

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

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| S1. Panelist | Workshop on Hot Topics in Cloud Computing Performance (HotCloudPerf) | 2025 |
| S2. Reviewer | Elsevier International Journal of Computer and Telecommunications Net-
working | 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 Com-
puting (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 Dis-
tributed 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

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

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. Thimo Wuttge	2025
A Survey on Energy Aware Offloading Strategies in the Compute Continuum	
S2. He Wen	2025
Testing Container Orchestration Systems: A Literature Review	
S3. Rohan Murali Nair	2025
Configuration Management Systems	
S4. Zhuoran Song	2025
Energy Consumption and Optimization Strategies of Cloud-Based Big Data and Machine Learning Applications	
S5. David Freina	2024
A Survey of Energy Measurement Methodologies for Computer Systems	
S6. Debarghya Saha	2024
A Survey of Serverless Workflows	
S7. Maciej Kozub	2024
Function Offloading and Serverless Computing in the Continuum	
S8. Antonios Sklavos	2023
Performance-Isolation Trade-offs for Isolation Mechanisms	
S9. Edgardo Reinoso Campos	2023
Serverless Computing at the Edge in Precision Agriculture	
S10. 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