the assembly code generated by the *just-in-time* compilation of the Java Virtual Machine. I helped with graphical improvements and integration of new features of the Java language.

Last update: February 19, 2024

[3] https://github.com/google/highway
[4] https://github.com/AdoptOpenJDK/jitwatch