SWC Software Construction

RWTHAACHEN UNIVERSITY
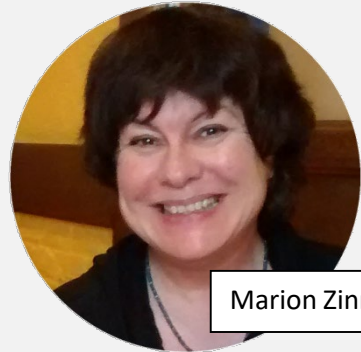
ANNUAL REPORT 2020

(COVID-19 edition)

Contact
office@swc.rwth-aachen.de
www.swc.rwth-aachen.de
+49-241-80-21331
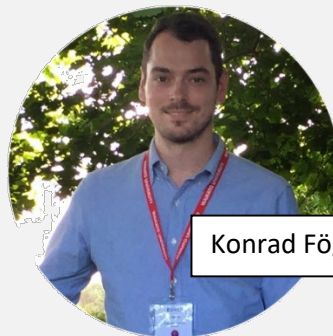Ahornstr. 55
52074 Aachen, Germany
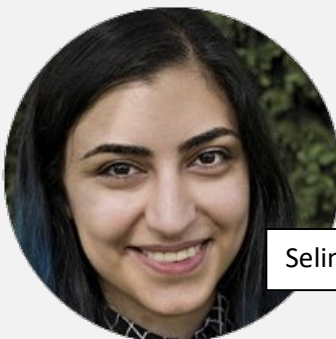
SWC TEAM

Horst Lichter
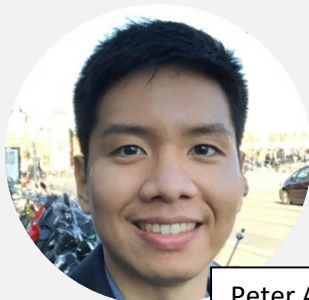
Marion Zinner

Christian Plewnia

Konrad Fögen

Selin Aydin
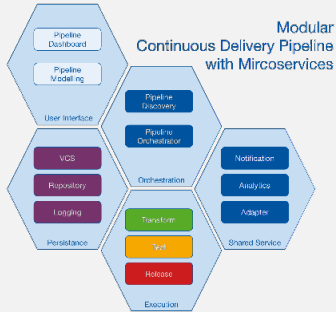
Alex Sabau

Peter Alexander

Nils Wild

Andreas Steffens

Research Projects

Scalable distributed Data Processing
Christian Plewnia

DevOps-aware Software Engineering
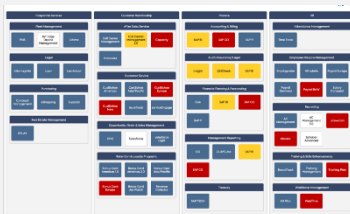Andreas Steffens

Combinatorial Robustness Testing
Konrad Fögen

Test Automation for Application Landscape Frameworks
Nils Wild

Enterprise Architecture Debt Management
Peter Alexander

HIGHLIGHTS

JANUARY : Industry Lecture @ OOSC

In the context of the **OOSC lecture**, Mirko Hartmann, a Senior Software Engineer from IVU Traffic Technologies AG, gave a guest lecture on **Migrating to a broker-based communication infrastructure using RabbitMQ.**

Thanks to IVU for offering this opportunity!

FOR THE MOBILITY OF TOMORROW

FACILITATING PUBLIC TRANSPORT

The smart software solutions from IVU enable transport operators and cities to offer innovative and modern services. Well designed, intelligently implemented and adapted to customer-specific requirements, IVU software is already supporting the organisation of transport for the passengers of tomorrow.

MARCH : Lockdown ...

To fight against the **COVID-19 pandemic**, a country-wide lockdown was needed. We did our very best, to adopt our way to work in order to teach students and to move on in our research projects.

Some News and Infos

Currently, the SWC team is working from home. You can reach us at any time by mail, you find the information on the team page.

Theses can still be **registered and supervised**. According processes are well documented and we use all tools to support you from home when you work on your thesis. So don't be afraid to request for a thesis!

HIGHLIGHTS

JULY: Final SW Lab Presentations

This summer term, Amadeus and IVU Technologies supported our **Bachelor Software Labs**. The following topics were elaborated by the students:

- **Many ways to travel** (together with Amadeus)
- **Daten, die uns bewegen** (together with IVU Technologies)

The final presentations were given virtually.

Thanks to both cooperation partners for offering this opportunity.

Thanks to **Christian** and **Nils** for managing the labs!

HIGHLIGHTS

SEPTEMBER: 5th CSE Workshop in L'Aquila (virtual)

Co-located with the 14th European Conference on Software Architecture (ECSA) we organized the **5th Workshop on Continuous Software Engineering.** For the second time, CSE and QUDOS joined forces to foster cross-fertilization and bootstrap an even bigger, stronger community around the urgently emerging topics they are both.

Thanks to **Andreas** for co-organizing this event.

OCTOBER: SWC Research Retreat in Hürtgenwald

This year, we organized our yearly research retreat in **Hürtgenwald** under the **COVID-19 restrictions.**

HIGHLIGHTS

DECEMBER: 8th QuASoQ Workshop in Singapore (virtual)

Collocated with the 27th Asia-Pacific Software Engineering Conference (APSEC 2020), we organized the **8th International Workshop "Quantitative Approaches to Software Quality"** (QuASoQ) .

This time, the workshop was conducted virtually. Ten papers were presented and 20 researchers attended the workshop.

WHAT ELSE HAPPENED …

DISTANCE TEACHING & RESEARCHING …

As almost everywhere, we had to change our teaching format in Summer in Winter Term to react to the COVID-19 pandemic.

Hence, we taught the **SPM lecture**, all **Bachelor Software Project Labs** and the **2020 Bridge Course in Computer Science** virtually!

But not only the teaching format changed but also our way to work together and to collaborate with our industry cooperation partners changed dramatically!
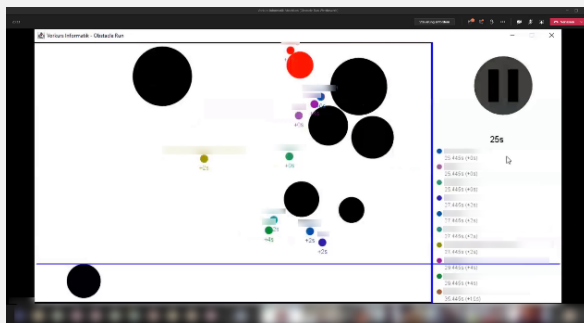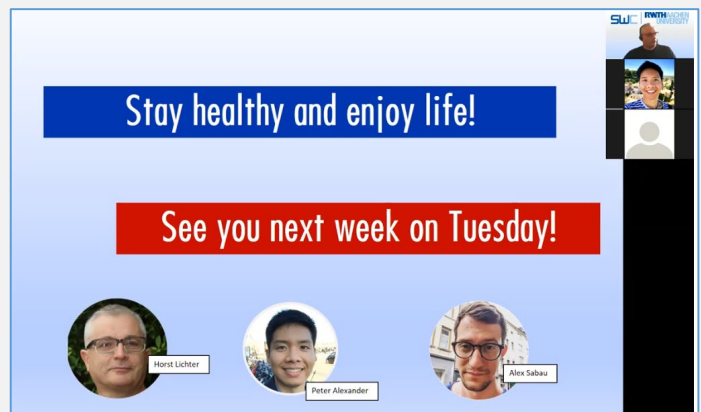
WHAT ELSE HAPPENED ...

CHRISTOPHER GERDES RECEIVED ONE OF THE BACHELOR AWARDS 2020

Christopher Gerdes received an Industry Bachelor Award at the virtual TDI 2020 for his Bachelor Thesis entitled "**Usage-based discovery of a fragmentation for a distributed tourism search database**".

The thesis was done in cooperation with Amadeus and was supervised by **Christian**.

TALK IN THE UTM DISTINGUISHED LECTURE SERIES

WHAT ELSE HAPPENED ...

NEW RESEARCH PROJECT WITH ITERGO DÜSSELDORF

In May, we started a new research project with **ITERGO Düsseldorf**. The topic of this project is to develop new approaches for **Enterprise Architecture Debt Management** as an integral part od Enterprise Architecture Management.

Peter is in charge of this project.

NEW RESEARCH PROJECT WITH apoBank DÜSSELDORF

In February, we started a new research project with **apoBank Düsseldorf**. There, the focus is to develop new approaches for **DevOps in regulated Software Development Environments**.

Alex, who joined us in January, is in charge of this project.

NEW RESEARCH PROJECT WITH KISTERS AACHEN

In July, we started a new research project with **KISTERS Aachen**. In this project appropriate Software technologies for BidData Applications should be researched and evaluated.

Selin, who joined us in July, is in charge of this project.

RESEARCH PROJECT WITH GDIS AACHEN finished

In July, we successfully finished a research project with **GDIS Informatik Services** on **Test Data Generation**.

Thanks to **Konrad** for heading this project!

PUBLICATIONS

H. Lichter, S. Aydin, T. Sunetnanta, T. Anwar (eds) (2020)**: Proceedings of the 8th International Workshop on Quantitative Approaches to Software Quality** (QuASoQ 2020), Singapore, December 1. CEUR-WS.org.

H. Lichter, S. Aydin, T. Sunetnanta, T. Anwar (2020)**: Report on the the 8th International Workshop on Quantitative Approaches to Software Quality**. In 8th International Workshop on Quantitative Approaches to Software Quality (QuASoQ 2020), Singapore, December 1, CEUR-WS.org, Vol. 2767, 1-5.

K. Fögen, H. Lichter (2020): **An Industrial Case Study on Fault Detection Effectiveness of Combinatorial Robustness Testing**. In 8th International Workshop on Quantitative Approaches to Software Quality (QuASoQ 2020), Singapore, December 1, CEUR-WS.org, Vol. 2767, 29-36.

B. Lehmann, P. Alexander, H. Lichter, S. Hacks (2020): **Towards the Identification of Process Anti-Patterns in Enterprise Architecture Models**. In 8th International Workshop on Quantitative Approaches to Software Quality (QuASoQ 2020), Singapore, December 1, CEUR-WS.org, Vol. 2767, 47-54.

S. Sok, C. Plewnia, S. Tanachutiwat, H. Lichter (2020): **Optimization of Compute Costs in Hybrid Clouds with Full Rescheduling**. In 2020 IEEE International Conference on Smart Cloud (SmartCloud) (to be published), IEEE Computer Society, Los Alamitos, CA, USA.

A. R. Sabau, S. Hacks, A. Steffens (2020)**: Implementation of a continuous delivery pipeline for enterprise architecture model evolution**. In Software and systems Modeling, Springer, New York, NY.

S. Hacks, H. Lichter (2020): **Qualitative Comparison of Enterprise Architecture Model Maintenance Processes**. In 40 Years EMISA – Proceedings of EMISA 2019, Gesellschaft für Informatik (GI), Vol. P-304, 105-118.

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N. Wild, H. Lichter, P. Kehren (2020): **Test Automation Challenges for Application Landscape Frameworks**. In Proceedings of 2020 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW), IEEE, 330-333.

K. Fögen, H. Lichter (2020): **Generation of Invalid Test Inputs from Over-Constrained Test Models for Combinatorial Robustness Testing**. In Proceedings of 2020 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW), IEEE, 171-180.

T. Friedrichs, K. Fögen, H. Lichter (2020)**: A Comparison Infrastructure for Fault Characterization Algorithms**. In Proceedings of 2020 IEEE International Conference on Software Testing, Verification and Validation Workshops (ICSTW), IEEE, 201-210.

C. Plewnia, A. Steffens, N. Wild, H. Lichter (2020): **A lightweight collaborative approach for teaching software project labs with industry partners**. In Joint Proceedings of 3rd Software Engineering Education Workshop (SEED 2020) & Workshop on NLP Advancements for Software Engineering (NLPaSE 2020), Singapore, December 1, CEUR-WS.org, Vol. 2799, 1-8.