Dr. André Bauer

University of Chicago

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RESEARCH INTEREST

My research aims to expand the potential of data science in scientific computing. To this end, my research contributes to key aspects of developing intuitive, efficient, and sustainable data science solutions across disciplines and domains.

ACADEMIC CAREER

Argonne National Laboratory *Lemont, United States*
ASSOCIATED RESEARCHER *since January 2023*

University of Chicago *Chicago, United States*
POSTDOCTORAL SCHOLAR (PROF. IAN FOSTER) *since November 2022*

University of Würzburg *Würzburg, Germany*
RESEARCH GROUP LEADER (PROF. SAMUEL KOUNEV) *January 2021 — October 2022*

University of Würzburg *Würzburg, Germany*
RESEARCH ASSISTANT *October 2016 — December 2020*

SCHOOL & ACADEMIC EDUCATION

University of Würzburg *Würzburg, Germany*
DR. RER. NAT. (COMPUTER SCIENCE) *October 2016 — December 2020*
- **Dissertation** "Automated Hybrid Time Series Forecasting: Design, Benchmarking, and Use Cases"
- **Advisor** Prof. Dr. Samuel Kounev
- **Grade** Summa cum laude (1.0) — *Defense December 22, 2020*

University of Würzburg *Würzburg, Germany*
MASTER OF SCIENCE IN COMPUTER SCIENCE *October 2014 — September 2016*

Blekinge Institute of Technology *Karlskrona, Sweden*
SEMESTER ABROAD (ERASMUS PROGRAM) *August 2015 — January 2016*

University of Würzburg *Würzburg, Germany*
BACHELOR OF SCIENCE IN COMPUTER SCIENCE *October 2012 — October 2014*

AWARDS & SCHOLARSHIPS

GAIN Participation Grant, German Academic International Network *Bonn, Germany*
The GAIN conference connects internationally mobile German scientists with representatives from the scientific community, politics, and industry. *May 2023*

2023 SPECtacular Award, Standard Performance Evaluation Corporation (SPEC) *Gainesville, United States*
The SPECtacular Award is given to individuals who have significantly exceeded expectations in their contributions to SPEC. *February 2023*

Leadership Academy Fellowship, German Scholars Organization *Berlin, Germany*
The Leadership Academy Fellowship is awarded to 25 outstanding researchers from all disciplines. *January 2023*

SPEC Kaivalya Dixit Distinguished Dissertation Award, SPEC *Gainesville, United States*
The SPEC Kaivalya Dixit Distinguished Dissertation Award is an annual award recognizing one outstanding doctoral dissertation within the scope of the SPEC Research Group in terms of scientific originality, scientific significance, practical relevance, impact, and presentation. *April 2022*

Distinguished Dissertation Award, Faculty of Mathematics and Computer Science *Würzburg, Germany*
The Distinguished Dissertation Award is an annual award for outstanding dissertations from the Faculty of Mathematics and Computer Science. *July 2021*

Dissertation Award, Unterfränkische Gedenkjahrstiftung für Wissenschaft *Würzburg, Germany*
The Dissertation Award is an annual award for outstanding dissertations from all disciplines. *May 2021*

Summa cum laude, University of Würzburg *Würzburg, Germany*
Grading of the doctoral thesis 'Automated Hybrid Time Series Forecasting: Design, Benchmarking, and Use Cases". *December 2020*

Winner of the FameLab State of Bavaria final, British Council
Regensburg, Germany
March 2020
In this science communication competition, researchers must present their work in three minutes in an understandable and humorous way.

Sokrates/Erasmus Grant, University of Würzburg
Würzburg, Germany
August 2015 — January 2016
Mobility grant for a semester abroad in Sweden.

Deutschlandstipendium, University of Würzburg
Würzburg, Germany
October 2014 — September 2015
The Deutschlandstipendium supports talented and high-achieving students, taking into account not only first-class grades but also social commitment and special personal achievements.

Heinrich-Thein Award, Heinrich-Thein-Stiftung
Haßfurt, Germany
November 2009
Award for talented students pursuing the "second-chance education".

Funding

Google Research Grant ($1,000), Google
March 2023
Acquisition of Google Cloud credits for the project "Performance Analysis and Prediction of Microservices in Cloud Environments".

DFG Research Grant ($347,235), Deutsche Forschungsgemeinschaft e.V.
January 2023
Applicant and PI for the project "MINERVA: Performance Prediction of Microservice Applications with Black-box Container Orchestration", starting in October 2023, with a project duration of 3 years.

Industrial project, DATEV eG
May 2022
Assistance for the extension of the project "Self-Configuring Autoscaler" ($30,068), with a project duration of 3 months.

Industrial project, DATEV eG
July 2021
Assistance with the application of the project "Self-Configuring Autoscaler" ($71,200), with a project duration of 6 months.

Normalverfahren Grant 2021 ($3,234), Universitätsbund Würzburg
April 2021
Acquisition of the Normalverfahren Grant for the project "Prediction of Winter Mortality of Bee Colonies Using Machine Learning".

Selected Publications (74 total)

A. Bauer, T. Dittus, M. Straesser, A. Kamatar, M. Baughman, L. Beierlieb, M. Hadry, D. Grillmeyer, Y. Lubas, S. Kounev, I. Foster, and K. Chard. "Unveiling Temporal Performance Deviation: Leveraging Clustering in Microservices Performance Analysis". In: *Companion of the 15th ACM/SPEC International Conference on Performance Engineering (ICPE)*. 2024.

A. Bauer, H. Pan, R. Chard, Y. Babuji, J. Bryan, D. Tiwari, I. Foster, and K. Chard. "The Globus Compute Dataset: An Open Function-as-a-Service Dataset From the Edge to the Cloud". In: *Future Generation Computer Systems* 153 (2024).

A. Bauer, M. Straesser, M. Leznik, L. Beierlieb, M. Hadry, N. Hudson, K. Chard, S. Kounev, and I. Foster. "Searching for the Ground Truth: Assessing the Similarity of Benchmarking Runs". In: *Companion of the 14th ACM/SPEC International Conference on Performance Engineering (ICPE)*. 2023.

M. Straesser, **A. Bauer**, R. Leppich, N. Herbst, K. Chard, I. Foster, and S. Kounev. "An Empirical Study of Container Image Configurations and Their Impact on Start Times". In: *Proceedings of the 23rd IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CCGRID)*. 2023.

A. Bauer, M. Züfle, S. Eismann, J. Grohmann, N. Herbst, and S. Kounev. "Libra: A Benchmark for Time Series Forecasting Methods". In: *Proceedings of the 12th ACM/SPEC International Conference on Performance Engineering (ICPE)*. 2021.

A. Bauer, M. Züfle, N. Herbst, A. Zehe, A. Hotho, and S. Kounev. "Time Series Forecasting for Self-Aware Systems". In: *Proceedings of the IEEE* 108.7 (2020).

A. Bauer, M. Züfle, N. Herbst, S. Kounev, and V. Curtef. "Telescope: An Automatic Feature Extraction and Transformation Approach for Time Series Forecasting on a Level-Playing Field". In: *Proceedings of the 36th IEEE International Conference on Data Engineering (ICDE)*. 2020.

A. Bauer, M. Züfle, J. Grohmann, N. Schmitt, N. Herbst, and S. Kounev. "An Automated Forecasting Framework based on Method Recommendation for Seasonal Time Series". In: *Proceedings of the 11th ACM/SPEC International Conference on Performance Engineering (ICPE)*. 2020.

A. Bauer, V. Lesch, L. Versluis, A. Ilyushkin, N. Herbst, and S. Kounev. "Chamulteon: Coordinated Auto-Scaling of Micro-Services". In: *Proceedings of the 39th IEEE International Conference on Distributed Computing Systems (ICDCS)*. 2019.

A. Bauer, N. Herbst, S. Spinner, A. Ali-Eldin, and S. Kounev. "Chameleon: A Hybrid, Proactive Auto-Scaling Mechanism on a Level-Playing Field". In: *IEEE Transactions on Parallel and Distributed Systems (TPDS)* 30.4 (2018).

SCIENCE COMMUNICATION COMPETITIONS

1st South Side Science Festival Science Slam — *Chicago, USA*
UNIVERSITY OF CHICAGO — *September 2023*

6th GAIN Science Slam — *Boston, USA*
GERMAN ACADEMIC INTERNATIONAL NETWORK — *August 2023*

21st Stuttgart Science Slam — *Stuttgart, Germany*
LUUPS — *October 2022*

FameLab State of Bavaria final — *Regensburg, Germany*
BRITISH COUNCIL — *March 2021*

6th Alumni-Science Slam — *Würzburg, Germany*
UNIVERSITY OF WÜRZBURG — *November 2020*

FameLab German final — *Bielefeld, Germany*
BRITISH COUNCIL — *May 2020*

FameLab State of Bavaria final — *Regensburg, Germany*
BRITISH COUNCIL — *March 2020*

14th Munich Science Slam — *Munich, Germany*
LUUPS — *February 2020*

33rd Dortmund Science Slam — *Dortmund, Germany*
LUUPS — *November 2019*

INVITED TALKS

Academic Success: Navigating your Journey — *Chicago, US*
UNIVERSITY OF CHICAGO — *February 2024*

Smart Infrastructure Management: Navigating Efficiency in Scientific Computing — *Chicago, US*
ILLINOIS INSTITUTE OF TECHNOLOGY — *November 2023*

Why Auto-Scaling Still Matters — *Chicago, US*
DEPAUL UNIVERSITY — *October 2023*

Towards an Intelligent Infrastructure for Data Science Clouds — *Edmonton, Canada*
CHALMERS UNIVERSITY OF TECHNOLOGY — *May 2023*

Autonomous Data Analytic Clouds — *Gothenburg, Sweden*
CHALMERS UNIVERSITY OF TECHNOLOGY — *February 2023*

A Short Overview of Auto-Scaling & Why It Is Not Yet Solved — *Virtual meeting*
MONGODB — *April 2022*

Measuring Energy-Efficiency in Digital Systems — *Potsdam, Germany*
HASSO-PLATTNER-INSTITUT — *March 2022*

TEACHING ACTIVITIES

Distributed Systems, University of Chicago — *Chicago, United States*
Co-Lecturer with Prof. Kyle Chard of this master's course (English). — *September 2023 — December 2023*

Time Series Analysis and Forecasting, University of Würzburg — *Würzburg, Germany*
Lecturer of this self-created master's course (English). — *April 2022 — September 2022*

Advance Programming, University of Würzburg — *Würzburg, Germany*
Co-Lecturer with Prof. Samuel Kounev of this master's course (English). — *October 2021 — March 2022*

Computer Science: Getting Started, University of Würzburg — *Würzburg, Germany*
Co-Lecturer with Prof. Samuel Kounev of this bachelor's course (German). — *April 2021 — September 2021*

Operating Systems, University of Würzburg *Würzburg, Germany*

Co-Lecturer with Dr. Nikolas Herbst of this bachelor's/master's course (German). *October 2020 — March 2021*

Software-Engineering Seminar, University of Würzburg *Würzburg, Germany*

Instructor of this bachelor's/master's course (German). *October 2016 — March 2021*

Operating Systems (Exercise), University of Würzburg *Würzburg, Germany*

Coordinator & instructor of this bachelor's/master's course (German). *October 2016 — March 2021*

Practical Course in Software, University of Würzburg *Würzburg, Germany*

Coordinator & instructor of this bachelor's course (German). *October 2016 — September 2020*

ACADEMIC SERVICE

Organization committee

- The International Conference on Performance Engineering 2024 (Data Challenge) *since July 2024*
- The International Conference on Performance Engineering 2024 (Posters and Demos) *August 2023 — May 2024*
- The Second International Workshop on Performance-Data Analytics and Data-Management *October 2022 — February 2023*
- The First International Workshop on Performance-Data Analytics and Data-Management *October 2021 — April 2022*

Program committee

- Symposium on Software Performance 2024 *since July 2024*
- International Conference on Performance Engineering 2025 *since June 2024*
- eScience 2024 *since April 2024*
- Int'l Conference on Autonomic Computing and Self-Organizing Systems 2024 *since March 2024*
- International conference on Time Series and Forecasting 2024 *January 2024 — July 2024*
- International Conference on Performance Engineering 2024 *December 2023 — May 2024*
- International Symposium on Cluster, Cloud and Internet Computing 2024 *November 2023 — May 2024*
- International conference on Data Science Technology and Applications 2024 *November 2023 — June 2024*
- International Conference on Cloud Computing and Services Science 2024 *August 2023 — May 2024*
- International Conference on Utility and Cloud Computing 2024 *July 2023 — December 2023*
- Symposium on Software Performance 2023 *June 2023 — November 2023*
- Int'l Conference on Autonomic Computing and Self-Organizing Systems 2023 (Posters and Demos) *May 2023 — September 2023*
- International Conference on Data Science Technology and Applications 2023 *March 2023 — July 2023*
- International Conference on Time Series and Forecasting 2023 *February 2023 — July 2023*
- International Symposium on Cluster, Cloud and Internet Computing 2023 *November 2022 — May 2023*
- International Conference on Utility and Cloud Computing 2022 *June 2022 — December 2022*
- Int'l Conference on Autonomic Computing and Self-Organizing Systems 2022 (Posters and Demos) *June 2022 — September 2022*
- Symposium on Software Performance 2022 *April 2022 — November 2022*
- International conference on Time Series and Forecasting 2022 *April 2022 — July 2022*
- International Conference on Performance Engineering 2020 (Artefact Evaluation) *March 2019 — April 2020*
- Workshop on Evaluations and Measurements in Self-Aware Computing Systems 2019 *January 2019 — June 2019*

Publicity chair

- International Conference on Performance Engineering 2020 *November 2018 — April 2020*
- Workshop on Evaluations and Measurements in Self-Aware Computing Systems 2019 *January 2019 — June 2019*

Standard Performance Evaluation Corporation

- Founder and chair of the SPEC RG Predictive Data Analytics Working Group *since June 2021*
- Elected editor of the annual SPEC RG newsletter *April 2017 — May 2023*
- Elected release manager of the SPEC RG Cloud Working Group *October 2018 — May 2021*

REVIEWING ACTIVITIES

Journals

- SoftwareX *February 2024*
- Journal of Grid Computing *November 2023*
- Transactions on Knowledge and Data Engineering *September 2023*
- Journal of Grid Computing *July 2023*
- Science of Computer Programming *July 2023*
- Transactions on Autonomous and Adaptive Systems *June 2023*
- Empirical Software Engineering *May 2023*
- Empirical Software Engineering *November 2022*
- Journal of Systems & Software *September 2022*
- Transactions on Cloud Computing *May 2021*
- Transactions on Services Computing *February 2020*
- Journal of Parallel and Distributed Computing *December 2019*
- Journal of Future Generation Computer Systems *March 2019*
- Transactions on Network and Service Management *November 2018*
- Journal of Systems and Software *March 2018*

Conferences

- eScience 2024 *July 2024*
- Int'l Conference on Autonomic Computing and Self-Organizing Systems 2024 *June 2024*
- International conference on Data Science Technology and Applications 2024 *April 2024*
- International Symposium on Cluster, Cloud and Internet Computing 2024 *March 2024*
- International Conference on Cloud Computing and Services Science 2024 *February 2024*
- International Conference on Time Series and Forecasting 2024 *February 2024*
- International Conference on Performance Engineering 2024 *December 2023*
- International Conference on Utility and Cloud Computing 2023 *October 2023*
- Symposium on Software Performance 2023 *September 2023*
- Int'l Conference on Autonomic Computing and Self-Organizing Systems 2023 *July 2022*
- International Conference on Time Series and Forecasting 2023 *March 2022*
- International Symposium on Cluster, Cloud and Internet Computing 2023 *January 2023*
- International Conference on Utility and Cloud Computing 2022 *October 2022*
- Symposium on Software Performance 2022 *September 2022*
- International Conference on Time Series and Forecasting 2022 *April 2022*
- International Conference on Distributed Computing Systems 2021 *February 2021*
- International Symposium on Software Engineering for Adaptive and Self-Managing Systems 2020 *February 2020*
- International Conference on Performance Engineering 2020 *November 2019*
- International Middleware Conference 2019 *June 2019*
- International Conference on Utility and Cloud Computing 2018 *September 2018*
- International Conference on Self-Adaptive and Self-Organizing Systems 2018 *May 2018*
- International Symposium on Software Engineering for Adaptive and Self-Managing Systems 2018 *February 2018*
- International Conference on Dependable Systems and Networks 2018 *January 2018*
- International Conference on Performance Engineering 2018 *November 2017*
- International Conference on Self-Adaptive and Self-Organizing Systems 2017 *June 2017*
- Symposium on Modelling, Analysis, and Simulation of Computer and Telecommunication Systems 2017 *May 2017*
- International Symposium on Software Engineering for Adaptive and Self-Managing Systems 2017 *February 2017*
- International Conference on Software Engineering 2017 *January 2017*
- International Conference on Performance Engineering 2017 *November 2016*

CERTIFICATES

Certificate of Leadership – Smart Skills National Postdoctoral Association *January 2024*

Certificate Leadership University of Würzburg *October 2022*

Certificate Academic Teaching – State of Bavaria University of Würzburg *November 2020*

Certificate Academic Teaching – University of Würzburg University of Würzburg *December 2019*

VOLUNTARY ACTIVITIES

Pen Pal Program *Chicago, United States*

OFFICE OF DIVERSITY AND INCLUSION UNIVERSITY OF CHICAGO *since February 2023*

Mentoring for students *Würzburg, Germany*

ALUMNIVEREIN UNIVERSITY OF WÜRZBURG *November 2019 — October 2022*

Supervision of scouts *Würzburg, Germany*

SCHWARZER HAUFEN WÜRZBURG (BdP E.V.) *July 2019 — February 2020*

Volunteer tutoring *Würzburg, Germany*

NACHBARSCHAFTSHILFE GROMBÜHL *September 2013 — September 2014*

Student council *Schweinfurt, Germany*

FRIEDRICH-FISCHER SCHULE *September 2010 — August 2011*

Volunteer fire brigade *Horhausen, Germany*

FFW HORHAUSEN E.V. *April 2003 — August 2009*

LANGUAGES

German Mother tongue

English Fluent