

Antonio PAOLILLO, Ph.D.

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Software engineer - Computer scientist

apaolill@gmail.com

Car driving license (B)

<https://antonio.paolillo.be>

Short bio

With 8 years of experience in both **Research** and **Software Development**, I solve challenging problems with **strong theoretical roots** that are **practical and industry-related**. My scholar background led me to strongly value **theoretical and technical knowledge**.

I focus on **low-level** and **system software** development, including demanding challenges such as efficiency, parallelism and concurrency. My interests gravitate towards **embedded real-time software** and **operating system design** running on modern heterogeneous multi-core platforms. I apply state-of-the-art software engineering practices (such as Agile and Continuous Integration) to facilitate the development and the validation of such complex systems.

Teamwork is key for me. I believe in people and I can demonstrate **good leadership**.

Former colleagues and co-worker describe me as:

- **fast** and **result-driven**,
- **analytic** and **sharp**,
- **empathetic** and **helpful**.

Professional experience

- **Huawei, Operating System Software Architect & Expert** *November 2019 - Today*
Dresden, Germany
- **Freelance software engineer** *June 2019 - October 2019*
Brussels, Belgium

I worked as a freelance solving issues of various clients of my portfolio, including by creating and maintaining software. Past missions include:

- Re-writing complex algorithms modelling physics phenomena originally written in Python, using **C++** and **CUDA**, obtaining speedups up to **x600**
 - Project planning for start-ups including roadmapping, requirements analysis and preparation of funding application
 - Training and consultancy work regarding embedded software engineering for IoT companies, including analysing business requirements and designing a verification and validation methodology (embedded debugging, emulations, continuous improvement, continuous delivery)
- **HIPPEROS, senior software engineer** *December 2012 - May 2019*
Louvain-la-Neuve, Belgium

HIPPEROS was a university spin-off developing embedded real-time operating systems. I joined the team when the company was not yet created, and I was an active member of the first kernel developers.

- Kernel Research & Development **Team Leader** (3-4 senior software engineer reports since December 2017 and mentored 4 successful master’s students)
 - **Software engineering**, including requirements analysis, development and testing, of operating system and application products, mainly in **C**, **C++** and **Python**
 - RTOS consultant for customers, partners and leads
 - **Project Manager** and **major contributor** in the Horizon 2020 **Tulipp** European project (<http://tulipp.eu>), notably with **Thales**, featuring cutting-edge **hardware acceleration** technology for embedded **image processing** and computer vision applications
 - Design and implementation of the multi-core *Maestro* Real-Time Operating System
 - Research work on low-power parallel real-time embedded systems, including ownership of **power management**, **scheduler** and **multi-threading** modules of the kernel
 - Contributions to several work packages of the FP7 CRAFTERS funded project (<http://ecsi.org/crafters>)
- **S.W.I.F.T., junior software developer** *October 2011 - November 2012*
La Hulpe, Belgium

SWIFT is a company that provides a private network that enables secured financial transactions to banks and financial institutions. As a young graduate software engineer, my role involved the following responsibilities.

- As part of a large product team, I implemented the **software life-cycle** — including design, development, testing, qualification and maintenance — of a real-time gross settlement software used by the **Euro Banking Association** (<https://www.ebaclearing.eu/>)
- I learned and applied **technical know-how** including business logic in **C/C++/C#**, **Oracle** databases and **XML** messaging.

Background

- **Ph.D. degree in Computer Science** *December 2012 - October 2018*
Université Libre de Bruxelles (ULB) Brussels, Belgium

For 6 years, in parallel to my commitment in the HIPPEROS project, I carried out research work at the University in the field of **parallel Real-Time Operating Systems** with **low-power constraints**. This led me to publish 11 papers.

I wrote a 382-page dissertation titled “*Optimization of Performance Metrics of Embedded Hard Real-Time Systems using Software and Hardware Parallelism*” (link: <http://hdl.handle.net/2013/ULB-DIPOT:oai:dipot.ulb.ac.be:2013/277427>). A video recording of the public defence is available online: <https://youtu.be/RjfZA61tas0>

I presented results in international conferences, participated in research projects and was involved in many activities of my research lab, called PARTS (<http://parts.ulb.ac.be/>).

- **Master degree in Computer Science** *September 2006 - June 2011*
Université Libre de Bruxelles (ULB) Brussels, Belgium

- Master’s thesis: *Multi-criteria performance prediction for embedded system design*
- Master obtained *magna cum laude* (major in embedded system design)

- Bachelor obtained *summa cum laude* (major in electrical engineering)
- *Fleurice Mercier* prize: Award for the best Grade Point Average in first year at Science Faculty (Academic year 2006-2007)

Languages

- **French** – Native language
- **Italian** – Second native language
- **English** – Fluent

Technical skills

Languages	C, C++, Embedded C, Python , bash, \LaTeX
Assembly	ARMv7-A, ARMv8-A, IA32
HW Parallelism	VHDL, HLS, OpenMP, CUDA
Build system	CMake , Make, Yocto
OS & Virtualisation	Linux , Unix-like, Docker, Docker Compose, Oracle VirtualBox, SSH
IDE	Vim, CLion , Pycharm
VCS	Git (advanced), SVN, ClearCase
Embedded tools	OpenOCD (JTAG), U-Boot , GDB , Lauterbach Trace32, Xilinx Vivado/SDx, FPGA
Platforms	i.MX6, Zynq 7000, Zynq UltraScale+ (FPGA / CPU interfaces)
OS design	micro-kernel , scheduling , virtual memory, multi-core, concurrency (mutexes & semaphores), CPU frequency scaling (low-power)
Methodologies	Scrum, Kanban, Scrumban
Electronics	Power measurement, oscilloscope probe
Theory	Real-time systems (strong), processor architecture, operating systems (Unix, RTOS), computer networks (TCP/UDP, socket programming), computational geometry (basics), machine learning (basics), computer security and cryptography (basics)
Game engines	Godot
Others	Confluence, Jira, GitHub, GitLab, GitLab-CI, Jenkins

Publications

Book chapter

- Tobias Kalb, Lester Kalms, Diana Göhringer, Carlota Pons, Ananya Muddukrishna, Magnus Jahre, Boitumelo Ruf, Tobias Schuchert, Igor Tchouchenkov, Carl Ehrensträhle, Magnus Peterson, Flemming Christensen, **Paolillo, Antonio**, Ben Rodriguez, and Philippe Millet. *Developing Low-Power Image Processing Applications with the TULIPP Reference Platform Instance*, pages 181–197. Springer International Publishing, Cham, 2019.

Conference papers

- Juan M. Rivas, Joël Goossens, Xavier Poczekajlo, and **Antonio Paolillo**. Implementation of Memory Centric Scheduling for COTS Multi-Core Real-Time Systems. In *31th Euromicro Conference on Real-Time Systems (ECRTS 2019)*, Leibniz International Proceedings in Informatics (LIPIcs), 2019.
- Ahmad Sadek, Ananya Muddukrishna, Lester Kalms, Asbjørn Djupdal, Ariel Podlubne, **Paolillo, Antonio**, Diana Goehringer, and Magnus Jahre. Supporting utilities for heterogeneous embedded image processing platforms (sthem): An overview. In *Applied Reconfigurable Computing. Architectures, Tools, and Applications*, pages 737–749, Cham, 2018. Springer International Publishing.
- **Paolillo, Antonio**, Paul Rodriguez, Nikita Veshchikov, Joël Goossens, and Ben Rodriguez. Quantifying energy consumption for practical fork-join parallelism on an embedded real-time operating system. In *Proceedings of the 24th International Conference on Real-Time Networks and Systems, RTNS '16*, pages 329–338. ACM, 2016.
- T. Kalb, L. Kalms, D. Göhringer, C. Pons, F. Marty, A. Muddukrishna, M. Jahre, P. G. Kjeldsberg, B. Ruf, T. Schuchert, I. Tchouchenkov, C. Ehrenstrahle, F. Christensen, **A. Paolillo**, C. Lemer, G. Bernard, F. Duhem, and P. Millet. Tulipp: Towards ubiquitous low-power image processing platforms. In *2016 International Conference on Embedded Computer Systems: Architectures, Modeling and Simulation (SAMOS)*, pages 306–311, 7 2016.
- **A. Paolillo**, J. Goossens, P. M. Hettiarachchi, and N. Fisher. Power minimization for parallel real-time systems with malleable jobs and homogeneous frequencies. In *2014 IEEE 20th International Conference on Embedded and Real-Time Computing Systems and Applications*, pages 1–10, 8 2014.

Workshop papers

- **Antonio Paolillo**, Paul Rodriguez, Vladimir Svoboda, Olivier Desenfans, Joël Goossens, Ben Rodriguez, Sylvain Girbal, Madeleine Faugère, and Philippe Bonnot. Porting a safety-critical industrial application on a mixed-criticality enabled real-time operating system. In *Proceedings of the 5th Workshop on Mixed-Criticality Systems*, 12 2017.
- Martin Cornil, **Antonio Paolillo**, Joël Goossens, and Ben Rodriguez. Research and implementation challenges of rtos support for heterogeneous computing platforms. In *Heterogeneous Architectures and Real-Time Systems Seminar*, 5 2017.
- **Antonio Paolillo**, Olivier Desenfans, Vladimir Svoboda, Joël Goossens, and Ben Rodriguez. A new configurable and parallel embedded real-time micro-kernel for multi-core platforms. In *Proceedings of the ECRTS Workshop on Operating Systems Platforms for Embedded Real-Time applications*, 7 2015.
- Olivier Desenfans, **Antonio Paolillo**, Vladimir Svoboda, Ben Rodriguez, Joël Goossens, and Dragomir Milojevic. Design and implementation of a multi-core embedded real-time operating system kernel. In *ACTRISS OPRTC-ULB*, 4 2014.
- **Antonio Paolillo** and François Santy. The design and implementation of a multicore real-time operating system as an experimental platform to benchmark and validate innovative research. In *Nano-Tera/Artist International Summer School on Embedded System Design*, 9 2013.