

# Abolfazl Lavaei, Prof. Dr.-Ing.

## Assistenzprofessor

School of Computing  
Newcastle University

Urban Sciences Building  
Newcastle, NE4 5TG, Vereinigtes Königreich

Telefon: +44 191 208 7856  
E-Mail: [abolfazl.lavaei@newcastle.ac.uk](mailto:abolfazl.lavaei@newcastle.ac.uk)  
Web: [www.lavaei-cps.de](http://www.lavaei-cps.de)

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## Kurzbiografie

Mein Forschungsschwerpunkt liegt auf theoretischen und praktischen Aspekten der “Formale Verifizierung, des Lernens und Steuerung von hochdimensionalen stochastischen cyber-physikalischen Systemen” mit Anwendung auf *autonome Systeme*. Meine Forschungsinteressen drehen sich um die Schnittstelle von Steuerungstheorie, Informatik, maschinellem Lernen, künstliche Intelligenz, und Datenwissenschaft.

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## Akademische Positionen/Abschlüsse

- Jul.'22-Gegenwart **Assistenzprofessor** an der School of Computing, Newcastle University, Vereinigtes Königreich
- Jan.'21 - Jul.'22 **Postdoktorand** am Institut für Dynamische Systeme und Regelungstechnik, ETH Zürich, Schweiz  
Forschungsthema: *Trustworthy Safety-Critical AI for Autonomous Vehicles*
- Nov.'19 - Jan.'21 **Postdoktorand (Gruppenführer)** in Informatik, Hybriden Steuerungssysteme (HyConSys) Lab, Ludwig-Maximilians-Universität München (LMU), Deutschland  
Forschungsthema: *Safe Learning and Control via Formal Methods and Data-Driven Optimization*
- Nov.'16 - Nov.'19 **Doktorand** in Elektrotechnik, Hybride Systeme & Regelung, Technische Universität München (TUM), Deutschland  
Dissertation: *Automated Verification and Control of Large-Scale Stochastic Cyber-Physical Systems: Compositional Techniques*
- Nov.'16 - Nov.'19 **Wissenschaftlicher Forscher** bei Munich Aerospace & Deutsches Zentrum für Luft- und Raumfahrt (DLR), Autonome Flugforschungsgruppe, Deutschland  
Forschungsthema: *Certifiable Autonomy in Unmanned Aerial Vehicles (UAVs)*
- May'19 - Aug.'19 **Gastforscher** am Delft Center für Systeme und Regelung, Technische Universität Delft (TUD), Niederlande  
Forschungsthema: *Verification and Synthesis of Unknown Stochastic Hybrid Systems via Data-driven Optimization*  
Gastgeber: Prof. Peyman Mohajerin Esfahani
- Sep.'13 - Sep.'14 **M.Sc.** in Luft- und Raumfahrttechnik, Flugdynamik & Regelung, Universität Teheran, Iran  
These: *3D Constrained Optimal Motion Planning and Robust Tracking Control Design for a*

## Forschungsinteressen

- Cyber-physischer Systeme
  - Hochdimensionale Stochastische Netzwerke
  - Autonome Fahrzeuge
  - Formales Lernen & Kontrolle
  - Vertrauenswürdige Autonomie & KI
  - Datengestützte Optimierung
  - Fortgeschrittene (parallele) Programmierung
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## Ehrungen & Auszeichnungen

- 2022 **Best Demo/Poster Award** at the *25th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Mailand, Italien.
- 2021 **Best Repeatability Prize** (als Co-Erstautor und Mentor), *7th IFAC Conference on Analysis and Design of Hybrid Systems (ADHS)*, Brussels, Belgium.
- 2020 **Best Demo/Poster Award**, *23rd ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Sydney, Australien. **Nachrichten: Munich Aerospace**
- 2019 Ausgezeichnet als **“hochqualifizierter Wissenschaftler”** für den ständigen Aufenthalt in Deutschland (**Niederlassungserlaubnis für Hochqualifizierte**).
- 2019 **IFAC Young Author Award Finalist**, *15. IFAC Symposium zu weitläufigen komplexen Systemen: Theorie und Anwendung (LSS)*, Delft, Niederlande. **Nachrichten: Munich Aerospace**
- 2016 Stipendiat des **Munich Aerospace Doctoral Scholarship**, Fakultät für Elektro- und Informationstechnik, *Technischen Universität München (TUM)*, Deutschland.
- 2016 Stipendiat des **University of Auckland Doctoral Scholarship**, Fakultät für Elektro- und Informationstechnik, *Universität Auckland*, Neuseeland.
- 2016 Stipendiat des **Concordia International Award of Excellence**, Fakultät für Elektro- und Informationstechnik, *Concordia Universität*, Kanada.
- 2016 Angenommen vom **EDEE Doktoranden Programm Komitee**, Fakultät für Elektrotechnik, *École Polytechnique Fédérale De Lausanne (EPFL)*, Schweiz.
- 2016 Angenommen vom **Doktoranden Programm Komitee**, Fakultät für Maschinenbau, *Universität Melbourne*, Australien.
- 2015 Stipendiat des **Departmental Prestigious Doctoral Fellowship**, Fakultät für Maschinenbau und Luftfahrt, *Universität von Kalifornien, San Diego (UCSD)*, Vereinigte Staaten.
- 2015 **Best Graduate Student Award** in *allen Feldern des Studiums* an der Fakultät für neue Wissenschaften und Technologien, *Universität Teheran*, Iran.

2014 **Erster & einziger Magisterstudent der Nation** der einen zwei-jahres Master of Science Studiengang in nur *zwei Semestern (ein akademisches Jahr)* mit *vollem GPA (20 von 20)*, Deutsche Skala: 1, abgeschlossen hat.

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## Fortgeschrittene Softwareentwicklung in “C++/OpenCL”

**AMYTISS: P**ARAllelized AutoMated Controller SYnthesis of Large-Scale STochastic Systems; Ein fortgeschrittenes Softwaretool geschrieben in C++/OpenCL, das parallele automatische Reglersynthese für weitläufige zeitdiskrete stochastische Systeme bereitstellt, was für viele sicherheitskritische Anwendungen, wie *autonomes Fahren*, unabdingbar ist. Dieses Tool erlaubt es:

- (i) endliche Markov-Entscheidungsprozesse (MDPs) als endliche Abstraktionen von gegebenen Systemen zu berechnen;
- (ii) automatische Regler für die konstruierten MDPs zu synthetisieren, die high-level Anforderungen (Sicherheit & Erreichbarkeit) erfüllen.

AMYTISS nutzt hoch performante Computing-Plattformen und Cloud-basierte Server, um die Probleme der Zustandsexplosion zu minimieren, die bei der Analyse weitläufiger stochastischer Systeme auftritt. Dieses Tool verbessert die Leistung im Bezug auf *Speichernutzung* und *Berechnungszeit* signifikant indem es Prozesse in verschiedenen heterogenen Computing-Plattformen wie CPUs, GPUs und HWAs parallelisiert.

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## Publikationen

### 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  \$\omega\$ -Regular Specifications](#)”, *submitted for publication*, 2021.

## Fachzeitschriftartikel

- [F21] **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.
- [F20] **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.
- [F19] **A. Lavaei** and E. Frazzoli, “[Data-Driven Synthesis of Symbolic Abstractions with Guaranteed Confidence](#)”, *IEEE Control Systems Letters*, vol. 7, pp. 253-258, 2022.
- [F18] 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.
- [F17] 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.
- [F16] 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.
- [F15] **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.
- [F14] 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.
- [F13] **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.
- [F12] 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.
- [F11] **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.
- [F10] **A. Lavaei**, S. Soudjani, and M. Zamani, “[Compositional Abstraction-based Synthesis for Networks of Stochastic Switched Systems](#)”, *Automatica*, vol. 114, 2020.
- [F9] **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.
- [F8] **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.

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\*Gleichermaßen beigetragen

- [F7] **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.
- [F6] **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.
- [F5] 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.
- [F4] 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.
- [F3] 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.
- [F2] **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.
- [F1] 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.

## Buchkapitel

- [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. **(Akzeptanzrate: 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.

## Konferenz-Paper

- [K24] **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.
- [K23] **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.
- [K22] **A. Lavaei** and E. Frazzoli, “Compositional Controller Synthesis for Interconnected Stochastic Systems with Markovian Switching”, *American Control Conference (ACC)*, to appear, 2022.
- [K21] **A. Lavaei**, S. Soudjani, and E. Frazzoli, “Safety Barrier Certificates for Stochastic Hybrid Systems”, *American Control Conference (ACC)*, to appear, 2022.
- [K20] **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)

- [K19] 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.
- [K18] A. Abate, H. Blom, M. Bouissou, N. Cauchi, H. Chraïbi, 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.
- [K17] 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.
- [K16] 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**)
- [K15] **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.
- [K14] **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.
- [K13] **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.
- [K12] 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.
- [K11] 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.
- [K10] **A. Lavaei\***, M. Khaled\*, S. Soudjani, and M. Zamani, “[AMYTESS: 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**)
- [K9] **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. (**Akzeptanzrate: 23%**)
- [K8] **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.
- [K7] **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.

- [K6] **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)**
- [K5] **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.
- [K4] **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.
- [K3] **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.
- [K2] **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.
- [K1] **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.

## Dissertation

- [Phd.] **A. Lavaei**, “Automated Verification and Control of Large-Scale Stochastic Cyber-Physical Systems: Compositional Techniques”, Phd. Dissertation, *Technischen Universität München (TUM)*, Deutschland, Oktober 2019.
- [M.Sc.] **A. Lavaei**, “3D Constrained Optimal Motion Planning and Robust Tracking Control for a 6DoF Quadcopter”, M.Sc. Thesis, *Universität Teheran (UT)*, Iran, September 2014.

## Besuchte fortgeschrittene Kurse in 2016 - 2019 (Doktorand)

- Optimierungsmethoden für weitläufige Netzwerke
- Formale Synthese eingebetteter Systeme
- Bestärkendes Lernen in Robotik
- Wahrscheinlichkeitstheorie
- Markov Prozesse
- Funktionale Analysis
- Programmierung in C++

## Besuchte fortgeschrittene Kurse in 2013 - 2014 (M.Sc.)

- Fortgeschrittene Regelung
- Nichtlineare Regelung

- Optimierte Regelung
  - Robuste Regelung
  - Digitale Regelung
  - Führung & Navigation
  - Fortgeschrittene Flugdynamik
  - Höhere Mathematik für Ingenieure
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## Konferenzpräsentationen

- Jun.'22 American Control Conference, Atlanta, US
- Mai.'22 25. ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Mailand, Italien
- Jul.'21 7. IFAC Conference on Analysis and Design of Hybrid Systems (ADHS), Brüssel, Belgien
- Mai.'21 24. ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Nashville, TN, USA
- Jul.'20 32. International Conference on Computer-Aided Verification (CAV), Los Angeles, Kalifornien, US
- Jul.'20 21. IFAC World Congress, Berlin, Deutschland
- Apr.'20 23. ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Sydney, Australien
- Apr.'20 11. ACM/IEEE Conference on Cyber-Physical Systems (ICCPS), Sydney, Australien
- Jun.'19 18. European Control Conference (ECC), Neapel, Italien
- Mai.'19 15. IFAC Symposium on Large-Scale Complex Systems: Theory and Applications (LSS), Delft, Niederlande
- Apr.'18 21. ACM International Conference on Hybrid Systems: Computation and Control (HSCC), Porto, Portugal
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## Besuchte Seminare

- 2021 EPFL & ETHZ Sommerschule am Foundation and Mathematical Guarantees for Data-Driven Control , **ETH Zürich**, Zürich, Schweiz
- 2020 Autonomy Talks, Institute for Dynamic Systems and Control, **ETH Zürich**, Schweiz
- 2019 Munich Aerospace Board of Trustees Meeting, **Munich Aerospace**, Taufkirchen/Ottobrunn, Deutschland
- 2019 Scientific Presentation, **DLR**, Oberpfaffenhofen, Deutschland
- 2019 Fit for Germany, **DLR**, Oberpfaffenhofen, Deutschland
- 2018 Deep Learning Workshop, **LRZ**, Munich, Deutschland
- 2018 **Munich Aerospace Summer School**, Glonn, Deutschland
- 2018 Partner Event: Long-Term Development of Aviation - Future Drivers and Key Technologies, **Bauhaus Luftfahrt (BHL)**, Taufkirchen/Ottobrunn, Deutschland
- 2018 Basic Project Management Skills, **DLR**, Oberpfaffenhofen, Deutschland
- 2018 Effective Reading, **DLR**, Oberpfaffenhofen, Deutschland
- 2017 Partner Event: Laboratory Tours at Department of Aerospace Engineering, **UniBw**, Neubiberg, Deutschland
- 2017 **Munich Aerospace Summer Summit** on Green Aerospace, Taufkirchen/Ottobrunn, Deutschland



- 2017 Workshop on Information and Communication Theory in Control Systems, **TUM**, Deutschland
  - 2017 Kick-Off Seminar on Scientific Paper Writing, **TUM**, Deutschland
  - 2017 Writing Readable Scientific Papers, **DLR**, Oberpfaffenhofen, Deutschland
  - 2017 The Basics of Communication, **DLR**, Oberpfaffenhofen, Deutschland
  - 2017 Professional Communication in Scientific Environments, **DLR**, Oberpfaffenhofen, Deutschland
  - 2017 Mastering the Ph.D. Study, **DLR**, Oberpfaffenhofen, Deutschland
  - 2016 Partner Event: Laboratory Tours, **DLR**, Oberpfaffenhofen, Deutschland
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## Akademische Dienste: Überprüfungsaktivitäten

- **Fachzeitschriftartikel:** 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 Systems Journal

- **Konferenzen:** 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)

## Akademische Dienste: Programmkomitee & Redaktion

- IEEE CSS Technology Conferences Editorial Board (TCEB)
  - **Co-chair of the session** "Large-Scale Systems", 61st IEEE Conference on Decision and Control (CDC 2022)
  - **Mitherausgeber** von European Control Conference (ECC 2023)
  - **Mitherausgeber** für eine spezielle Sektion mit dem Titel "Formal Verification and Synthesis of Cyber-Physical Systems" im IEEE Open Journal of Control Systems, 2022
  - **Chair of the session** "Stochastic Systems", Virtual American Control Conference (ACC 2022)
  - **Co-chair of the session** "Hybrid Systems", Virtual American Control Conference (ACC 2022)
  - **Mitherausgeber** von European Control Conference (ECC 2022)
  - **Programmkomitee** von 4. IFAC Workshop on Cyber-Physical & Human Systems (CPHS 2022)
  - **Programmkomitee** von Workshop on Computation-Aware Algorithmic Design for Cyber-Physical Systems (CAADCP) auf der CPS-IoT Week 2022
  - **Programmkomitee** von WIP, Posters and Demo Sessions of 13. ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS 2022)
  - **Programmkomitee** von Workshop on Computation-Aware Algorithmic Design for Cyber-Physical Systems auf der CPS-IoT Week 2021
  - **IEEE Technical Committee** on Hybrid Systems (2020 - Gegenwart)
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## Technische Kompetenzen

- **Programmiersprachen:** C++, Python, MATLAB (GUI und Simulink)
- **Betriebssystem:** Microsoft Windows, iOS, Linux

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## Sprachen

- **English:** Volles professionelles Niveau
- **Deutsch:** B2.2 Zertifikat

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## Professionsbezogene Mitgliedschaften

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