Abolfazl Lavaei, Prof. Dr.-Ing.

Assistant Professor

School of Computing
Newcastle University

Urban Sciences Building
Newcastle, NE4 5TG, United Kingdom

Phone: +44 191 208 7856
Email: abolfazl.lavaei@newcastle.ac.uk
Web: www.lavaei-cps.de

Brief Biography

My line of research focuses mainly on theoretical and practical aspects of "formal verification, learning and control of large-scale stochastic cyber-physical systems" with application to *Autonomous Systems*. My research interests revolve around the intersection of Control Theory, Computer Science, Machine Learning, Artificial Intelligence and Data Science.

Academic Positions/Degrees

Jul.'22 - Present **Assistant Professor** in School of Computing, Newcastle University, United Kingdom

Jan.'21 - Jul.'22 **Postdoctoral Associate** in Institute for Dynamic Systems and Control, ETH Zurich, Switzerland

Research topic: *Trustworthy Safety-Critical AI for Autonomous Vehicles*

Nov.'19 - Jan.'21 **Postdoctoral Researcher (Group Leader)** in Computer Science, Software and Computational Systems, Ludwig Maximilian University of Munich (LMU), Germany

Research topic: *Safe Learning and Control via Formal Methods and Data-Driven Optimization*

Nov.'16 - Nov.'19 **Ph.D.** in Electrical Engineering, Hybrid Systems & Control, Technical University of Munich (TUM), Germany

Dissertation: *Automated Verification and Control of Large-Scale Stochastic Cyber-Physical Systems: Compositional Techniques*

Nov.'16 - Nov.'19 **Scientific Researcher** in Munich Aerospace & German Aerospace Center (DLR), Autonomous Flight Research Group, Germany

Research topic: *Certifiable Autonomy in Unmanned Aerial Vehicles (UAVs)*

May'19 - Aug.'19 **Visiting Researcher** in Delft Center for Systems and Control (DCSC), Delft University of Technology (TUD), The Netherlands

Research topic: *Formal Verification and Synthesis of Black-Box Stochastic Hybrid Systems via Data-Driven Optimization*

Host: Prof. Peyman Mohajerin Esfahani

Sep.'13 - Sep.'14 **M.Sc.** in Aerospace Engineering, Flight Dynamics & Control, University of Tehran, Iran

Thesis: *3D Constrained Optimal Motion Planning and Robust Tracking Control for a 6DoF Quadcopter*

Research Interests

- Cyber-Physical Systems
- Large-Scale Stochastic Networks
- Autonomous Vehicles
- Formal Learning & Control
- Trustworthy Autonomy & AI
- Data-Driven Optimization
- Advanced Software Development in C++/Python/OpenCL

Honors & Awards

2022 **Best Demo/Poster Award** at the *25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Milan, Italy.

2021 **Best Repeatability Prize** (as the co-first author and a mentor) at the *7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, Brussels, Belgium.

2020 **Best Demo/Poster Award** at the *23rd ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Sydney, Australia. **News: Munich Aerospace**

2019 Distinguished as **"highly-qualified scientists"** for *permanent residence of Germany* (**Niederlassungserlaubnis für Hochqualifizierte**).

2019 **IFAC Young Author Award Finalist**, at the *15th IFAC Symposium on Large-Scale Complex Systems: Theory and Applications (LSS)*, Delft, The Netherlands. **News: Munich Aerospace**

2016 Recipient of **Munich Aerospace Doctoral Scholarship**, Department of Electrical and Computer Engineering, *Technical University of Munich (TUM)*, Germany.

2016 Recipient of **University of Auckland Doctoral Scholarship**, Department of Electrical and Computer Engineering, *University of Auckland*, New Zealand.

2016 Recipient of **Concordia International Award of Excellence**, Department of Electrical and Computer Engineering, *Concordia University*, Canada.

2016 Admitted by **EDEE Doctoral Program Committee**, Department of Electrical Engineering, *École Polytechnique Fédérale De Lausanne (EPFL)*, Switzerland.

2016 Admitted by **Doctoral Program Committee**, Department of Mechanical Engineering, *University of Melbourne*, Australia.

2015 Recipient of **Departmental Prestigious Doctoral Fellowship**, Department of Mechanical and Aerospace Engineering, *University of California at San Diego (UCSD)*, United States.

2015 **Best Graduate Student Award** in *all fields of study* at Faculty of New Sciences and Technologies, *University of Tehran*, Iran.

2014 **First & Only Graduate Student Nationwide** who managed to receive a two-year Master of Science degree in *two semesters* **(one academic-year)** with the *full GPA* **(20 out of 20)**.

Advanced Software Development in "C++/OpenCL"

AMYTISS: PArallelized AutoMated Controller SYnthesis of Large-Scale STochastIc SystemS; An advanced software tool developed in C++/OpenCL that provides parallel automated controller synthesis for large-scale discrete-time stochastic control systems which is absolutely crucial in many safety-critical applications such as *autonomous driving*. This tool allows to:

(i) build finite Markov decision processes (MDPs) as finite abstractions of given original systems;

(ii) synthesize automated controllers for the constructed finite MDPs satisfying some high-level specifications (*e.g.,* safety, reachability & reach-avoid).

AMYTISS enjoys high-performance computing (HPC) platforms together with cloud-computing services to mitigate the problem of state-explosion which is always the case in analyzing large-scale stochastic systems. This tool significantly improves performances w.r.t. *memory usage* and *computation time* by parallel execution in different heterogeneous computing platforms including CPUs, GPUs and hardware accelerators (HWAs).

Publications

Preprints

[P7] **A. Lavaei** and E. Frazzoli, "Scalable Synthesis of Safety Controllers for Networks of Two-Player Stochastic Switched Games", *submitted for publication*, 2021.

[P6] **A. Lavaei** and E. Frazzoli, "Formal Synthesis of Finite MDPs for Stochastic Hybrid Systems", *submitted for publication*, 2021.

[P5] **A. Lavaei**, S. Soudjani, and E. Frazzoli, "A Compositional Dissipativity Approach for Data-Driven Safety Verification of Large-Scale Dynamical Systems", *submitted for publication*, 2021.

[P4] A. Salamati, **A. Lavaei**, S. Soudjani, and M. Zamani, "Data-Driven Verification and Synthesis of Stochastic Systems via Barrier Certificates", *submitted for publication*, 2021.

[P3] **A. Lavaei**, M. Perez, M. Kazemi, F. Somenzi, S. Soudjani, A. Trivedi, and M. Zamani, "Compositional Reinforcement Learning for Discrete-Time Stochastic Control Systems", *submitted for publication*, 2021.

[P2] A. Nejati, **A. Lavaei**, P. Jagtap, S. Soudjani, and M. Zamani, "Formal Verification of Unknown Discrete- and Continuous-Time Systems: A Data-Driven Approach", *submitted for publication*, 2021.

[P1] M. Anand, **A. Lavaei**, and M. Zamani, "Compositional Synthesis of Control Barrier Certificates for Networks of Stochastic Systems against ω-Regular Specifications", *submitted for publication*, 2021.

Journal Papers

[J21] **A. Lavaei**, S. Soudjani, E. Frazzoli, and M. Zamani, "Constructing MDP Abstractions using Data with Formal Guarantees", *IEEE Control Systems Letters*, vol. 7, pp. 460-465, 2022.

[J20] **A. Lavaei**, S. Soudjani, A. Abate, and M. Zamani, "Automated Verification and Synthesis of Stochastic Hybrid Systems: A Survey", *Automatica*, to appear as a survey paper, 2022.

[J19] **A. Lavaei** and E. Frazzoli, "Data-Driven Synthesis of Symbolic Abstractions with Guaranteed Confidence", *IEEE Control Systems Letters*, vol. 7, pp. 253-258, 2022.

[J18] A. Nejati, **A. Lavaei**, S. Soudjani, and M. Zamani, "Estimation of Infinitesimal Generators for Stochastic Hybrid Systems via Sampling: A Formal Approach", *IEEE Control Systems Letters*, vol. 7, pp. 223-228, 2022.

[J17] B. Zhong, **A. Lavaei**, M. Zamani, and M. Caccamo, "Automata-based Controller Synthesis for Stochastic Systems: A Game Framework via Approximate Probabilistic Relations", *Automatica*, to appear as a regular paper, 2022.

[J16] M. Anand*, **A. Lavaei***, and M. Zamani, "From Small-Gain Theory to Compositional Construction of Barrier Certificates for Large-Scale Stochastic Systems", *IEEE Transactions on Automatic Control*, 2022.

[J15] **A. Lavaei**, L. Di Lillo, A. Censi, and E. Frazzoli, "Formal Estimation of Collision Risks for Autonomous Vehicles: A Compositional Data-Driven Approach", *IEEE Transactions on Control of Network Systems*, to appear, 2022.

[J14] N. Jahanshahi, **A. Lavaei**, and M. Zamani, "Compositional Construction of Safety Controllers for Networks of Continuous-Space POMDPs", *IEEE Transactions on Control of Network Systems*, 2022.

[J13] **A. Lavaei** and M. Zamani, "From Dissipativity Theory to Compositional Synthesis of Large-Scale Stochastic Switched Systems", *IEEE Transactions on Automatic Control*, vol. 67, no. 9, pp. 4422-4437, 2022.

[J12] B. Zhong, **A. Lavaei**, H. Cao, M. Zamani, and M. Caccamo, "Safe-visor Architecture for Sandboxing (AI-based) Unverified Controllers in Stochastic Cyber-Physical Systems", *Nonlinear Analysis: Hybrid Systems*, **(Special Issue on Security, Privacy and Safety of Cyber-Physical Systems)**, vol. 43, 2021.

[J11] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional Abstraction-based Synthesis of General MDPs via Approximate Probabilistic Relations", *Nonlinear Analysis: Hybrid Systems*, vol. 39, 2021

[J10] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional Abstraction-based Synthesis for Networks of Stochastic Switched Systems", *Automatica*, vol. 114, 2020.

[J9] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional (In)Finite Abstractions for Large-Scale Interconnected Stochastic Systems", *IEEE Transactions on Automatic Control*, vol. 65, no. 12, pp. 5280-5295, 2020.

[J8] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional Abstraction of Large-Scale Stochastic Systems: A Relaxed Dissipativity Approach", *Nonlinear Analysis: Hybrid Systems*, vol. 36, 2020.

[J7] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional Construction of Infinite Abstractions for Networks of Stochastic Control Systems", *Automatica*, vol. 107, pp. 125-137, 2019.

[J6] **A. Lavaei**, and M.A. Atashgah, "Optimal 3D Trajectory Generation in Delivering Missions under Urban Constraints for a Flying Robot", *Intelligent Service Robotics*, vol. 10, no. 3, pp. 241-256, 2017.

[J5] A. Kosari, H. Maghsoudi, and **A. Lavaei**, "Path Generation for Flying Robots in Mountainous Regions", *International Journal of Micro Air Vehicles*, vol. 9, no. 1, pp. 44-60, 2017.

*Equally contributed

[J4] M.A. Atashgah, H. Gazerpour, **A. Lavaei**, and Y. Zarei, "An Active Time-optimal Control for Space Debris Deorbiting via Geomagnetic Field", *Celestial Mechanics and Dynamical Astronomy*, vol. 128, no. 2-3, pp. 343-360, 2017.

[J3] M.A. Atashgah, M.R. Torkamani, and **A. Lavaei**, "Robust Positioning, Preliminary Orbit Determination, and Trajectory Prediction of Space Debris using In-Space Iterative-Bearing-Only Observations", *The Journal of Navigation*, vol. 70, no. 4, pp. 789-809, 2017.

[J2] **A. Lavaei**, and M.A. Atashgah, "Three-Dimensional Constrained Optimal Motion Planning for a Six-Degree-of-Freedom Quadrotor for Urban Traffic Purposes", *Modares Mechanical Engineering*, vol. 15, no. 5, pp. 13-24, 2015.

[J1] A. Kosari, H. Maghsoudi, **A. Lavaei**, and R. Ahmadi, "Optimal Online Trajectory Generation for a Flying Robot for Terrain Following Purposes using Neural Network", *Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering*, vol. 229, no. 6, pp. 1124-1141, 2014.

Book Chapters

[B2] **A. Lavaei***, M. Khaled*, S. Soudjani, and M. Zamani, "AMYTISS: Parallelized Automated Controller Synthesis of Large-Scale Stochastic Systems", *32nd International Conference on Computer-Aided Verification (CAV)*, Lecture Notes in Computer Science 12225, pp. 461-474, Springer, 2020. **(acceptance rate:** 27%**)**

[B1] **A. Lavaei**, S. Soudjani, and M. Zamani, "Approximate Probabilistic Relations for Compositional Synthesis of Stochastic Systems", *Numerical Software Verification*, Lecture Notes in Computer Science 11652, pp. 101–109, Springer, 2019.

Conference Papers

[C24] **A. Lavaei**, P. Mohajerin Esfahani, and M. Zamani, "Data-Driven Stability Verification of Homogeneous Nonlinear Systems with Unknown Dynamics", *61st IEEE Conference on Decision and Control (CDC)*, to appear, 2022.

[C23] **A. Lavaei** and E. Frazzoli, "Scalable Synthesis of Finite MDPs for Large-Scale Stochastic Switching Systems", *61st IEEE Conference on Decision and Control (CDC)*, to appear, 2022.

[C22] **A. Lavaei** and E. Frazzoli, "Compositional Controller Synthesis for Interconnected Stochastic Systems with Markovian Switching", *American Control Conference (ACC)*, to appear, 2022.

[C21] **A. Lavaei**, S. Soudjani, and E. Frazzoli, "Safety Barrier Certificates for Stochastic Hybrid Systems", *American Control Conference (ACC)*, to appear, 2022.

[C20] **A. Lavaei**, L. Di Lillo, M. Atzei, A. Censi, and E. Frazzoli, "Data-Driven Estimation of Collision Risks for Autonomous Vehicles with Formal Guarantees", *25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2022. **(Best Demo/Poster Award)**

[C19] B. Zhong, **A. Lavaei**, M. Zamani, and M. Caccamo, "Controller Synthesis for Nonlinear Stochastic Games via Approximate Probabilistic Relations", *25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2022.

[C18] A. Abate, H. Blom, M. Bouissou, N. Cauchi, H. Chraibi, J. Delicaris, S. Haesaert, A. Hartmanns, M. Khaled, **A. Lavaei**, H. Ma, K. Mallik, M. Niehage, A. Remke, S. Schupp, F. Shmarov, S. Soudjani, A. Thorpe, V. Turcuman and P. Zuliani, "ARCH-COMP21 Category Report: Stochastic Models", *8th International Workshop on Applied Verification of Continuous*

and Hybrid Systems (ARCH), EPiC Series in Computing, vol. 80, pp. 55-89, 2021.

[C17] A. Nejati, **A. Lavaei**, S. Soudjani, and M. Zamani, "Data-Driven Estimation of Infinitesimal Generators of Stochastic Systems", *7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, vol. 54, no. 5, pp. 277-282, 2021.

[C16] A. Salamati*, **A. Lavaei***, S. Soudjani, and M. Zamani, "Data-Driven Safety Verification of Stochastic Systems via Barrier Certificates", *7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, vol. 54, no. 5, pp. 7-12, 2021. **(Best Repeatability Prize)**

[C15] **A. Lavaei**, B. Zhong, M. Caccamo, and M. Zamani, "Towards Trustworthy AI: Safe-visor Architecture for Uncertified Controllers in Stochastic Cyber-Physical Systems", *CPS-IoT Week workshop on Computation-Aware Algorithmic Design for Cyber-Physical Systems*, 2021.

[C14] **A. Lavaei**, A. Nejati, S. Soudjani, and M. Zamani, "Estimating Infinitesimal Generators of Stochastic Systems with Formal Error Bounds: A Data-Driven Approach", *24th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2021.

[C13] **A. Lavaei**, A. Nejati, P. Jagtap, and M. Zamani, "Formal Safety Verification of Unknown Continuous-Time Systems: A Data-Driven Approach", *24th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2021.

[C12] A. Abate, H. Blom, N. Cauchi, J. Delicaris, A. Hartmanns, M. Khaled, **A. Lavaei**, C. Pilch, A. Remke, S. Schupp, F. Shmarov, S. Soudjani, A. P. Vinod, B. Wooding, M. Zamani, and P. Zuliani, "ARCH-COMP20 Category Report: Stochastic Models", *7th International Workshop on Applied Verification of Continuous and Hybrid Systems (ARCH), EPiC Series in Computing*, vol. 74, pp. 76-106, 2020.

[C11] M. Anand*, **A. Lavaei***, and M. Zamani, "Compositional Construction of Control Barrier Certificates for Large-Scale Interconnected Stochastic Systems", *21st IFAC World Congress*, vol. 53, no. 2, pp. 1862-1867, 2020.

[C10] **A. Lavaei***, M. Khaled*, S. Soudjani, and M. Zamani, "AMYTISS: A Parallelized Tool on Automated Controller Synthesis for Large-Scale Stochastic Systems", *23rd ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2020. **(Best Demo/Poster Award)**

[C9] **A. Lavaei**, F. Somenzi, S. Soudjani, A. Trivedi, and M. Zamani, "Formal Controller Synthesis for Continuous-Space MDPs via Model-Free Reinforcement Learning", *11th ACM/IEEE Conference on Cyber-Physical Systems (ICCPS)*, pp. 98-107, 2020. **(acceptance rate:** 23%**)**

[C8] **A. Lavaei**, and M. Zamani, "Compositional Verification of Large-Scale Stochastic Systems via Relaxed Small-Gain Conditions", *58th IEEE Conference on Decision and Control (CDC)*, pp. 2574-2579, 2019.

[C7] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional Synthesis of not Necessarily Stabilizable Stochastic Systems via Finite Abstractions", *18th European Control Conference (ECC)*, pp. 2802–2807, 2019.

[C6] **A. Lavaei**, and M. Zamani, "Compositional Construction of Finite MDPs for Large-Scale Stochastic Switched Systems: A Dissipativity Approach", *15th IFAC Symposium on Large-Scale Complex Systems: Theory and Applications (LSS)*, vol. 52, no. 3, pp. 31-36, 2019. **(IFAC Young Author Award Finalist)**

[C5] **A. Lavaei**, and M. Zamani, "Compositional Finite Abstractions for Large-Scale Stochastic Switched Systems", *5th International Workshop on Symbolic-Numeric Methods for Reasoning about CPS and IoT (SNR) in conjunction with Cyber-Physical Systems and Internet-of-Things Week (CPS-IoT Week)*, 2019.

[C4] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional Synthesis of Finite Abstractions for Continuous-Space Stochastic Control Systems: A Small-Gain Approach", *6th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, vol. 51, no. 16, pp. 265-270, 2018.

[C3] **A. Lavaei**, S. Soudjani, and M. Zamani, "Compositional Synthesis of Interconnected Stochastic Control Systems based on Finite MDPs", *21st ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, 2018.

[C2] **A. Lavaei**, S. Soudjani, and M. Zamani, "From Dissipativity Theory to Compositional Construction of Finite Markov Decision Processes", *21st ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, pp. 21-30, 2018.

[C1] **A. Lavaei**, S. Soudjani, R. Majumdar, and M. Zamani, "Compositional Abstractions of Interconnected Discrete-Time Stochastic Control Systems", *56th IEEE Conference on Decision and Control (CDC)*, pp. 3551-3556, 2017.

Dissertations

[Ph.D.] **A. Lavaei**, "Automated Verification and Control of Large-Scale Stochastic Cyber-Physical Systems: Compositional Techniques,", Ph.D. Dissertation, *Technical University of Munich (TUM)*, Germany, October 2019.

[M.Sc.] **A. Lavaei**, "3D Constrained Optimal Motion Planning and Robust Tracking Control for a 6DoF Quadcopter", M.Sc. Thesis, *University of Tehran (UT)*, Iran, September 2014.

Advanced Courses Taken in 2016 - 2019 (Ph.D.)

- Optimization Methods for Large-scale Networks
- Formal Synthesis of Embedded Systems
- Reinforcement Learning in Robotics
- Probability Theory
- Markov Processes
- Functional Analysis
- Programming in C++

Advanced Courses Taken in 2013 - 2014 (M.Sc.)

- Advanced Automatic Control
- Nonlinear Control
- Optimal Control
- Robust Control
- Digital Control
- Guidance & Navigation
- Advanced Flight Dynamics
- Advanced Engineering Mathematics

Conference Presentations

Jun.'22 American Control Conference, Atlanta, US

May'22 25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Milan, Italy

Jul.'21 7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), Brussels, Belgium

May'21 24th ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Nashville, TN, USA

Jul.'20 32nd International Conference on Computer-Aided Verification (CAV), Los Angeles, California, US

Jul.'20 21st IFAC World Congress, Berlin, Germany

Apr.'20 23th ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Sydney, Australia

Apr.'20 11th ACM/IEEE Conference on Cyber-Physical Systems (ICCPS), Sydney, Australia

Jun.'19 18th European Control Conference (ECC), Naples, Italy

May'19 15th IFAC Symposium on Large-Scale Complex Systems: Theory and Applications (LSS), Delft, The Netherlands

Apr.'18 21st ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Porto, Portugal

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Seminar/Workshop Attendance

2021 EPFL & ETHZ Summer School on Foundation and Mathematical Guarantees for Data-Driven Control, **ETH Zurich**, Switzerland

2020 Autonomy Talks, Institute for Dynamic Systems and Control, **ETH Zurich**, Switzerland

2019 Munich Aerospace Board of Trustees Meeting, **Munich Aerospace**, Taufkirchen/Ottobrunn, Germany

2019 Scientific Presentation, **DLR**, Oberpfaffenhofen, Germany

2019 Fit for Germany, **DLR**, Oberpfaffenhofen, Germany

2018 Deep Learning Workshop, **LRZ**, Munich, Germany

2018 **Munich Aerospace Summer School**, Glonn, Germany

2018 Partner Event: Long-Term Development of Aviation - Future Drivers and Key Technologies, **Bauhaus Luftfahrt (BHL)**, Taufkirchen/Ottobrunn, Germany

2018 Basic Project Management Skills, **DLR**, Oberpfaffenhofen, Germany

2018 Effective Reading, **DLR**, Oberpfaffenhofen, Germany

2017 Partner Event: Laboratory Tours at Department of Aerospace Engineering, **UniBw**, Neubiberg, Germany

2017 **Munich Aerospace Summer Summit** on Green Aerospace, Taufkirchen/Ottobrunn, Germany

2017 Workshop on Information and Communication Theory in Control Systems, **TUM**, Germany

2017 Kick-Off Seminar on Scientific Paper Writing, **TUM**, Germany

2017 Writing Readable Scientific Papers, **DLR**, Oberpfaffenhofen, Germany

2017 The Basics of Communication, **DLR**, Oberpfaffenhofen, Germany

2017 Professional Communication in Scientific Environments, **DLR**, Oberpfaffenhofen, Germany

2017 Mastering the Ph.D. Study, **DLR**, Oberpfaffenhofen, Germany

2016 Partner Event: Laboratory Tours, **DLR**, Oberpfaffenhofen, Germany

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Academic Services: Reviewing Activities

- Journals: IEEE Transaction on Automatic Control (TAC, IEEE), Automatica (Elsevier), Nonlinear Analysis: Hybrid Systems (NAHS, Elsevier), ACM Transactions on Embedded Computing Systems (TECS, ACM), IEEE Control Systems Letters (L-CSS, IEEE), IEEE Systems Journal

- Conferences: ACM Conference on Hybrid Systems: Computation and Control (HSCC), IEEE Conference on Decision and Control (CDC), IEEE European Control Conference (ECC), IEEE American Control Conference (ACC), IEEE Indian Control Conference (ICC), IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), IFAC World Congress, Formal Modeling and Analysis of Timed Systems (FORMATS), Symposium on Mathematical Theory of Networks and Systems (MTNS)

Academic Services: Program Committee & Editorial

- IEEE CSS Technology Conferences Editorial Board (TCEB)
- **Co-chair of the session** "Large-Scale Systems" at the 61st IEEE Conference on Decision and Control (CDC 2022)
- **Associate Editor** for European Control Conference (ECC 2023)
- **Associate Editor** for a Special Section entitled "Formal Verification and Synthesis of Cyber-Physical Systems" in IEEE Open Journal of Control Systems, 2022
- **Chair of the session** "Stochastic Systems" in Virtual American Control Conference (ACC 2022)
- **Co-chair of the session** "Hybrid Systems" in Virtual American Control Conference (ACC 2022)
- **Associate Editor** for European Control Conference (ECC 2022)
- **Program Committee** for 4th IFAC Workshop on Cyber-Physical & Human Systems (CPHS 2022)
- **Program Committee** for Workshop on Computation-Aware Algorithmic Design for Cyber-Physical Systems (CAADCP) at the CPS-IoT Week 2022
- **Program Committee** for WIP, Posters and Demo Sessions of 13th ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2022)
- **Program Committee** for Workshop on Computation-Aware Algorithmic Design for Cyber-Physical Systems (CAADCP) at the CPS-IoT Week 2021
- **IEEE Technical Committee** on Hybrid Systems (since 2020)

Technical Skills

- Programming Language: C++, Python, MATLAB (GUI and Simulink)

- Operating System: Microsoft Windows, iOS, Linux

Languages

- English: Full professional proficiency

- German: B2.2 certificate

Professional Memberships

- Institute of Electrical and Electronics Engineers (IEEE): Control Systems Society
- Munich Aerospace Research Group (as an alumni)
- DLR Graduate Program (as an alumni)