Adrian Kulmburg, Ph.D. Student

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Education

2020 – **Ph.D., Technical University of Munich (TUM),** Germany.
Supervisor: Prof. Dr. Matthias Althoff

2018 – 2019 **B.Sc. Physics, Federal Institute of Technology (ETH)** of Zurich, Switzerland.
Focus: Quantum Mechanics and Astrophysics.

2017 – 2018 **M.Sc. Mathematics, Federal Institute of Technology (ETH)** of Zurich, Switzerland.
Thesis title: *Viscosity Solutions for Generalized Level-Set Flows*.
Supervisor: Prof. Dr. Michael Struwe

2013 – 2017 **B.Sc. Mathematics, Federal Institute of Technology (ETH)** of Zurich, Switzerland.
Thesis title: *Tunnel's theorem for congruent numbers*.
Supervisor: Prof. Dr. Özlem Imamoglu

Research Publications

Journal Articles

- **A. Kulmburg**, "The Generalized Matrix Norm Problem," 2023, To appear in SIAM Journal on Matrix Analysis and Applications (SIMAX). arXiv: 2310.00605.
- M. Wetzlinger, **A. Kulmburg**, A. Le Penven, and M. Althoff, "Adaptive reachability algorithms for nonlinear systems using abstraction error analysis," *Nonlinear Analysis: Hybrid Systems*, vol. 46, p. 101 252, 2022. DOI: 10.1016/j.nahs.2022.101252.
- **A. Kulmburg** and M. Althoff, "On the co-NP-completeness of the zonotope containment problem," *European Journal of Control*, vol. 62, pp. 84–91, 2021. DOI: 10.1016/j.ejcon.2021.06.028.

Conference Proceedings

- **A. Kulmburg**, I. Brkan, and M. Althoff, "Search-based and stochastic solutions to the zonotope and ellipsotope containment problems," in *European Control Conference (ECC)*, To appear, 2024.
- M. Wetzlinger, **A. Kulmburg**, and M. Althoff, "Adaptive parameter tuning for reachability analysis of nonlinear systems," in *Proceedings of the 24th International Conference on Hybrid Systems: Computation and Control*, Association for Computing Machinery, 2021. DOI: 10.1145/3447928.3456643.

Under Review

- **A. Kulmburg**, L. Schäfer, and M. Althoff, "Approximability of the Containment Problem for Zonotopes and Ellipsotopes," 2024. arXiv: 2404.11185.

Teaching

Lectures

2021 – 2023 **Main Organizer.** Technical University of Munich (TUM), Germany.
Orchestrated the logistics for the lecture *Techniques in Artificial Intelligence*.

Teaching (continued)

2020 – 2023 **Instructor.** Technical University of Munich (TUM), Germany.
Organized the Logic section of the lecture *Techniques in Artificial Intelligence*.

2015 & 2019 **Teaching Assistant.** Federal Institute of Technology (ETH) of Zurich, Switzerland.
Prepared and held exercise sessions for the lecture *Numerical Methods*.

Student Projects

2021 – 2023 **Seminar – Cyber-Physical Systems,** advising students on literature research.

Practical course – Verification, Controller Synthesis, and Design of Cyber-Physical Systems, advising students on programming projects.

Student Theses Supervision

2020 – **Master theses,** two at Technical University of Munich (TUM), Germany.

2020 – **Bachelor theses,** four at Technical University of Munich (TUM), Germany.

2020 – **Guided research,** one at Technical University of Munich (TUM), Germany.

Employment History

2011 & 2012 **Summer Internship,** Hoffmann-La Roche in Basel, Switzerland. Prepared the documentation of various molecular structures.

Skills

Languages French (native) – German (native) – English (fluent) – Russian (beginner)

Coding MATLAB (proficient) – LaTeX(proficient) – Python (proficient) – C (beginner) – C++ (beginner) – HTML/CSS (beginner)

Miscellaneous Experience

Initiatives

2021 – **Women in CS @ TUM,** student group working towards equal participation and support of women and other under-represented groups. Member since 2021, and co-team lead since 2023.

Awards

2013 **German Physical Society (DPG) Book Price** for exceptional performances in Physics.

Commitees & Organization

2022 – **Deputy Gender Equality Officer (GEO),** at Technical University of Munich.
Interview and selection process for associate professorships.

2022 **Summer CPS Workshop**, organization of a four-day workshop for CPS group in Sicily, Italy.

2021 **Summer CPS Workshop**, organization of a four-day workshop for CPS group at Lake Garda, Italy.