Vito **Kortbeek**

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Education

Delft University of Technology — *Delft, the Netherlands*

PhD Student — *Feb. 2019 - present*

Delft University of Technology — *Delft, the Netherlands*

Master Embedded Systems (+ one year pre-master) — *Sep. 2015 - Feb. 2019*

Amsterdam University of Applied Sciences — *Amsterdam, the Netherlands*

Bachelor Electrical Engineering (HBO) — *Sep. 2011 - July 2015*

Research Interests

My Current Research

My Ph.D. research focuses on intermittent computing support, ensuring that low-power battery-less embedded systems–that work on harvested energy–continue where they left off after a total power failure. I prefer to do this in such a way that it is invisible to the programmer. Doing so often involves compiler transformations and modifications.

Other Research Interests

I enjoy exploring how to improve CPU architectures or utilize existing features better. Especially when both software and embedded hardware come together, this includes leveraging unutilized architecture features in the compiler or figuring out how to exploit them in (low-level) software.

Publications

PLDI '22—WARio: Efficient Code Generation for Intermittent Computing (A*) — *San Diego, USA*

Vito Kortbeek, Souradip Ghosh, Josiah Hester, Simone Campanoni, Przemysław Pawełczak — *Jun. 13 - 17, 2022*

- Conference: 43rd ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI)
- Paper: https://doi.org/10.1145/3519939.3523454
- Artifact: https://zenodo.org/record/6413018 — GitHub: https://github.com/TUDSSL/WARio

UbiComp '21—BFree: Enabling Battery-free Sensor Prototyping with Python (A*) — *Virtual, USA*

Vito Kortbeek, Abu Bakar, Stefany Cruz, Kasim Sinan Yildirim, Przemysław Pawełczak, Josiah Hester — *Sep. 21 - 26, 2021*

- Conference: ACM international joint conference on pervasive and ubiquitous computing (UbiComp)
- Paper: https://dl.acm.org/doi/abs/10.1145/3432191
- GitHub: https://github.com/TUDSSL/BFree
- Media: Adafruit, Hackaday, Independent, Tweakers, TechXplore, AD, Volkskrant.

UbiComp '20—Battery-Free Game Boy (A*) — *Virtual, USA*

Jasper de Winkel, **Vito Kortbeek**, Josiah Hester, Przemysław Pawełczak — *Sep. 12 - 17, 2020*

- Conference: ACM international joint conference on pervasive and ubiquitous computing (UbiComp)
- Paper: https://dl.acm.org/doi/abs/10.1145/3411839
- Received a **Distinguished Paper Award** in PACM IMWUT Vol. 4 during UbiComp '21
- GitHub: https://github.com/TUDSSL/ENGAGE
- Media: CNET, The Wall Street Journal, Mashable, Hackaday, The Verge, Gizmodo, Engadget, PCMag, The Register, Tech Times, Nintendo Life, Daily Mail, The Independent.

ASPLOS '20—Time-sensitive Intermittent Computing Meets Legacy Software (A*) — *Virtual, Lausanne, Switzerland*

Vito Kortbeek, Kasim Sinan Yildirim, Abu Bakar, Jacob Sorber, Josiah Hester, Przemysław Pawełczak — *Mar. 16 - 20, 2020*

- Conference: ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)
- Paper: https://dl.acm.org/doi/10.1145/3373376.3378476
- GitHub: https://github.com/TUDSSL/TICS

Projects

Wireless Sensor System
Noordwijk, the Netherlands

Head Communications, ESA Business Incubation Centre—**Internship** *Feb. 2015 - Sep. 2015*

This was my graduation project for my Bachelor of Electrical Engineering at the Amsterdam University of Applied Sciences.

- Redesigned hardware for GSM, Bluetooth, and GPS connectivity
- Designed hardware and software for utilizing a Linux System on Module
- Designed modular embedded software for collecting and distributing sensor data from multiple sources to possibly multiple end-points using ZeroMQ
- Designed a Bluetooth Android app that reads QR codes and transfers this data to an embedded Linux system

Porting an SNMP stack to a DSP platform
Landsmeer, the Netherlands

Micro Elektronische Producten (MEP)—**Internship** *Sep. 2013 - Feb. 2014*

During my internship at MEP I worked on porting an Simple Network Management Protocol (SNMP) stack to their, in-house designed, DSP platform running a modified Texas Instruments RTOS

- Porting the Simple Network Management Protocol (SNMP)
- Making encryption work on the exotic DPS architecture
- Extending the SNMP solution with IPC features

Shell Eco-marathon
Amsterdam, the Netherlands

Amsterdam University of Applied Sciences *Sep. 2012 - Aug. 2013*

I worked with a team of fellow E-technology students on the electrical system of a prototype car that runs on hydrogen, named the H2A. My main tasks were as programmer for the embedded systems. These included:

- A graphical OLED display driver
- A data-logger using flash chips and a micro-controller
- PC based logger for the hydrogen fuel cell

Solar Boat Challenge
Amsterdam, the Netherlands

Amsterdam University of Applied Sciences *Sep. 2012 - Aug. 2013*

During this project, I worked with the same E-technology students as with the Shell Eco-marathon project. Here we worked on the power-train and measurement systems of the solar powered boat. My main tasks consisted of designing:

- A GPS system (witch was also used in the H2A car)
- A brushless DC and normal DC motor driver
- An android and a web based application for displaying the current location of the solar boat

Experience

Delft University of Technology
Delft, the Netherlands

PhD. Candidate *Feb. 2019 - present*

I am currently a forth year PhD candidate at the Delft University of Technology. My supervisors are Dr. P. Pawełczak and Prof. dr. K.G. Langendoen.

Micro Elektronische Producten (MEP)
Landsmeer, the Netherlands

Junior software developer *Feb. 2014 - Sep. 2015*

At MEP I worked with a group of approximately 7 people on the software development for a Texas Instrument DSP with an RTOS used for a multitude of applications related to Voice over IP. The system was mostly used for maritime applications.

- Simple Network Management Protocol (SNMP) integration.
- Solving software bugs/issues.
- Implementing zero-copy messaging between tasks.
- Displaying logging information on the integrated web server.

Skills

Languages	Dutch, Native language; English, Proficient (Average IELTS band 8—C1 CEFR skill level)
Software	Vim, gcc, clang, llvm, gdb, make, cmake, Docker, LTSpice, Eagle, Altium Designer, ModelSim, Quartus
Programming	C, C++, Java, Python, Assembly (ARM, MSP), Bash, Matlab, Lua, VHDL
Large Project Experience	I am familiar with the GCC MSP back-end, LLVM middle-end, LLVM MSP back-end, LLVM ARM back-end