Wolfgang Hönig

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Last Updated: 1/2021

Academic Positions

5/2021– **Independent Junior Research Group Leader**, *Technical University Berlin, Germany.*
Part of the Emmy-Noether program with full funding for 3+3 years for conducting research with a team of two PhD students and two student workers on the topic "Motion Coordination for Heterogeneous Aerial Swarms in Congested Environments."

11/2020– **Visiting Postdoctoral Scholar in Aerospace**, *California Institute of Technology, Pasadena, USA.*
Visiting/Guest researcher. Advised by Prof. Soon-Jo Chung.

4/2019– 10/2020 **Postdoctoral Scholar in Aerospace**, *California Institute of Technology, Pasadena, USA.*
Advised by Prof. Soon-Jo Chung and member of the Center for Autonomous Systems and Technologies (CAST)
Close collaboration with Prof. Yisong Yue (Computing and Mathematical Sciences)

Industrial Positions

1/2021 – **Visiting Researcher**, *Bitcraze AB, Malmö, Sweden.*
Research and engineering to improve the Crazyflie and its ecosystem for academic use cases.

5/2017 – 8/2017 **Research Scientist Intern**, *Amazon Robotics, North Reading, MA, USA.*
Research on multi-robot path planning and safe execution for robotic warehouses.
Resulted in two papers published (AAMAS 2018 and IEEE RA-L 2019).

1/2012 – 7/2014 **Senior Software Engineer**, *NVIDIA GmbH, Würselen, Germany.*
Developer tools engineer (senior since 2013) with focus on data collection for GPU profiling (graphics and compute).

10/2010 – 10/2011 **Software Engineer Intern**, *NVIDIA, Austin, TX, USA.*
Internship in the NVIDIA Nsight (developer tool for debugging and profiling GPUs) team. Researched data collection for tracing and profiling for GPUs, focusing on binary code patching of GPU assembly.

Education

8/2014– 3/2019 **Ph.D. in Computer Science**, *University of Southern California, Los Angeles, USA.*
PhD student in Robotics (Computer Science Department)
Advised by Prof. Nora Ayanian and member of the Automatic Coordination of Teams Laboratory (ACT Lab)
Thesis: "Motion Coordination for Large Multi-Robot Teams in Obstacle-Rich Environments"
Committee: Nora Ayanian, Gaurav S. Sukhatme, Sven Koenig, and Vijay Kumar
GPA: 4.0 (best 4.0, range 0.0 – 4.0)
Best Dissertation Award in Computer Science at USC

8/2014– 12/2016 **M.S. in Computer Science (Intelligent Robotics)**, *University of Southern California, Los Angeles, USA.*
Relevant classes: Computer Vision, Robotics, Coordinated Mobile Robotics, Advanced Distributed Systems, Self-Organization, Advanced Analysis of Algorithms, Probability for Electrical and Computer Engineers, Advanced Program Analysis and Verification
GPA: 4.0 (best 4.0, range 0.0 – 4.0)

2006–2012 **Diploma in Computer Science**, *Technical University Dresden, Dresden, Germany.*
Equivalent to combined Bachelor's and Master's
Specialization: Computer Engineering / Embedded Systems
Minor: Applied Neuroinformatics
GPA: 1.0 (best 1.0, range 1.0 – 5.0)
Valedictorian at the Institute of Computer Science with Computer Science as field of study

Selected Publications

Full list available at online databases: Google Scholar, DBLP
Citations: 1031, h-index: 16.

Book Chapters and Journal Publications

2020 [J6] B. Rivière, **W. Hönig**, Y. Yue, and S.-J. Chung. "GLAS: Global-to-Local Safe Autonomy Synthesis for Multi-Robot Motion Planning with End-to-End Learning". *IEEE Robotics and Automation Letters (RA-L)*. Vol. 5. 3. 2020, pp. 4249–4256. DOI: 10.1109/LRA.2020.2994035.

2019 [J5] **W. Hönig**, S. Kiesel, A. Tinka, J. W. Durham, and N. Ayanian. "Persistent and Robust Execution of MAPF Schedules in Warehouses". *IEEE Robotics and Automation Letters (RA-L)*. Vol. 4. 2. 2019, pp. 1125–1131. DOI: 10.1109/LRA.2019.2894217.

2018 [J4] **W. Hönig**, J. A. Preiss, T. K. S. Kumar, G. S. Sukhatme, and N. Ayanian. "Trajectory Planning for Quadrotor Swarms". *IEEE Transactions on Robotics, Special Issue on Aerial Swarm Robotics* 34.4 (2018), pp. 856–869. DOI: 10.1109/TRO.2018.2853613.

2017 [J3] H. Ma, **W. Hönig**, L. Cohen, T. Uras, H. Xu, T. K. S. Kumar, N. Ayanian, and S. Koenig. "Overview: A Hierarchical Framework for Plan Generation and Execution in Multirobot Systems". *IEEE Intelligent Systems* 32.6 (2017), pp. 6–12. DOI: 10.1109/MIS.2017.4531217.

[J2] **W. Hönig** and N. Ayanian. "Flying Multiple UAVs Using ROS". *Robot Operating System (ROS): The Complete Reference (Volume 2)*. Ed. by A. Koubaa. Springer International Publishing, 2017, pp. 83–118. ISBN: 978-3-319-54927-9. DOI: 10.1007/978-3-319-54927-9_3.

2010 [J1] H. Burau, R. Widera, **W. Hönig**, G. Juckeland, A. Debus, T. Kluge, U. Schramm, T. E. Cowan, R. Sauerbrey, and M. Bussmann. "PIConGPU: A Fully Relativistic Particle-in-Cell Code for a GPU Cluster". *IEEE Transactions on Plasma Science* 38.10 (2010), pp. 2831–2839. ISSN: 0093-3813. DOI: 10.1109/TPS.2010.2064310.

Conferences

2021 [C16] Y. K. K. Nakka, **W. Hönig**, C. Choi, A. Harvard, A. Rahmani, and S.-J. Chung. "Information-Based Guidance and Control Architecture for Multi-Spacecraft On-Orbit Inspection". *AIAA Scitech 2021 Forum*. 2021. DOI: 10.2514/6.2021-1103. **Awarded best AIAA GNC Graduate Student Paper.**

2020 [C15] G. Shi, **W. Hönig**, Y. Yue, and S.-J. Chung. "Neural-Swarm: Decentralized Close-Proximity Multirotor Control Using Learned Interactions". *IEEE International Conference on Robotics and Automation (ICRA)*. 2020, pp. 3241–3247. DOI: 10.1109/ICRA40945.2020.9196800.

[C14] **W. Hönig**, J. Li, and S. Koenig. "A Project on Multi-Agent Path Finding (MAPF)". *AAAI Symposium on Educational Advances in Artificial Intelligence (EAAI-20)*. 2020. URL: http://modelai.gettysburg.edu/2020/mapf/. Paper with other AI assignments at https://doi.org/10.1609/aaai.v34i09.7072.

2019 [C13] D. Albani*, **W. Hönig***, N. Ayanian, D. Nardi, and V. Trianni. "Summary: Distributed Task Assignment and Path Planning with Limited Communication for Robot Teams". *International Conference on Autonomous Agents and MultiAgent Systems (AAMAS)*. 2019, pp. 1770–1772. URL: http://dl.acm.org/citation.cfm?id=3331913.

[C12] H. Ma, **W. Hönig**, T. K. S. Kumar, N. Ayanian, and S. Koenig. "Lifelong Path Planning with Kinematic Constraints for Multi-Agent Pickup and Delivery". *AAAI Conference on Artificial Intelligence (AAAI)*. 2019, pp. 7651–7658. DOI: 10.1609/aaai.v33i01.33017651.

[C11] A. Molchanov*, T. Chen*, **W. Hönig**, J. A. Preiss, N. Ayanian, and G. S. Sukhatme. "Sim-to-(Multi)-Real: Transfer of Low-Level Robust Control Policies to Multiple Quadrotors". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2019, pp. 59–66. DOI: 10.1109/IROS40897.2019.8967695.

2018 [C10] M. Debord, **W. Hönig**, and N. Ayanian. "Trajectory Planning for Heterogeneous Robot Teams". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2018, pp. 7924–7931. DOI: 10.1109/IROS.2018.8593876.

[C9] B. Şenbaşlar, **W. Hönig**, and N. Ayanian. "Robust Trajectory Execution for Multi-robot Teams Using Distributed Real-time Replanning". *International Symposium on Distributed Autonomous Robotic Systems (DARS)*. Vol. 9. Springer Proceedings in Advanced Robotics. Springer, 2018, pp. 167–181. DOI: 10.1007/978-3-030-05816-6_12. Software available at https://github.com/baskinburak/mrtrajreplan-dars2018.

[C8] **W. Hönig**, S. Kiesel, A. Tinka, J. W. Durham, and N. Ayanian. "Conflict-Based Search with Optimal Task Assignment". *International Conference on Autonomous Agents and MultiAgent Systems (AAMAS)*. 2018, pp. 757–765. URL: http://dl.acm.org/citation.cfm?id=3237495. Software available at https://github.com/whoenig/libMultiRobotPlanning.

2017 [C7] J. A. Preiss, **W. Hönig**, N. Ayanian, and G. S. Sukhatme. "Downwash-aware trajectory planning for large quadrotor teams". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2017, pp. 250–257. DOI: 10.1109/IROS.2017.8202165.

[C6] J. A. Preiss*, **W. Hönig***, G. S. Sukhatme, and N. Ayanian. "Crazyswarm: A large nano-quadcopter swarm". *IEEE International Conference on Robotics and Automation (ICRA)*. 2017, pp. 3299–3304. DOI: 10.1109/ICRA.2017.7989376. Star (*) refers to equal contribution. The Crazyswarm is now widely used internationally as testbed for multi-robot research.

[C5] **W. Hönig**, T. K. S. Kumar, L. Cohen, H. Ma, H. Xu, N. Ayanian, and S. Koenig. "Summary: Multi-Agent Path Finding with Kinematic Constraints". *International Joint Conference on Artificial Intelligence (IJCAI)*. 2017, pp. 4869–4873. DOI: 10.24963/ijcai.2017/684.

2016 [C4] **W. Hönig** and N. Ayanian. "Dynamic multi-target coverage with robotic cameras". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2016, pp. 1871–1878. DOI: 10.1109/IROS.2016.7759297.

[C3] **W. Hönig**, T. K. S. Kumar, L. Cohen, H. Ma, H. Xu, N. Ayanian, and S. Koenig. "Multi-Agent Path Finding with Kinematic Constraints". *International Conference on Automated Planning and Scheduling (ICAPS)*. AAAI Press, 2016, pp. 477–485. URL: http://www.aaai.org/ocs/index.php/ICAPS/ICAPS16/paper/view/13183. **Awarded best paper in robotics track.**

[C2] **W. Hönig**, T. K. S. Kumar, H. Ma, S. Koenig, and N. Ayanian. "Formation change for robot groups in occluded environments". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2016, pp. 4836–4842. DOI: 10.1109/IROS.2016.7759710.

2015 [C1] **W. Hönig**, C. Milanes, L. Scaria, T. Phan, M. T. Bolas, and N. Ayanian. "Mixed reality for robotics". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. 2015, pp. 5382–5387. DOI: 10.1109/IROS.2015.7354138.

Workshops, Symposia, and Extended Abstracts

2020 [W14] B. Rivière, **W. Hönig**, Y. Yue, and S.-J. Chung. "GLAS: Global-to-Local Safe Autonomy Synthesis for Multi-Robot Motion Planning with End-to-End Learning (Short Version)". *Workshop on Heterogeneous Multi-Robot Task Allocation and Coordination at RSS*. 2020. URL: https://whoenig.github.io/publications/2020_MRTA-RSS_Riviere.pdf.

2019 [W13] A. Molchanov*, T. Chen*, **W. Hönig**, J. A. Preiss, N. Ayanian, and G. S. Sukhatme. "Sim-to-(Multi)-Real: Transfer of Low-Level Robust Control Policies to Multiple Quadrotors". *Southern California Robotics Symposium (SCR), Pasadena, CA, April 2019*. 2019.

[W12] B. Şenbaşlar, **W. Hönig**, and N. Ayanian. "Robust Trajectory Execution for Multi-robot Teams Using Distributed Real-time Replanning (Extended Abstract)". *Southern California Robotics Symposium (SCR), Pasadena, CA, April 2019*. 2019. URL: https://whoenig.github.io/publications/2019_SCR_Senbaslar.pdf.

2018 [W11] M. Debord, **W. Hönig**, and N. Ayanian. "Trajectory Planning for Heterogeneous Robot Teams". *International Symposium on Aerial Robotics (ISAR), Philadelphia, PA, USA, June 2018*. 2018. URL: https://whoenig.github.io/publications/2018_ISAR_Debord.pdf.

[W10] T. Phan, **W. Hönig**, and N. Ayanian. "Mixed Reality Collaboration Between Human-Agent Teams". *IEEE Conference on Virtual Reality and 3D User Interfaces, (VR)*. 2018, pp. 659–660. DOI: 10.1109/VR.2018.8446542.

[W9] B. Şenbaşlar, **W. Hönig**, and N. Ayanian. "Robust Trajectory Execution for Multi-robot Teams Using Distributed Real-time Replanning (Late Breaking)". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (Late Breaking)*. 2018. URL: https://whoenig.github.io/publications/2018_IROS-LateBreaking_Senbaslar.pdf.

[W8] **W. Hönig**. "Scalable Task and Motion Planning for Multi-Robot Systems in Obstacle-Rich Environments (Doctoral Consortium)". *International Conference on Autonomous Agents and MultiAgent Systems (AAMAS)*. 2018, pp. 1746–1751. URL: http://dl.acm.org/citation.cfm?id=3237962.

2017 [W7] J. A. Preiss, **W. Hönig**, G. S. Sukhatme, and N. Ayanian. "Downwash-Aware Trajectory Planning for Large Quadcopter Teams". *Southern California Robotics Symposium (SCR), Los Angeles, CA, April 2017*. 2017. URL: https://whoenig.github.io/publications/2017_SCR_Preiss.pdf.

[W6] J. A. Preiss, **W. Hönig**, G. S. Sukhatme, and N. Ayanian. "Downwash-Aware Trajectory Planning for Large Quadrotor Swarms". *International Symposium on Aerial Robotics, Philadelphia, PA, USA, June 2017*. 2017. URL: https://whoenig.github.io/publications/2017_ISAR_Preiss.pdf.

2016 [W5] H. Ma, S. Koenig, N. Ayanian, L. Cohen, **W. Hönig**, T. K. S. Kumar, T. Uras, H. Xu, C. Tovey, and G. Sharon. "Overview: Generalizations of Multi-Agent Path Finding to Real-World Scenarios". *IJCAI-16 Workshop on Multi-Agent Path Finding (WOMPF), New York City, NY, July 2016*. 2016. URL: https://whoenig.github.io/publications/2016_IJCAI-Workshop_Ma.pdf.

[W4] J. A. Preiss*, **W. Hönig***, G. S. Sukhatme, and N. Ayanian. "Crazyswarm: A large nano-quadcopter swarm (Extended Abstract)". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) (Late Breaking)*. 2016. URL: https://whoenig.github.io/publications/2016_IROS-LateBreaking_Preiss.pdf.

[W3] **W. Hönig**, T. K. S. Kumar, L. Cohen, H. Ma, S. Koenig, and N. Ayanian. "Path Planning With Kinematic Constraints For Robot Groups". *Southern California Robotics Symposium (SCR), San Diego, CA, April 2016*. 2016. URL: https://whoenig.github.io/publications/2016_SCR_Hoenig.pdf.

[W2] **W. Hönig**, A. Tavakoli, and N. Ayanian. "Seamless Robot Simulation Integration for Education: A Case Study". *Workshop on the Role of Simulation in Robot Programming at SIMPAR 2016, San Francisco, CA, December 2016*. 2016. URL: https://whoenig.github.io/publications/2016_SimRP_Hoenig.pdf.

2012 [W1] **W. Hönig**, F. Schmitt, R. Widera, H. Burau, G. Juckeland, M. S. Müller, and M. Bussmann. "A Generic Approach for Developing Highly Scalable Particle-Mesh Codes for GPUs". *Symposium on Application Accelerators in High-Performance Computing* (2012). URL: http://saahpc.ncsa.illinois.edu/10/papers/paper_10.pdf.

Theses

2019 [T3] **W. Hönig**. "Motion Coordination for Large Multi-Robot Teams in Obstacle-Rich Environments". PhD thesis. University of Southern California, 2019. URL: https://whoenig.github.io/publications/2019_PhD-Thesis_Hoenig.pdf. Supervisors: Nora Ayanian, Gaurav S. Sukhatme, Sven Koenig, Vijay Kumar.

2012 [T2] **W. Hönig**. "Towards Source-Level CUDA Kernel Profiling". Diploma Thesis. Technical University Dresden, 2012. Supervisors: Prof. Nagel, Prof. Hochberger, Dr. Strengert, Guido Juckeland, Robert Dietrich. In cooperation with NVIDIA.

2010 [T1] **W. Hönig**. "Porting a Ptychography Application to the CUDA GPU-Model". Bachelor Thesis. Technical University Dresden, 2010. Supervisors: Prof. Nagel, Prof. Schroer, Dr. Knüpfer, Dr. Schropp, Guido Juckeland. In German.

Maintained Open Source Software

Code released as part of a publication is not included.

2017– **libMultiRobotPlanning**, *author and maintainer* , https://github.com/whoenig/libMultiRobotPlanning.
Library and example applications for multi-robot path planning (CBS, ECBS, SIPP, and variants) and task assignment. Written in C++ (templated state/actions).

2016– **Crazyswarm**, *co-author (with J. A. Preiss) and maintainer*, https://crazyswarm.readthedocs.io.
Framework to control 50+ Crazyflie 2.x quadrotors from a single PC. Uses ROS for visualization and Python scripting. Extensive documentation is available online and a tutorial was presented as part of an invited talk at IROS 2019. The Crazyswarm is used at many universities worldwide to experimentally validate multi-robot systems algorithms. Written in C++ and Python and based on crazyflie_ros.

2014– **crazyflie_ros**, *author and maintainer*, https://github.com/whoenig/crazyflie_ros.
Robot Operating System (ROS) stack for the Crazyflie 1 and 2.x quadrotors. The stack provides low- and high-level interfaces, includes examples, and is described in a tutorial-style book chapter in detail. Written in C++ and Python.

Academic Experience

Teaching

2019–2020 **Guest Lecturer**, *California Institute of Technology, Pasadena, USA*.
Held two guest lectures and designed one homework assignment as part of "AE240/CDS270 Control and Estimation for Swarm Autonomy" (Fall 2019) and "AE103B Aerospace Control Systems" (Spring 2020, virtual lectures).
- Created and held lecture on "Motion Planning for (Multi) Robot Systems".
- Created and held lecture on "Planning Under Uncertainty for (Multi) Robot Systems".
- Created and graded homework assignment on rapidly-exploring random tree (RRT) and sequential convex programming (SCP).

2019 **Lab Assistant**, *3rd Summer School on Cognitive Robotics*, University of Southern California, Los Angeles, USA.
Co-designed and co-organized (with Jiaoyang Li and Sven Koenig) the lab on "Multi-Robot Path Planning". Assisted students during the summer school. Extended class material was subsequently accepted at AAAI Symposium on Educational Advances in Artificial Intelligence (EAAI-20) as Model AI Assignment (http://modelai.gettysburg.edu/2020/mapf/).

2015–2017 **Teaching Assistant**, *University of Southern California, Los Angeles, USA*.
- Spring 2017: TA for "CSCI 445: Introduction to Robotics".
- Spring 2016: Redesign of the CSCI 445 lab to use more modern robots and a simulation environment (V-REP). This led to a workshop publication at SIMPAR 2016.
- Fall 2015: TA for "CSCI 445: Introduction to Robotics": Held weekly lab-sessions to enhance students' knowledge about robotics, covering topics like actuators, sensors, PID controllers, and particle filters.

Outstanding PhD teaching assistant in the Department of Computer Science in 2017.

2007–2010 **Teaching Assistant**, *Technical University Dresden, Institute of Theoretical Computer Science, Dresden, Germany*.
- Biweekly interactive exercises for courses in "Algorithms and Data Structures" and "Programming".
- Independently prepared advanced exercises and sample exams.

2009 **Programming Instructor**, *Technical University Dresden, Dresden, Germany*.
Independently organized and conducted C programming tutorials, which were taught by several TU Dresden students outside school hours.

(Co)-Organizer

2019 Southern California Robotics Symposium (SCR)

Program Committee Member

2021 AAMAS

2020 IJCAI Workshop on Multi-Agent Path Finding

2019 International Symposium on Multi-Robot and Multi-Agent Systems (MRS)

2020, 2019 Pioneers Workshop at RSS

2019 Autonomous Robots and Multirobot Systems (ARMS) workshop at AAMAS

2019 International Workshop on Multi-Agent Path Finding at IJCAI

Reviewer

2020 Swarm Intelligence

2020, 2019, 2018 Autonomous Robots (AURO)

2020, 2019 Journal of Guidance, Control, and Dynamics

2019, 2020 Pioneers Workshop at RSS

2021, 2020, 2019, 2018 IEEE Robotics and Automation Letters (RA-L)

2018 International Journal of Robotics Research (IJRR)

2020, 2019, 2018, 2017 IEEE Transactions on Robotics

2021, 2020, 2018, 2017 International Conference on Robotics and Automation (ICRA)

2019, 2017 International Symposium on Multi-Robot and Multi-Agent Systems (MRS)

2019, 2017, 2016 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

2017 Planning and Robotics Workshop (PLANROB)

Mentoring

4/2019 – **Yashwanth Nakka**, *PhD Student*, California Institute of Technology.
Collaborated on research combining task assignment, control theory, and motion planning for multi-spacecraft on-orbit inspection (AIAA GNC 2021).

4/2019 – **Ben Riviere**, *PhD Student*, California Institute of Technology.
Collaborated on research combining machine learning, control theory, and multi-robot systems to learn a distributed, efficient, and safe policy for multi-robot motion planning (RA-L 2020).

4/2019 – **Guanya Shi**, *PhD Student*, California Institute of Technology.
Collaborated on research combining machine learning, control theory, and multi-robot systems to estimate the residual forces that occur when quadrotors fly in close proximity of each other (ICRA 2020). A journal version extending our work to heterogeneous swarms is submitted.

6/2018 – 4/2019 **Tao Chen**, *Master's Student Researcher*, University of Southern California.
Co-mentored (with Artem Molchanov) research on quadrotor control learning, resulting in a paper at IROS 2019. Tao received a 2019 Viterbi Master's Award for his research.

9/2017 – 3/2019 **Baskın Şenbaşlar**, *Master's Student Researcher*, University of Southern California.
Mentored research on robust motion execution, resulting in a paper at DARS 2018.

4/2017 – 5/2018 **Mark Debord**, *Master's Student Researcher*, University of Southern California.
Mentored research on motion planning for heterogeneous robot teams, resulting in a paper at IROS 2018.

9/2014 – 7/2015 **Christina Milanes**, *Undergraduate Researcher*, University of Southern California.
Mentored research on mixed reality, resulting in a paper at IROS 2015.

9/2014 – 7/2015 **Lisa Scaria**, *Undergraduate Researcher*, University of Southern California.
Mentored research on mixed reality, resulting in a paper at IROS 2015.

4/2019 – **Undergraduate and High School Researchers**, *California Institute of Technology*.
Co-mentored the following undergraduate students' research: Marcus Dominguez-Kuhne, Karthik P. Nair, Jennifer K. Sun, Brendan J. Hollaway. Co-mentored the following high school students' research: Sauhaarda Chowdhuri.

9/2014 – 3/2019 **Undergraduate Researchers**, *University of Southern California*.
Mentored the following undergraduate students' research: Kim Luong, Joao Victor Cordeiro Coutinho, Colin Heath, Jillian Khoo, Alex Colello, Eric Yihan Chen, Trevor Nielsen, Daniel Lytle, Ceasar Navarro.

9/2014 – 3/2019 **Master's Student Researchers**, *University of Southern California*.
Mentored the following Master's students' research: Minzhi Xue, Chotiwat Chawannakul, Alp Cevikel, Alexander Winger.

Outreach

Invited Talks/Panels

Regular presentations at conferences not listed.

1/2021 **IJCAI-20 Workshop on Multi-Agent Path Finding**.
Invited talk on "Multi-Agent Path Finding for Robotics: Progress and Challenges" (Remote).

11/2020 **Group Meeting Prof. Toussaint**, TU Berlin, Berlin, Germany.
Invited talk on "Using Function Approximation for Provable Safe Multi-Robot Motion Coordination" (Remote).

3/2020 **Joint Group Meeting Prof. Koenig and Prof. Ayanian**, University of Southern California, Los Angeles, USA.
Invited talk on "Using Function Approximation for Provable Safe Multi-Robot Motion Coordination" (Remote).

3/2020 **CAST Scientific Showcase**, California Institute of Technology, Pasadena, USA.
Presentation on "Swarm AI and Autonomy".

11/2019 **Aerial Swarms Workshop**, IEEE/RSJ International Conference on Intelligent Robots and Systems, Macau, China.
Invited talk on "Crazyswarm: A safe and low-cost solution for aerial swarm research".

10/2019 **2nd AI 4 Science Workshop**, California Institute of Technology, Pasadena, USA.
Invited talk on "Machine Learning for Agile Multirotor Teams".

4/2019 **Viterbi Best Dissertation Symposium**, University of Southern California, Los Angeles, USA.
Presented part of my PhD thesis work and its impact to a general (engineering) audience.

3/2019 **CSCI 697 Seminar in Computer Science Research**, University of Southern California, Los Angeles, USA.
Research in the Automatic Coordination of Teams (ACT) Laboratory

12/2018 **Czech Technical University in Prague**, Multi-robot Systems (MRS) group, Prague, Czech Republic.
Motion Planning for Quadrotor Teams in Obstacle-Rich Environments

12/2018 **Bosch Corporate Research**, Renningen, Germany.
Motion Coordination for Large Multi-Robot Teams in Obstacle-Rich Environments

9/2018 **University of Toronto**, Dynamic Systems Lab, Toronto, Canada.
Motion Coordination for Large Multi-Robot Teams in Obstacle-Rich Environments

9/2018 **California Institute of Technology**, Pasadena, USA.
Motion Coordination for Large Multi-Robot Teams in Obstacle-Rich Environments

9/2018 **Oregon State University**, Robotics Seminar, Corvalis, USA.
Motion Coordination for Large Multi-Robot Teams in Obstacle-Rich Environments

6/2018 **University of Southern California**, Information Sciences Institute, Marina del Rey, USA.
Scalable Task and Motion Planning for Multi-Robot Systems in Obstacle-Rich Environments

9/2017 **IEEE Panel**, *University of Southern California*, Los Angeles, CA.
Participated in a panel on career paths and ongoing education through industry and academia.

Media Coverage

2020 **Caltech News**.
Article on "Machine Learning Helps Robot Swarms Coordinate" also appeared on hackster.io, Engadget, and others.

2017 **Discovery Channel Canada**, *TV Science Documentary*.
Trajectory Planning for Quadrotor Swarms.

3/2017 **USA Today**, *Featured Tech Story*.
Article Online.

Demos/Tours

2018 **2018 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)**, *Madrid, Spain*.
Prepared a demo of the Crazyswarm in collaboration with Bitcraze.

2015 – 2018 **Annual Robotics Open House**, *University of Southern California*.
Prepared and presented live demos with UAVs and ground robots for visiting children and their families.

2017 **USC Viterbi New Years Message**, *University of Southern California*.
Prepared a New Year's message for Engineering students at USC in form of lightwriting using UAVs. Link.

Awards

2021 **Best AIAA GNC Graduate Student Paper**, *AIAA*, Guidance, Navigation, and Control.
Collaborated with Yashwanth Nakka, who won the best AIAA GNC Graduate Student Paper award for our paper "Information-Based Guidance and Control Architecture for Multi-Spacecraft On-Orbit Inspection."

2019 **Best Dissertation Award**, *University of Southern California*, Viterbi School of Engineering, Department of Computer Science.
Recipient of the 2019 Best Dissertation Award in Computer Science at USC.

2019 **Finalist for William F. Ballhaus, Jr. Prize for Excellence in Graduate Engineering Research**, *University of Southern California*, Viterbi School of Engineering.
One of four finalists for the best dissertation at the Viterbi School of Engineeering in 2019.

2019 **USC Stevens Center Commercialization Award**, *University of Southern California*.
Award is given to USC inventors whose technology was licensed during the preceding calendar year. MAPF-POST (ICAPS 2016) was licensed to Amazon Robotics as part of a research agreement.

2017 **Jenny Wang Excellence in Teaching Award**, *University of Southern California*, Viterbi School of Engineering.
Awarded outstanding PhD teaching assistant in the Department of Computer Science.

2017 **Best Research Assistant Award**, *University of Southern California*, Viterbi School of Engineering, Department of Computer Science.
Awarded outstanding research assistant in the Department of Computer Science.

2016 **Best Paper in Robotics Track**, *International Conference on Automated Planning and Scheduling (ICAPS)*, London, U.K.
Best paper in robotics track for the paper "Multi-Agent Path Finding with Kinematic Constraints".

2016 **Best Presentation**, *University of Southern California*, Computer Science Department.
Best presentation at annual research review poster session.

2015 **Best Demo**, *University of Southern California*, Computer Science Department.
Best demonstration at annual research review poster session.

2012 **Lohrmann-Medaille**, *Technical University Dresden*, School of Computer Science.
Valedictorian at the Institute of Computer Science with Computer Science as field of study.

2006 **Award by the Saxon State Ministry for Economic Affairs and Labor in Regional Youth Research Competition ("Jugend forscht")**, *Topic: "Development of a Balanced Solar Control"*, Dresden.
Developed a controller to optimize the collaboration between heat pumps and thermal solar collectors.

2005 **Winner of the 11th International Electrical Engineering-Olympics "Neisse Elektro 2000"**.
Competition between high-school students from Poland, Czech Republic, and Germany that requires students to solve electrical engineering questions.

Skills and Interests

Languages

German native speaker

English fluent

Programming

Programming Languages: C++ 11 (3 years professional), Python, Matlab, C, CUDA C, GPU Assembly, C#, Java, LaTeX, Perl, PHP, Haskell, Prolog, VHDL

APIs & Tools: pyTorch, PCL, OpenCV, boost, C++ STL, Eigen3, qpOASES, OSQP, nlopt, Gurobi, git

Robotics

Tools: ROS (author and maintainer of crazyflie_ros stack and the Crazyswarm), V-REP, Gazebo, FreeRTOS

Platforms: Bitcraze Crazyflie, iRobot Create2, TurtleBot 2, TurtleBot 3, custom built quadrotors