

# Daniel Duclos-Cavalcanti

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## SUMMARY

Finding a thesis topic at the intersection of finance and computer science naturally complemented my rigorous German education in electrical engineering, leading me to the mentorship of Dr. Sivaraman at NYU. Today I am living in New York, completing a master's degree via an exciting research collaboration that envisions a future financial exchange on the cloud.

## EDUCATION

### Technical University of Munich

Munich, Germany & New York, USA

*M.Sc. Electrical and Computer Engineering*

*Oct 2020 – Sept 2024*

- External M.Sc. Thesis: **VM Selection Heuristic for Multicast Overlay Trees in the Cloud**
- **Coursework:** Embedded Design for Machine Learning, High Performance Computing for Machine Intelligence

### New York University

New York, USA

*Computer Science - Visiting Non-Degree Graduate Student*

*Sept 2023 – May 2024*

- Co-Authoring Publication: Jasper: Fair Multicast for Financial Exchanges in the Cloud
- CSCI-GA 2250 - Operating Systems - A

### Technical University of Munich

Munich, Germany

*B.Sc. Electrical and Computer Engineering*

*Oct 2016 – Sept 2020*

- **Coursework:** Embedded Systems Programming Lab, Computer Networks, Data Structures

## EXPERIENCE

### Research Assistant

Jul 22–Oct 22, Oct 20–Mar 21

*TU Munich*

*Munich, Germany*

- Evaluated and compared the performance of various Machine Learning models across GPUs, CPUs and TPUs.
- Analyzed USB traffic through PyShark between the host and externally added TPUs.
- Generated reports to establish a Design-Space Exploration framework to guide future model deployment decisions.

### Embedded Engineer Intern

Aug 2021 – Jan 2022

*Molabo GmbH*

*Ottobrunn, Germany*

- Developed internal tooling for state simulations through Linux's virtual CAN interface and mock APIs.
- Added unit-tests and code coverage to safety critical features of their motor drive embedded controller.
- Extended an automatic firmware update functionality used by over 20 clients.
- Automated build and testing workflows via Jenkins and CMake utilized by over 10 engineers.

### Tutor - Embedded Systems Programming Lab

Apr 2021 – Aug 2021

*TU Munich*

*Munich, Germany*

- Supervised and aided 20+ students on their final embedded FreeRTOS laboratory projects in C.

## PUBLICATIONS

### Jasper: Fair Multicast for Financial Exchanges in the Cloud | *(Paper)*

Jan 2024 – Present

- Novel cloud hosted financial exchange achieving low latency multicast service for up to 1000 market participants.
- Achieves better scalability and around 50% lower latency than the multicast service provided by AWS.
- Utilizes DPDK, overlay trees, VM hedging and more to achieve a fair delivery of up to a 35K multicast packet rate.

## TECHNICAL SKILLS

**Languages:** C, C++, Python, Golang, Rust, Bash, Lua, VHDL, Tcl, JavaScript, HTML/CSS

**Tools:** Terraform, Docker, Packer, AWS, GCP, Git, Unix Shell, Makefile, CMake, Linux, Jenkins, Vim

**Technologies:** Cloud Computing, Computer Networking, Embedded Systems, FPGAs, RTOS, Machine Learning, HPC

**Frameworks:** ZeroMQ, DPDK, Tensorflow, TFLite, Numpy, Pandas, Pytest, OpenMPI, OpenMP, Xilinx Vivado

**Certificates:** UCSD: Data Structures Fundamentals, UT Austin: Embedded Systems - uC I/O

## PROJECTS

### Open-MPI Value Iteration | *C++, Multi-Threaded, HPC*

[Github](#) | 2022

- Asynchronous value iteration model to distribute workload on an HPC cluster.

### Hamming Code Error Detection | *C, VHDL, FPGA, SoC*

[Github](#) | 2022

- Error detection/correction algorithm for packet transmission on Microsemi's SF2 FPGA/SoC.

### FreeRTOS-SpaceInvaders | *C, RTOS, Multi-Threaded*

[Github](#) | 2021

- Implemented the famous arcade game as a multi-threaded FreeRTOS application in C.