

Henrique M. P. Cabral

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About me

I'm a systems programmer and designer focusing on embedded platforms, with interests ranging from firmware development to cloud performance to cryptography. My toolbox includes C, Python, and POSIX shell, and I'm working on adding Haskell to the mix. I'm passionate about correctness and stability, but above all solving real human problems—with or without technology.

Education

Sep 2009— **Master in Electrical and Computer Engineering**, *Faculty of Engineering of the University of Porto*, Porto, Portugal, GPA 17.9/20.

Jul 2014

- *Prémio Incentivo* for four best 1st year engineering students (one in 1500) — 2011
- Merit Scholarship for twelve best engineering students (one in 500) — 2012
- MSc thesis on FPGA implementation of FSK and PSK acoustic modems using Verilog HDL.

Professional experience and research

Feb 2018— **Embedded Engineering Lead**, *Veniam*, Porto, Portugal.

present Responsible for macro system architecture and design decisions.

- Onboarding into Linux kernel development.
- Managing development of outsourced components.

Feb 2017— **Embedded Dev Lead**, *Veniam*, Porto, Portugal.

Feb 2018 Managed day-to-day development and task assignments in a Kanban model, interfacing with engineering and company leadership, while continuing to actively contribute to the system.

- Managed development and provided on-site support for two auto OEM PoCs, helping the company reach critical yearly goals and establish new focus.
- Integrated tiger team which developed platform demo in ten days to secure PoCs.
- Onboarded three new developers of varying seniority, bringing the embedded team up to a total of seven members.
- Onboarded and mentored three-month summer intern.
- Helped port platform to third iteration of the hardware and modified U-Boot bootloader for custom boot process.
- Implemented support for MPTCP-based link aggregation in connection manager.
- Fixed and improved open-source MPTCP stack.
- Designed and implemented new network traffic accounting architecture and unified event logging infrastructure.
- Developed multiple network monitoring and troubleshooting tools for Operations teams.
- Helped redesign existing big data pipeline.
- Prepared and deployed four major system releases.

Sep 2014— Embedded Systems Engineer, Veniam, Porto, Portugal.

Feb 2017 Systems and network programming in OpenWrt-based platform for city-scale vehicular networks (around 500 buses and trucks), in a full-stack environment (from hardware to cloud-based services).

- Designed and implemented multiple core and auxiliary services, including connection manager, custom IPC and logging infrastructure, and over-the-air software and configuration updates.
- Designed configuration update pipeline and implemented central configuration repository for production and development networks.
- Helped port entire system from MIPS to first ARM platform.
- Designed communication protocol between CPU and microcontroller, reviewed firmware implementation, and implemented topside service.
- Debugged and fixed Wi-Fi driver (ath9k) issues.
- Designed and built laboratory testbed for automated integration and end-to-end testing.
- Wrote embedded development guidelines and introduced code reviews.
- Advocated for and wrote initial system documentation.

Apr 2011— Student researcher, Carebox project, FEUP, Portugal.

July 2014 Design, implementation, and evaluation of a black box for car insurance purposes.

- Implementation of low-level sensor drivers and internal data logging system.
- Design and assembly of main printed circuit board.

Nov 2010— Fellow, Novos Talentos em Matemática, Calouste Gulbenkian Foundation, Portugal.

2012 Mathematics research programme for undergraduate students. Research in geometry, number theory, elliptic curves and functional analysis.

Awards

Sep 2013 Best Student Team, 6th World Robotic Sailing Championship, Brest, France.

Together with the École Navale prize for 1st place in endurance race. Tasks involving speed, endurance, sensing, and high-level behaviours.

Sep 2012 1st place, 5th World Robotic Sailing Championship, Cardiff, Wales, UK.

- First place in Microtransat class and general ranking.
- Winners of Hacker Challenge together with German team (building an autonomous sailboat in one week with assorted materials).

Aug 2009 Bronze medal, 40th International Physics Olympiad, Mérida, Yucatán, Mexico.

Best theoretical examination score in bronze tier and best result in Portuguese team.

Patents (main author)

[1] H. Cabral et al. "Systems and methods for managing connectivity in a network of moving things." U.S. Patent 9 674 735 2, Jun. 6, 2017.

[2] H. Cabral. "Systems and Methods for Inter-Application Communication in a Network of Moving Things." U.S. Patent 9 924 327 2, Mar. 20, 2017.