MATTHIJS JANSEN

Academic Researcher
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RESEARCH AREAS

My research focuses on infrastructure provisioning, resource management, and application offloading in the digital compute continuum. My active interest concerns declarative deployments and configuration management, which aim to simplify the use and increase the interoperability of systems within the digital compute continuum.

EDUCATION

E1. **PhD in Computer Science**, Vrije Universiteit (*Expected*) 2020 - 2025
Thesis: Exploring the Compute Continuum: Architectures, Configurations, and Education
Supervised by dr. ir. Animesh Trivedi and prof. dr. ir. Alexandru Iosup

E2. **Master of Computer Science**, University of Amsterdam and Vrije Universiteit Amsterdam 2018 - 2020
Thesis: A Performance-Based Recommender System for Distributed DNN Training
Supervised by prof. dr. ir. Ana-Lucia Varbanescu

E3. **Bachelor of Computer Science**, University of Amsterdam 2015 - 2018
Thesis: Thermal Models for the Exploration of Embedded System Architectures
Supervised by prof. dr. Andy Pimentel

PUBLICATIONS

P1. **Performance Characterization of Data Store Event Trigger Mechanisms for Serverless Computing**
Ritul Satish, Sacheendra Talluri, Sudarshan Sivakumar, **Matthijs Jansen**, et al.
The 25th IEEE International Symposium on Cluster, Cloud, and Internet Computing (CCGRID) 2025

P2. **Columbo: A Reasoning Framework for Kubernetes' Configuration Space**
Matthijs Jansen, Sacheendra Talluri, Krijn Doekemeijer, et al.
The 16th ACM/SPEC International Conference on Performance Engineering (ICPE) 2025

P3. **The Computing Continuum: From IoT to the Cloud**
Auday Al-Dulaimy, **Matthijs Jansen**, Bjarne Johansson, et al.
Elsevier Internet of Things 2024

P4. **Reviving Storage Systems Education in the 21st Century — An experience report**
Animesh Trivedi, **Matthijs Jansen**, Krijn Doekemeijer, et al.
The 24th IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGRID) 2024

P5. **The SPEC-RG Reference Architecture for the Compute Continuum**
Matthijs Jansen, Auday Al-Dulaimy, Alessandro V. Papadopoulos, et al.
The 23rd International Symposium on Cluster, Cloud and Internet Computing (CCGRID) 2023

P6. **Continuum: Automate Infrastructure Deployment and Benchmarking in the Compute Continuum**
Matthijs Jansen, Linus Wagner, Animesh Trivedi, et al.
The First FastContinuum Workshop (FastContinuum) 2023

P7. **Can My WiFi Handle the Metaverse? A Performance Evaluation Of Meta's Flagship Virtual Reality Hardware**
Matthijs Jansen*, Jesse Donkervliet*, Animesh Trivedi, et al.
The Sixth Workshop on Hot Topics in Cloud Computing Performance (HotCloudPerf) 2023

P8. **Beyond von Neumann in the Computing Continuum: Architectures, Applications, and Future Directions**
Dragi Kimovski, Nishant Saurabh, **Matthijs Jansen**, et al.
IEEE Internet Computing 2023

P9. **GradeML: Towards Holistic Performance Analysis for Machine Learning Workflows**
Tim Hegeman, **Matthijs Jansen**, Alexandru Iosup, et al.
The Fifth Workshop on Hot Topics in Cloud Computing Performance (HotCloudPerf) 2021

P10. **DDLBench: Towards a Scalable Benchmarking Infrastructure for Distributed Deep Learning**
Matthijs Jansen, Valeriu Codreanu, Ana Lucia Varbanescu
The Fourth Workshop on Deep Learning on Supercomputers (DLS@SC) 2020

WORK EXPERIENCE

W1. Machine Learning Intern at IBM Research Dublin, Ireland Sep 2024 - Dec 2024

- I constructed a database storing and predicting the performance and memory use of machine learning applications.
- I designed, implemented, and evaluated a scheduling framework to help assess the impact of exposing knowledge on machine learning application performance to machine learning schedulers.

W2. Machine Learning Intern at the Dutch National Supercomputing Center SURF, Amsterdam Feb 2020 - Jun 2020

- I analyzed distributed machine learning algorithms and systems (TensorFlow, PyTorch, Horovod, GPipe, PipeDream).
- I designed, implemented, and evaluated a recommender system for distributed machine learning, advising machine learning algorithms based on dataset and machine learning model properties.

OPEN SOURCE PROJECTS

O1. **Continuum**: Automate cloud-edge infrastructure deployments and benchmarks with Continuum 2021 - 2025
Awarded with the IEEE reproducibility badges for Open Research Object and Reusable/Research Object Reviewed.
The project is available at https://github.com/atlarge-research/continuum.

O2. **Columbo**: Explore and optimize Kubernetes configurations for fast application deployment 2023 - 2025
The project is available at https://github.com/atlarge-research/continuum/tree/columbo.

O3. **MetaBench**: Benchmark the performance and energy usage of Meta's flagship virtual reality hardware 2023
The project is available at https://github.com/atlarge-research/measuring-the-metaverse.

O4. **DDLBench**: A recommender system for distributed machine learning algorithms 2020
The project is available at https://github.com/sara-nl/DDLBench.

SERVICE

S1. Newsletter editor for the Standard Performance Evaluation Corporation (SPEC) Research Group 2023 - 2025
S2. Website Administrator for the Dutch Computer Systems Conference (CompSys) 2022 - 2025
S3. System Administrator for research infrastructure operated by the Massivizing Computer Systems group at the Vrije Universiteit Amsterdam 2020 - 2025
S4. Website Administrator for the Massivizing Computer Systems group at the Vrije Universiteit Amsterdam 2020 - 2025
S5. Reviewer for the International Symposium on Cluster, Cloud and Internet Computing (CCGRID) 2023 - 2024
S6. Reviewer for the Amsterdam Data Science Thesis Awards 2022 - 2023
S7. Reviewer for the Journal of Signal Processing Systems 2023
S8. Subreviewer for the International Symposium on High-Performance Parallel and Distributed Computing (HPDC) 2023
S9. Subreviewer for the Transactions on Parallel and Distributed Computing (TPDS) 2022
S10. Subreviewer for the Web Conference (TheWebConf) 2022
S11. Artifact Evaluation for the European Systems Conference (EuroSys) 2021

PRESENTATIONS

Columbo: A Reasoning Framework for Kubernetes' Configuration Space

R1. Dutch Computer Systems Conference (CompSys) 2024
R2. NWO ICT.OPEN 2024

Continuum: Automate Infrastructure Deployment and Benchmarking in the Compute Continuum

R3. Dutch National Growth Fund project Future Network Services consortium 2025
R4. Distributed and Parallel Systems group, University of Klagenfurt 2024
R5. The First FastContinuum Workshop (FastContinuum) 2023
R6. EU Horizon project Graph Massivizer Consortium 2023
R7. VU Amsterdam India Science Seminar 2023
R8. Dutch Computer Systems Conference (CompSys) 2023
R9. NWO ICT.OPEN 2023

The SPEC-RG Reference Architecture for the Compute Continuum

R10. The 23rd International Symposium on Cluster, Cloud and Internet Computing (CCGRID) 2023
R11. TNO-ESI Cloud Continuum workshop 2023
R12. Parallel Computing Systems group, University of Amsterdam 2023
R13. Dutch National Supercomputing Center SURF 2022
R14. SPEC Research Group Cloud 2022
R15. Dutch Computer Systems Conference (CompSys) 2022
R16. NWO ICT.OPEN 2022

DDLBench: Towards a Scalable Benchmarking Infrastructure for Distributed Deep Learning

R17. Dutch Computer Systems Conference (CompSys) 2021
R18. NWO ICT.OPEN 2021
R19. The Fourth Workshop on Deep Learning on Supercomputers (DLS@SC) 2020

TEACHING

T1. Teacher for Computer Organization (BSc) at Vrije Universiteit Amsterdam 2024
T2. Teacher for Advanced Network Programming (BSc) at Vrije Universiteit Amsterdam 2023 - 2024
T3. Teacher for Computer Networks (BSc) at Vrije Universiteit Amsterdam 2023 - 2024
T4. Teaching Assistant for Distributed Systems (MSc) at Vrije Universiteit Amsterdam 2021 - 2024
T5. Teaching Assistant for Storage Systems (MSc) at Vrije Universiteit Amsterdam 2021 - 2023
T6. Teaching Assistant for Advanced Topics in Distributed Systems (MSc) at Vrije Universiteit Amsterdam 2020 - 2023
T7. Teacher for High-performance Computing (graduate) at the Advanced School for Computing and Imaging 2023
T8. Teacher for Distributed Systems (graduate) at the Advanced School for Computing and Imaging 2022
T9. Teaching Assistant for Compiler Constructions (BSc) at University of Amsterdam 2019 - 2020
T10. Teaching Assistant for Image Processing and Computer Vision (BSc) at University of Amsterdam 2019
T11. Teaching Assistant for Modern Databases (BSc) at University of Amsterdam 2019
T12. Teaching Assistant for Concurrent and Parallel Programming (BSc) at University of Amsterdam 2019
T13. Teaching Assistant for Information Retrieval (BSc) at Vrije Universiteit Amsterdam 2018

SUPERVISION

At the Vrije Universiteit Amsterdam:

U1. **Alfred Daimari**, MSc Individual Systems Practical 2025
Energy Consumption of Heuristic Kubernetes Schedulers
U2. **Davit Darbinyan**, BSc Thesis 2024
Kubeless: A Novel Architecture for Kubernetes' Control Plane
U3. **Jacek Kuśnierz**, MSc Thesis 2024
Enhancing Graph Processing Efficiency in Kubernetes: Towards Application-Aware Scheduling
U4. **David Freina**, MSc Thesis 2024
End-to-End Power Model for the Compute Continuum
U5. **Debarghya Saha**, MSc Thesis 2024
Controless: A serverless control plane for Kubernetes
U6. **Maciej Kozub**, MSc Thesis 2024
Memory-Efficient WebAssembly Containers
U7. **Tim van Kemenade**, MSc Thesis 2024
Real-time Scaphandre Energy Metrics Pipeline Integrated with Escheduler
U8. **David Freina**, MSc Literature Survey 2024
A Survey of Energy Measurement Methodologies for Computer Systems
U9. **Debarghya Saha**, MSc Literature Survey 2024
A Survey of Serverless Workflows
U10. **Maciej Kozub**, MSc Literature Survey 2024
Survey of Function Offloading and Serverless Functions in the Computing Continuum
U11. **Daniel Berzak**, BSc Thesis 2023
Embedded Domain Specific Language: A Streamlined Approach for Framework Abstraction
U12. **Antonios Sklavos**, MSc Thesis 2023
Exploring the Performance of Kubernetes-Deployed Containers
U13. **Edgardo Reinoso Campos**, MSc Thesis 2023
Serverless Computing at the Edge in Precise Agriculture

U14. **Antonios Sklavos**, MSc Literature Survey 2023
Exploring the Performance-Isolation Trade-off for Isolation Mechanisms

U15. **Edgardo Reinoso Campos**, MSc Literature Survey 2023
Serverless Computing at the Edge in Precise Agriculture

U16. **Tim van Kemenade**, MSc Literature Survey 2023
A Survey of Scheduling Algorithms for the Edge

U17. **Felix Goosens**, MSc Individual Systems Practical 2022
Edge Continuum Framework on an ARM Raspberry Pi Cluster

SKILLS

Programming Languages	Fluent in Python and Bash, familiar with Go and C
Platforms	GNU/Linux, Kubernetes, OpenShift, KubeEdge, OpenWhisk, Spark, GraphScope
DevOps	QEMU, KVM, Docker, WebAssembly, Ansible, Git, Terraform, AWS, GCP
Machine Learning	TensorFlow, PyTorch, Horovod, Kueue, Hugging Face
Data Analysis	NumPy, SciPy, Pandas, Matplotlib