

# Dr. André Bauer

University of Chicago

✉ andré.bauer@uchicago.edu | 🌐 <https://bauer-research.net>

## 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

ASSOCIATED RESEARCHER

*Lemont, United States*

*since January 2023*

### University of Chicago

POSTDOCTORAL SCHOLAR (PROF. IAN FOSTER)

*Chicago, United States*

*since November 2022*

### University of Würzburg

RESEARCH GROUP LEADER (PROF. SAMUEL KOUNEV)

*Würzburg, Germany*

*January 2021 — October 2022*

### University of Würzburg

RESEARCH ASSISTANT

*Würzburg, Germany*

*October 2016 — December 2020*

## SCHOOL & ACADEMIC EDUCATION

### University of Würzburg

DR. RER. NAT. (COMPUTER SCIENCE)

*Würzburg, Germany*

*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

MASTER OF SCIENCE IN COMPUTER SCIENCE

*Würzburg, Germany*

*October 2014 — September 2016*

### Blekinge Institute of Technology

SEMESTER ABROAD (ERASMUS PROGRAM)

*Karlskrona, Sweden*

*August 2015 — January 2016*

### University of Würzburg

BACHELOR OF SCIENCE IN COMPUTER SCIENCE

*Würzburg, Germany*

*October 2012 — October 2014*

## AWARDS & SCHOLARSHIPS

### GAIN Participation Grant, German Academic International Network

The GAIN conference connects internationally mobile German scientists with representatives from the scientific community, politics, and industry.

*Bonn, Germany*

*May 2023*

### 2023 SPECtacular Award, Standard Performance Evaluation Corporation (SPEC)

The SPECtacular Award is given to individuals who have significantly exceeded expectations in their contributions to SPEC.

*Gainesville, United States*

*February 2023*

### Leadership Academy Fellowship, German Scholars Organization

The Leadership Academy Fellowship is awarded to 25 outstanding researchers from all disciplines.

*Berlin, Germany*

*January 2023*

### SPEC Kaivalya Dixit Distinguished Dissertation Award, SPEC

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.

*Gainesville, United States*

*April 2022*

### Distinguished Dissertation Award, Faculty of Mathematics and Computer Science

The Distinguished Dissertation Award is an annual award for outstanding dissertations from the Faculty of Mathematics and Computer Science.

*Würzburg, Germany*

*July 2021*

### Dissertation Award, Unterfränkische Gedenkjahrstiftung für Wissenschaft

The Dissertation Award is an annual award for outstanding dissertations from all disciplines.

*Würzburg, Germany*

*May 2021*

**Summa cum laude, University of Würzburg**

Grading of the doctoral thesis ‘Automated Hybrid Time Series Forecasting: Design, Benchmarking, and Use Cases’.

Würzburg, Germany

December 2020

**Winner of the FameLab State of Bavaria final, British Council**

In this science communication competition, researchers must present their work in three minutes in an understandable and humorous way.

Regensburg, Germany

March 2020

**Sokrates/Erasmus Grant, University of Würzburg**

Mobility grant for a semester abroad in Sweden.

Würzburg, Germany

August 2015 — January 2016

**Deutschlandstipendium, University of Würzburg**

The Deutschlandstipendium supports talented and high-achieving students, taking into account not only first-class grades but also social commitment and special personal achievements.

Würzburg, Germany

October 2014 — September 2015

**Heinrich-Thein Award, Heinrich-Thein-Stiftung**

Award for talented students pursuing the “second-chance education”.

Haßfurt, Germany

November 2009

## FUNDING

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**Google Research Grant (\$1,000), Google**

Acquisition of Google Cloud credits for the project “Performance Analysis and Prediction of Microservices in Cloud Environments”.

March 2023

**DFG Research Grant (\$347,235), Deutsche Forschungsgemeinschaft e.V.**

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.

January 2023

**Industrial project, DATEV eG**

Assistance for the extension of the project “Self-Configuring Autoscaler” (\$30,068), with a project duration of 3 months.

May 2022

**Industrial project, DATEV eG**

Assistance with the application of the project “Self-Configuring Autoscaler” (\$71,200), with a project duration of 6 months.

July 2021

**Normalverfahren Grant 2021 (\$3,234), Universitätsbund Würzburg**

Acquisition of the Normalverfahren Grant for the project “Prediction of Winter Mortality of Bee Colonies Using Machine Learning”.

April 2021

## SELECTED PUBLICATIONS (61 TOTAL)

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**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. V. Papadopoulos, L. Versluis, **A. Bauer**, N. Herbst, J. von Kistowski, A. Ali-Eldin, C. Abad, J. N. Amaral, P. Tuma, and A. Iosup. “Methodological Principles for Reproducible Performance Evaluation in Cloud Computing”. In: *IEEE Transactions on Software Engineering (TSE)* 47.8 (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

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### 1st South Side Science Festival Science Slam

UNIVERSITY OF CHICAGO

Chicago, USA

September 2023

### 6th GAIN Science Slam

GERMAN ACADEMIC INTERNATIONAL NETWORK

Boston, USA

August 2023

### 21st Stuttgart Science Slam

LUUPS

Stuttgart, Germany

October 2022

### FameLab State of Bavaria final

BRITISH COUNCIL

Regensburg, Germany

March 2021

### 6th Alumni-Science Slam

UNIVERSITY OF WÜRZBURG

Würzburg, Germany

November 2020

### FameLab German final

BRITISH COUNCIL

Bielefeld, Germany

May 2020

### FameLab State of Bavaria final

BRITISH COUNCIL

Regensburg, Germany

March 2020

### 14th Munich Science Slam

LUUPS

Munich, Germany

February 2020

### 33rd Dortmund Science Slam

LUUPS

Dortmund, Germany

November 2019

## INVITED TALKS

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### Smart Infrastructure Management: Navigating Efficiency in Scientific Computing

ILLINOIS INSTITUTE OF TECHNOLOGY

Chicago, US

November 2023

### Why Auto-Scaling Still Matters

DEPAUL UNIVERSITY

Chicago, US

October 2023

### Towards an Intelligent Infrastructure for Data Science Clouds

CHALMERS UNIVERSITY OF TECHNOLOGY

Edmonton, Canada

May 2023

### Autonomous Data Analytic Clouds

CHALMERS UNIVERSITY OF TECHNOLOGY

Gothenburg, Sweden

February 2023

### A Short Overview of Auto-Scaling & Why It Is Not Yet Solved

MONGODB

Virtual meeting

April 2022

### Measuring Energy-Efficiency in Digital Systems

HASSO-PLATTNER-INSTITUT

Potsdam, Germany

March 2022

## TEACHING ACTIVITIES

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### Distributed Systems, University of Chicago

Co-Lecturer with Prof. Kyle Chard of this master's course (English).

Chicago, United States

since September 2023

### Time Series Analysis and Forecasting, University of Würzburg

Lecturer of this self-created master's course (English).

Würzburg, Germany

April 2022 — September 2022

### Advance Programming, University of Würzburg

Co-Lecturer with Prof. Samuel Kounev of this master's course (English).

Würzburg, Germany

October 2021 — March 2022

### Computer Science: Getting Started, University of Würzburg

Co-Lecturer with Prof. Samuel Kounev of this bachelor's course (German).

Würzburg, Germany

April 2021 — September 2021

## **Operating Systems, University of Würzburg**

Co-Lecturer with Dr. Nikolas Herbst of this bachelor's/master's course (German).

*Würzburg, Germany*

*October 2020 — March 2021*

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

Instructor of this bachelor's/master's course (German).

*Würzburg, Germany*

*October 2016 — March 2021*

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

Coordinator & instructor of this bachelor's/master's course (German).

*Würzburg, Germany*

*October 2016 — March 2021*

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

Coordinator & instructor of this bachelor's course (German).

*Würzburg, Germany*

*October 2016 — September 2020*

## **ACADEMIC SERVICE**

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### **Organization committee**

- The International Conference on Performance Engineering 2024 (Posters and Demos)
- The Second International Workshop on Performance-Data Analytics and Data-Management
- The First International Workshop on Performance-Data Analytics and Data-Management

*since August 2023*

*October 2022 — February 2023*

*October 2021 — April 2022*

### **Program committee**

- International conference on Time Series and Forecasting 2024
- International Conference on Performance Engineering 2024
- International Symposium on Cluster, Cloud and Internet Computing 2024
- International conference on Data Science Technology and Applications 2024
- International Conference on Cloud Computing and Services Science 2024
- International Conference on Utility and Cloud Computing 2024
- Symposium on Software Performance 2023
- Int'l Conference on Autonomic Computing and Self-Organizing Systems 2023 (Posters and Demos)
- International Conference on Data Science Technology and Applications 2023
- International Conference on Time Series and Forecasting 2023
- International Symposium on Cluster, Cloud and Internet Computing 2023
- International Conference on Utility and Cloud Computing 2022
- Int'l Conference on Autonomic Computing and Self-Organizing Systems 2022 (Posters and Demos)
- Symposium on Software Performance 2022
- International conference on Time Series and Forecasting 2022
- International Conference on Performance Engineering 2020 (Artefact Evaluation)
- Workshop on Evaluations and Measurements in Self-Aware Computing Systems 2019

*since January 2024*

*since December 2023*

*since November 2023*

*since November 2023*

*since August 2023*

*since July 2023*

*June 2023 — November 2023*

*May 2023 — September 2023*

*March 2023 — July 2023*

*February 2023 — July 2023*

*November 2022 — May 2023*

*June 2022 — December 2022*

*June 2022 — September 2022*

*April 2022 — November 2022*

*April 2022 — July 2022*

*March 2019 — April 2020*

*January 2019 — June 2019*

### **Publicity chair**

- International Conference on Performance Engineering 2020
- Workshop on Evaluations and Measurements in Self-Aware Computing Systems 2019

*November 2018 — April 2020*

*January 2019 — June 2019*

### **Standard Performance Evaluation Corporation**

- Founder and chair of the SPEC RG Predictive Data Analytics Working Group
- Elected editor of the annual SPEC RG newsletter
- Elected release manager of the SPEC RG Cloud Working Group

*since June 2021*

*April 2017 — May 2023*

*October 2018 — May 2021*

## **REVIEWING ACTIVITIES**

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### **Journals**

- SoftwareX
- Journal of Grid Computing
- Transactions on Knowledge and Data Engineering
- Journal of Grid Computing
- Science of Computer Programming
- Transactions on Autonomous and Adaptive Systems
- Empirical Software Engineering
- Empirical Software Engineering
- Journal of Systems & Software
- Transactions on Cloud Computing
- Transactions on Services Computing
- Journal of Parallel and Distributed Computing
- Journal of Future Generation Computer Systems
- Transactions on Network and Service Management
- Journal of Systems and Software

*February 2024*

*November 2023*

*September 2023*

*July 2023*

*July 2023*

*June 2023*

*May 2023*

*November 2022*

*September 2022*

*May 2021*

*February 2020*

*December 2019*

*March 2019*

*November 2018*

*March 2018*

### **Conferences**

- 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

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<b>Certificate of Leadership – Smart Skills</b> National Postdoctoral Association	January 2024
<b>Certificate Leadership</b> University of Würzburg	October 2022
<b>Certificate Academic Teaching – State of Bavaria</b> University of Würzburg	November 2020
<b>Certificate Academic Teaching – University of Würzburg</b> University of Würzburg	December 2019

## VOLUNTARY ACTIVITIES

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<b>Pen Pal Program</b>	Chicago, United States
OFFICE OF DIVERSITY AND INCLUSION UNIVERSITY OF CHICAGO	since February 2023
<b>Mentoring for students</b>	Würzburg, Germany
ALUMNIVEREIN UNIVERSITY OF WÜRZBURG	November 2019 — October 2022
<b>Supervision of scouts</b>	Würzburg, Germany
SCHWARZER HAUFEN WÜRZBURG (BDP E.V.)	July 2019 — February 2020
<b>Volunteer tutoring</b>	Würzburg, Germany
NACHBARSCHAFTSHILFE GROMBÜHL	September 2013 — September 2014
<b>Student council</b>	Schweinfurt, Germany
FRIEDRICH-FISCHER SCHULE	September 2010 — August 2011
<b>Volunteer fire brigade</b>	Horhausen, Germany
FFW HORHAUSEN E.V.	April 2003 — August 2009

## LANGUAGES

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**German** Mother tongue  
**English** Fluent