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. Memory Efficient WebAssembly Containers
Matthijs Jansen, Maciej Kozub, Alexandru Iosup, et al.
Third International Workshop on Intelligent and Adaptive Edge-Cloud Operations and Services (Intel4EC) 2025

P2. 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

P3. 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

P4. The Computing Continuum: From IoT to the Cloud
Auday Al-Dulaimy, **Matthijs Jansen**, Bjarne Johansson, et al.
Elsevier Internet of Things 2024

P5. 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

P6. 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

P7. Continuum: Automate Infrastructure Deployment and Benchmarking in the Compute Continuum
Matthijs Jansen, Linus Wagner, Animesh Trivedi, et al.
The First FastContinuum Workshop (FastContinuum) 2023

P8. 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

P9. Beyond von Neumann in the Computing Continuum: Architectures, Applications, and Future Directions
Dragi Kimovski, Nishant Saurabh, **Matthijs Jansen**, et al.
IEEE Internet Computing 2023

P10. 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

P11. 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. Panelist	Workshop on Hot Topics in Cloud Computing Performance (HotCloudPerf)	2025
S2. Reviewer	Elsevier International Journal of Computer and Telecommunications Networking	2025
S3. Reviewer	ACM Transactions on Internet Technology (TOIT)	2025
S4. Newsletter Editor	Standard Performance Evaluation Corporation (SPEC) Research Group	2023–2025
S5. Website Admin	Dutch Computer Systems Conference (CompSys)	2022–2025
S6. Sysadmin	Massivizing Computer Systems group, VU Amsterdam	2020–2025
S7. Website Admin	Massivizing Computer Systems group, VU Amsterdam	2020–2025
S8. Artifact Reviewer	IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGRID)	2023–2024
S9. Reviewer	Amsterdam Data Science Thesis Awards	2022–2023
S10. Reviewer	Springer Journal of Signal Processing Systems	2023
S11. Subreviewer	ACM International Symposium on High-Performance Parallel and Distributed Computing (HPDC)	2023
S12. Subreviewer	IEEE Transactions on Parallel and Distributed Computing (TPDS)	2022
S13. Subreviewer	ACM Web Conference	2022
S14. Artifact Reviewer	ACM European Systems Conference (EuroSys)	2021

PRESENTATIONS

Memory Efficient WebAssembly Containers

R1. The 3rd International Workshop on Intelligent and Adaptive Edge-Cloud Operations and Services (Intel4EC) 2025

Columbo: A Reasoning Framework for Kubernetes' Configuration Space

R2. The 16th ACM/SPEC International Conference on Performance Engineering (ICPE) 2025
R3. Dutch Computer Systems Conference (CompSys) 2024

R4. NWO ICT.OPEN 2024

Continuum: Automate Infrastructure Deployment and Benchmarking in the Compute Continuum

R5. Dutch National Growth Fund project Future Network Services consortium 2025
R6. Distributed and Parallel Systems group, University of Klagenfurt 2024
R7. The 1st FastContinuum Workshop (FastContinuum) 2023
R8. EU Horizon project Graph Massivizer Consortium 2023
R9. VU Amsterdam India Science Seminar 2023
R10. Dutch Computer Systems Conference (CompSys) 2023
R11. NWO ICT.OPEN 2023

The SPEC-RG Reference Architecture for the Compute Continuum

R12. The 23rd IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGRID) 2023
R13. TNO-ESI Cloud Continuum workshop 2023
R14. Parallel Computing Systems group, University of Amsterdam 2023
R15. Dutch National Supercomputing Center SURF 2022
R16. SPEC Research Group Cloud 2022
R17. Dutch Computer Systems Conference (CompSys) 2022
R18. NWO ICT.OPEN 2022

DDLBench: Towards a Scalable Benchmarking Infrastructure for Distributed Deep Learning

R19. Dutch Computer Systems Conference (CompSys) 2021
R20. NWO ICT.OPEN 2021
R21. The 4th Workshop on Deep Learning on Supercomputers (DLS@SC) 2020

TEACHING

At the Vrije Universiteit Amsterdam:

T1. Teacher	Computer Organization	BSc	2024–2025
T2. Teacher	Advanced Network Programming	BSc	2023–2024
T3. Teacher	Computer Networks	BSc	2023–2024
T4. Teaching Assistant	Distributed Systems	MSc	2021–2024
T5. Teaching Assistant	Storage Systems	MSc	2021–2023
T6. Teaching Assistant	Advanced Topics in Distributed Systems	MSc	2020–2023
T7. Teaching Assistant	Information Retrieval	BSc	2018

At the Advanced School for Computing and Imaging:

T1. Teacher	High-performance Computing	Graduate	2023
T2. Teacher	Distributed Systems	Graduate	2022

At the University of Amsterdam:

T1. Teaching Assistant	Compiler Constructions	BSc	2019–2020
T2. Teaching Assistant	Image Processing and Computer Vision	BSc	2019
T3. Teaching Assistant	Modern Databases	BSc	2019
T4. Teaching Assistant	Concurrent and Parallel Programming	BSc	2019

SUPERVISION

At the Vrije Universiteit Amsterdam:

MSc Theses

S1. Jacek Kuśnierz 2024
Enhancing Graph Processing Efficiency in Kubernetes: Towards Application-Aware Scheduling
S2. David Freina 2024
End-to-End Power Model for the Compute Continuum
S3. Debarghya Saha 2024
Controless: A Serverless Control Plane for Kubernetes

S4. Maciej Kozub 2024
Memory-Efficient WebAssembly Containers

S5. Tim van Kemenade 2024
Real-time Scaphandre Energy Metrics Pipeline Integrated with Escheduler

S6. Antonios Sklavos 2023
Exploring the Performance of Kubernetes-Deployed Containers

S7. Edgardo Reinoso Campos 2023
Serverless Computing at the Edge in Precision Agriculture

MSc Literature Surveys

S1. He Wen 2025
Testing Container Orchestration Systems: A Literature Review

S2. Rohan Murali Nair 2025
Configuration Management Systems

S3. Zhuoran Song 2025
Energy Consumption and Optimization Strategies of Cloud-Based Big Data and Machine Learning Applications

S4. David Freina 2024
A Survey of Energy Measurement Methodologies for Computer Systems

S5. Debarghya Saha 2024
A Survey of Serverless Workflows

S6. Maciej Kozub 2024
Function Offloading and Serverless Computing in the Continuum

S7. Antonios Sklavos 2023
Performance-Isolation Trade-offs for Isolation Mechanisms

S8. Edgardo Reinoso Campos 2023
Serverless Computing at the Edge in Precision Agriculture

S9. Tim van Kemenade 2023
A Survey of Scheduling Algorithms for the Edge

MSc Individual Systems Practicals

S1. Alfred Daimari 2025
Energy Consumption of Heuristic Kubernetes Schedulers

S2. Felix Goosens 2022
Edge Continuum Framework on an ARM Raspberry Pi Cluster

BSc Theses

S1. Davit Darbinyan 2024
Kubeless: A Novel Architecture for Kubernetes' Control Plane

S2. Daniel Berzak 2023
Embedded Domain Specific Language: A Streamlined Approach for Framework Abstraction

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