



ANNUAL REPORT 2024

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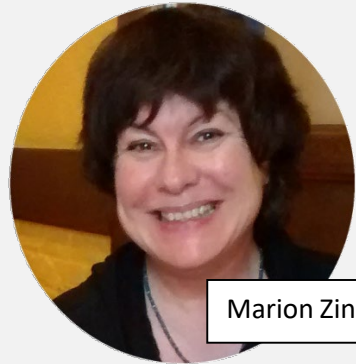
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SWC TEAM



Horst Lichter



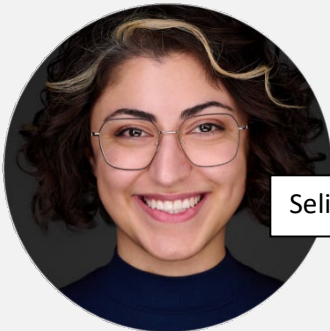
Marion Zinner



Christian Plewnia



Ada Slupczynski



Selin Aydin



Alex Sabau



Nils Wild

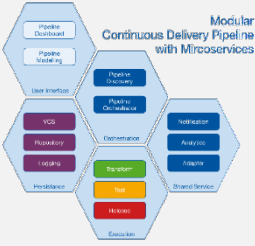


Peter Alexander



Andreas Steffens

RESEARCH PROJECTS



DevOps-aware Software Engineering

Andreas Steffens

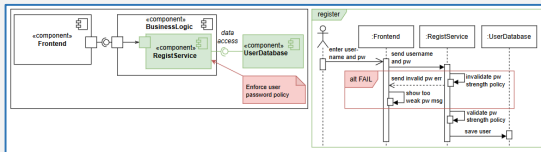
Cloud Service Selection and Cost Optimization

Christian Plewnia



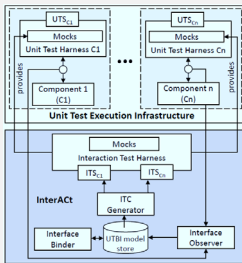
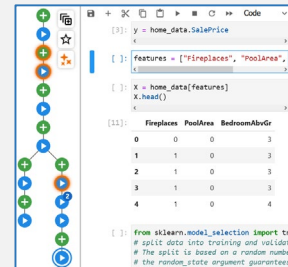
SCAM - Security-Centric Architecture Modelling

Alex Sabau



SE4ML - Processes, People and Tools

Selin Aydin



Vertical Reuse of Unit Test Cases to Automate Integration Testing

Nils Wild

Modernization Approaches for Legacy Systems

Ada Slupczynski



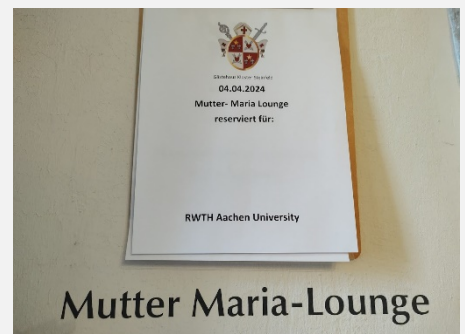
HIGHLIGHTS

APRIL: SWC Research Retreat

This year, we organized our yearly research retreat in the Benedictine Abbey of Steinfeld.

The Abbey offered a perfect environment to discuss our research projects.

As always, we enjoyed our stay at the Abbey, the good food, and the beautiful surroundings.



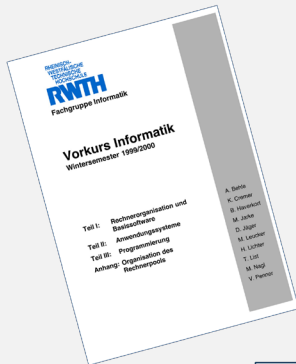
HIGHLIGHTS

SEPTEMBER: 25 Years Vorkurs Informatik

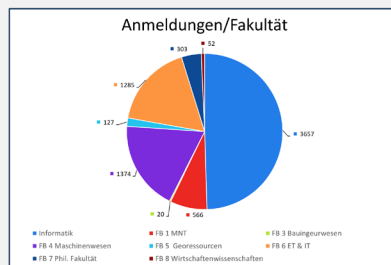
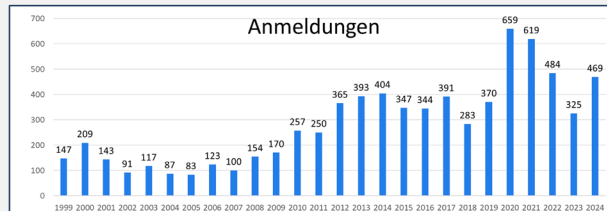
Since 1999, we have organized and conducted the Vorkurs Informatik. Since then, approx. 7000 students from all faculties of the RWTH Aachen University have attended the Vorkurs Informatik.

This year, the last Vorkurs Informatik edition organized by SWC took place!

Thanks to all the student mentors and SWC staff for their invaluable support and contributions!



PERSONALISIERTES LERNEN VON FACHLICHEN GRUNDLAGEN UND STUDIEN-TECHNIKEN IN VORKURSEN
Antragsteller für die Fachgruppe Informatik: Prof. H. Lichter, Prof. U. Schroeder



HIGHLIGHTS

OCTOBER: Team Trip to Schwetzingen and Heidelberg

This year, we visited Schwetzingen again, as we were unable to visit the famous **Schwetzingen Palace and Gardens** in 2023 due to the bad weather.

We also visited the old university city of **Heidelberg** and, of course, the famous **Old Bridge** and **Heidelberg Castle**.



HIGHLIGHTS

SEPTEMBER: 12th QuASoQ Workshop @ APSEC in Chongqing, China

Collocated with the 31st Asia-Pacific Software Engineering Conference (APSEC 2024), we organized the **12th International Workshop “Quantitative Approaches to Software Quality” (QuASoQ 2024)**.

Researchers from Japan, China, Germany, Thailand, Sweden, and Bangladesh presented their results.

One author could not make it to China, so the workshop was held in a hybrid mode.

Thanks to Nils, who perfectly chaired the workshop!



HIGHLIGHTS

OCTOBER: GI Working Group “Modeling, Analysis and Assessment of Secure Software Architectures (MABSS)” founded

After many discussions and emails, the new working group “Modeling, Analysis and Assessment of Secure Software Architectures” which is part of the GI Fachgruppe Architekturen (ARC) was founded in Paderborn.

Thanks to Alex, who invested a lot of time to get the new working group started!

Alex serves as the spokesperson for the new working group.



ARBEITSKREIS
MABSS

Main Questions

- 2 What do we understand under secure design architectures?
 - What is our perspective/point of view on security?
 - Is there already a paper which covers this perspective on security and defines its terms?
- Backlog 4 How to evaluate security of architecture?
 - What methods exist to analyse some aspect of security?
 - Threats -> Threat Modeling
 - What else exists? In industry vs. in Academia
- Backlog Security degree of design patterns?
 - Which levels? How do they impact it?
- Backlog Design Decision Support for security assets?
 - Design Decision Support for tradeoff optimization of other quality attributes.
- 1 What is being done in industry to secure architectures?
 - What is industry? -> See Industry conferences
- Backlog How high is the tradeoff between security and other quality attributes of security solutions?
 - There is a Non-exhaustive list of quality attributes, that are correlated with security.
- Backlog 3 What is the complexity of secure design decisions for implementation & infrastructure?
 - -> Implementation complexity is a neck-breaker. How severe is this factor?

HIGHLIGHTS

OCTOBER: OODACH Meeting at JKU in Linz

The so-called OODACH meeting has been taking place for many years. It is an invitational meeting where scientists and practitioners from Germany, Austria, and Switzerland (DACH) discuss innovative and exciting software engineering topics.

This year, the OODACH workshop was hosted by **JKU in Linz**. As always, there were exciting presentations and plenty of time for discussion and networking.

Alex and Nils presented some results of their PhD research projects!

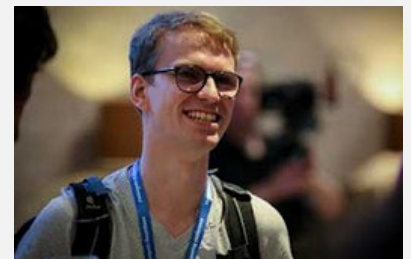


TALKS @ CONFERENCES & WORKSHOPS

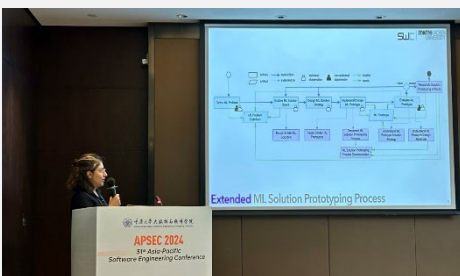
Alex Sabau: **A Guided Modeling Approach for Secure System Design.**
ICSA 2024, Hyderabad, India, Jun 4-8.



Selin Aydin: **An Automated Evaluation Approach for Jupyter Notebook Code Cell Recommender Systems.**
QuASoQ 2024, Chongqing, China, Dec 3.



Christian Plewnia: **CICO2e: A Compute Carbon Footprint Estimation Tool Based on Time Series Data.**
SAI 2024, London, UK, Jul 11-12.



Selin Aydin: **Tool-supported Development of ML Prototypes.**
APSEC 2024, Chongqing, China, Dec 3-6.

Nils Wild: **Expectation-Based Integration Testing of Unidirectional Interactions in Component-Based Software Systems.**
ENASE 2024, Angers, France, Apr 28-29.

Expectation-Based Integration Testing
of Unidirectional Interactions in
Component-Based Software Systems



Nils Wild
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UNIVERSITY

PUBLICATIONS

Nils Wild, Horst Lichter, Constantin Mensendiek (2024): [Expectation-Based Integration Testing of Unidirectional Interactions in Component-Based Software Systems](#). In Hermann Kaindl, Mike Mannion, Leszek Maciaszek (eds.) 19th International Conference on Evaluation of Novel Approaches to Software Engineering (ENASE 2024), Angers, France, Apr 28-29, SCITEPRESS – Science and Technology Publications, Lda, ISBN 978-989-758-696-5, 202-213.

Horst Lichter, Nils Wild, Thanwadee Sunetnanta, Toni Anwar (2024): [Report on the 12th International Workshop on Quantitative Approaches to Software Quality](#). In 12th International Workshop on Quantitative Approaches to Software Quality (QuASoQ 2024), Chongqing, China, Dec 3, CEUR-WS.org, CEUR Workshop Proceedings, Vol. 3864, 1–3.

Christian Plewnia, Horst Lichter (2024): [CICO2e: A Compute Carbon Footprint Estimation Tool Based on Time Series Data](#). In Kohei Arai (ed.) Intelligent Computing. SAI 2024. Proceedings of the 2024 Computing Conference, Volume 2, London, United Kingdom, Jul 11-12, Springer Nature Switzerland, Cham, Lecture Notes in Networks and Systems, Vol. 1017, ISBN 978-3-031-62277-9, 39-55.

Horst Lichter, Nils Wild, Thanwadee Sunetnanta, Toni Anwar (eds.) (2024): [Proceedings of the 12th International Workshop on Quantitative Approaches to Software Quality \(QuASoQ 2024\)](#). CEUR-WS.org, CEUR Workshop Proceedings, Vol. 3864, ISSN 1613-0073, Chongqing, China, Dec 3.

Miguel Perez, Selin Aydin, Horst Lichter (2024): [A Flexible Cell Classification for ML Projects in Jupyter Notebooks](#). In Computing Research Repository (CoRR), Vol. 2403.

Ada Slupczynski, Peter Alexander, Horst Lichter (2024): [Defining and Evaluating Prudence and Recklessness of Enterprise Architecture Debt](#). In Joaquim Filipe, Michal Smialek, Alexander Brodsky, Slimane Hammoudi (eds.) Enterprise Information Systems - 25th International Conference on Enterprise Information Systems, Revised Selected Papers, Part II, Prague, Czech Republic, Apr 24-26, Springer Nature Switzerland, Lecture Notes in Business Information Processing, Vol. 519, ISBN 978-3-031-64754-3, 1-25.

Ada Slupczynski, Simon Hacks (2024): [Towards a Knowledge Base of Terms on Enterprise Architecture Debt](#). In Tiago Sales, Sybren Kinderen, Henderik Proper, Luise Pufahl, Dimka Karastoyanova, Marten Sinderen (eds.) Enterprise Design, Operations, and Computing - EDOC 2023 Workshops, Nov 30, Springer Nature Switzerland, Cham, ISBN 978-3-031-54712-6, 194-210.

Timo Langstrof, Alex Sabau (2024): [The current state of security - Insights from the German software industry](#). In Computing Research Repository (CoRR), Vol. 2402.

Selin Aydin, Horst Lichter (2024): [Tool-supported Development of ML Prototypes](#). In 31st Asia-Pacific Software Engineering Conference (APSEC 2024), Chongqing, China, Dec 3-6, IEEE Computer Society.

Sana Khurram, Alex Sabau, Sansiri Tanachutiwat, Horst Lichter (2024): [Scenario-based synthetic traffic generation for web applications using workload patterns](#). In 6th Asia Pacific Information Technology Conference (APIT 2024), Bangkok, Thailand, Jan 29-31, Association for Computing Machinery, New York, NY, USA, ISBN 9798400716218, 22–30.

PUBLICATIONS

Selin Aydin, Dennis Mertens, Ouyu Xu (2024): [An Automated Evaluation Approach for Jupyter Notebook Code Cell Recommender Systems](#) In 12th Workshop on Quantitative Approaches to Software Quality (QuASoQ 2024): co-located with APSEC 2024, Chongqing, China, Dec 3, CEUR-WS.org, CEUR Workshop Proceedings, Vol. 3864, 4-11.

Alex Sabau (2024): [A Guided Modeling Approach for Secure System Design](#). In 2024 IEEE 21st International Conference on Software Architecture Companion (ICSA-C), Hyderabad, India, Jun 4-8, IEEE, 105-110.