

ANDRIY SARABAKHA

Senior Scientist

andriy.sarabakha@tum.de • +49 15736417087 • E.85, Heßstraße 134, München 80797, Germany

[Portfolio Website](#) • [LinkedIn Page](#) • [Google Scholar](#) • [Youtube Channel](#) • [GitHub Repository](#)

EDUCATION

- Doctor of Philosophy in Mechanical and Aerospace Engineering** *January 2016 – August 2020*
Nanyang Technological University, Singapore (Singapore)
Thesis: ‘Learning Control of UAVs Using Artificial Intelligence-Based Methods’
- Master of Science in Artificial Intelligence and Robotics** *September 2012 – July 2015*
“Sapienza” Università di Roma, Rome (Italy) *Grade: 110 cum laude/110*
Thesis: ‘Reactive Obstacle Avoidance for UAVs Based on Dynamic Feedback Linearisation’
- Bachelor of Science in Computer Engineering** *September 2007 – March 2012*
“Sapienza” Università di Roma, Rome (Italy) *Grade: 110 cum laude/110*
Thesis: ‘On-Line Computer Game “UNO”’ (in Italian)
- Technical Manager in Information Technology** *September 2003 – July 2007*
I.T.I.S. “Antonio Meucci”, Rome (Italy) *Grade: 100/100*
Thesis: ‘Computer Game “Pacman” with Joystick’ (in Italian)

WORK EXPERIENCE

- Senior Scientist** *October 2020 – present*
Technische Universität München, Munich (Germany)
Tasks: lead Flying Systems Arena and Underwater Systems Lab, supervise PhD students, proposals writing
- Research Assistant** *March 2020 – September 2020*
Singapore University of Technology and Design, Singapore (Singapore)
Tasks: development of learning algorithms for nature-inspired unmanned aerial vehicles

TEACHING EXPERIENCE

- Aircraft Propulsion** *January 2018 – March 2018*
Teaching Assistant at Nanyang Technological University (Singapore)
- Flight Instrumentation and Navigation** *August 2017 – November 2017*
Teaching Assistant at Nanyang Technological University (Singapore)

INDUSTRIAL PROJECTS

- Mobile Robotics Hub for Environment Protection and Monitoring** *January 2021 – present*
Tasks: project leader, management and coordination of research assistants and PhD students
- Safe Autonomous Mobile Robot** *October 2020 – February 2021*
Tasks: project leader, management of the resources
- Indoor Manned-Unmanned Teaming with Multiple UAVs** *March 2020 – September 2020*
Tasks: implementation of trajectory generation and collision avoidance for unmanned aerial vehicles
- Visualisation of Virtual Outcrops Using Aerial Robots** *April 2019 – July 2019*
Tasks: preparation of unmanned aerial vehicles and installation of on-board sensors
- Learning Path Planning of UAVs with Vision-Based Sensing** *March 2018 – November 2019*
Tasks: implementation of deep neural network-based controllers for unmanned aerial vehicles
- Fuzzy Neural Network-Based Learning Control of UAVs** *January 2016 – May 2018*
Tasks: development, implementation and testing of adaptive controllers for Y6 coaxial hexacopter

STUDENT MENTORING

Auditory Feedback in Robotic Telepresence Doctoral student at Technische Universität München, Munich (Germany)	<i>October 2020 – present</i>
Efficient Robotic Telepresence Doctoral student at Technische Universität München, Munich (Germany)	<i>October 2020 – present</i>
Benchmarking Robotic Manipulators Doctoral student at Technische Universität München, Munich (Germany)	<i>October 2020 – present</i>
Synthetic Images for CNNs in Autonomous Drone Racing Master student at Aarhus Universitet, Aarhus (Denmark)	<i>January 2019 – July 2019</i>
Design, Construction and Control of Gripper for UAV Bachelor student at Nanyang Technological University, Singapore (Singapore)	<i>August 2017 – April 2018</i>
Design of Delivery Box for UAV Bachelor student at Nanyang Technological University, Singapore (Singapore)	<i>August 2017 – April 2018</i>
Design and Control and Small-Size UAV Bachelor student at Nanyang Technological University, Singapore (Singapore)	<i>August 2016 – April 2017</i>
DNN for Improving Trajectory Tracking of UAV Undergraduate student at Nanyang Technological University (Singapore)	<i>August 2017 – June 2018</i>

AWARDS & GRANTS

Singapore International Graduate Award PhD scholarship	<i>January 2016 – January 2020</i>
IEEE CIS Travel Grant FUZZ-IEEE 2017 conference travel	<i>July 2017</i>
EUSFLAT Student Grant FUZZ-IEEE 2017 conference registration	<i>July 2017</i>

TECHNICAL SKILLS

Programming Languages	C, C++, Java, Matlab, HTML, PHP, SQL, Python, L ^A T _E X
Operating Systems	Windows, Linux, ROS
Software Tools	Microsoft Office, Photoshop, Corel Video Studio

LANGUAGE KNOWLEDGE

Ukrainian	Mother tongue
English	Advanced
Italian	Advanced
Russian	Upper intermediate
German	Beginner

ACADEMIC REFERENCES

- Assoc Prof Erdal Kayacan – erdal@eng.au.dk
- Assoc Prof Domenico Campolo – d.campolo@ntu.edu.sg
- Assoc Prof Yiqun Dong – yiqundong@fudan.edu.cn
- Assist Prof Changhong Fu – changhongfu@tongji.edu.cn
- Prof Giuseppe Oriolo – oriolo@diag.uniroma1.it

REVIEW DUTIES

Journals	IEEE Transactions on Fuzzy Systems, IEEE Transactions on Industrial Electronics, IEEE Transactions on Industrial Informatics, IEEE/ASME Transactions on Mechatronics, IEEE Robotics and Automation Letters, IEEE/CAA Journal of Automatica Sinica, IEEE Transactions on Systems, Man and Cybernetics: Systems
Conferences	FUZZ-IEEE'17, FUZZ-IEEE'18, IROS'18, FUZZ-IEEE'20, IROS'20, ICRA'21, FUZZ-IEEE'21, IROS'21

PUBLICATION LIST

Journal Articles

- [7] **A. Sarabakha** and E. Kayacan, "Online Deep Fuzzy Learning for Control of Nonlinear Systems Using Expert Knowledge," *IEEE Transactions on Fuzzy Systems*, vol. 28, no. 7, pp. 1492–1503, July 2020. doi:[10.1109/TFUZZ.2019.2936787](https://doi.org/10.1109/TFUZZ.2019.2936787), video:tiny.cc/DFNN
- [6] **A. Sarabakha**, C. Fu, and E. Kayacan, "Intuit Before Tuning: Type-1 and Type-2 Fuzzy Logic Controllers," *Applied Soft Computing*, vol. 81, pp. 105495–105510, Aug. 2019. doi:[10.1016/j.asoc.2019.105495](https://doi.org/10.1016/j.asoc.2019.105495), video:tiny.cc/FM-FLC
- [5] S. Patel, **A. Sarabakha**, D. Kircali, and E. Kayacan, "An Intelligent Hybrid Artificial Neural Network-Based Approach for Control of Aerial Robots," *Journal of Intelligent & Robotic Systems*, pp. 1–12, May 2019. doi:[10.1007/s10846-019-01031-z](https://doi.org/10.1007/s10846-019-01031-z), video:tiny.cc/failure-ANN
- [4] **A. Sarabakha**, C. Fu, E. Kayacan, and T. Kumbasar, "Type-2 Fuzzy Logic Controllers Made Even Simpler: From Design to Deployment for UAVs," *IEEE Transactions on Industrial Electronics*, vol. 65, no. 6, pp. 5069–5077, June 2018. doi:[10.1109/TIE.2017.2767546](https://doi.org/10.1109/TIE.2017.2767546), video:tiny.cc/SI-IT2-FLC
- [3] E. Kayacan, **A. Sarabakha**, S. Coupland, R. John, and M. A. Khanesar, "Type-2 Fuzzy Elliptic Membership Functions for Modeling Uncertainty," *Engineering Applications of Artificial Intelligence*, vol. 70, pp. 170–183, Apr. 2018. doi:[10.1016/j.engappai.2018.02.004](https://doi.org/10.1016/j.engappai.2018.02.004)
- [2] C. Fu, **A. Sarabakha**, E. Kayacan, C. Wagner, R. John, and J. M. Garibaldi, "Input Uncertainty Sensitivity Enhanced Nonsingleton Fuzzy Logic Controllers for Long-Term Navigation of Quadrotor UAVs," *IEEE/ASME Transactions on Mechatronics*, vol. 23, no. 2, pp. 725–734, Apr. 2018. doi:[10.1109/TMECH.2018.2810947](https://doi.org/10.1109/TMECH.2018.2810947), video:tiny.cc/SLAM-FLC
- [1] **A. Sarabakha**, N. Imanberdiyev, E. Kayacan, M. A. Khanesar, and H. Hagnas, "Novel Levenberg-Marquardt Based Learning Algorithm for Unmanned Aerial Vehicles," *Information Sciences*, vol. 417, pp. 361–380, Nov. 2017. doi:[10.1016/j.ins.2017.07.020](https://doi.org/10.1016/j.ins.2017.07.020), video:tiny.cc/FNN

Conference Proceedings

- [9] H. X. Pham, I. Bozcan, **A. Sarabakha**, S. Haddadin and E. Kayacan, "GateNet: An Efficient Deep Neural Network Architecture for Gate Perception Using Fish-Eye Camera in Autonomous Drone Racing," *2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Submitted. video:tiny.cc/drone-racing
- [8] T. Morales, **A. Sarabakha**, and E. Kayacan, "Image Generation for Efficient Neural Network Training in Autonomous Drone Racing," in *2020 IEEE International Joint Conference on Neural Networks (IJCNN)*, Glasgow, UK, 2020, pp. 1–8. doi:[10.1109/IJCNN48605.2020.9206943](https://doi.org/10.1109/IJCNN48605.2020.9206943), video:tiny.cc/gate-detection
- [7] S. Patel, **A. Sarabakha**, D. Kircali, G. Loianno, and E. Kayacan, "Artificial Neural Network-Assisted Controller for Fast and Agile UAV Flight: Onboard Implementation and Experimental Results," in *2019 International Workshop on Research, Education and Development on Unmanned Aerial Systems (RED-UAS)*, Cranfield, UK, 2019, pp. 37–43. doi:[10.1109/REDUAS47371.2019.8999677](https://doi.org/10.1109/REDUAS47371.2019.8999677), video:tiny.cc/fast-ANN
- [6] S. Zhou, **A. Sarabakha**, E. Kayacan, M. K. Helwa, and A. P. Schoellig, "Knowledge Transfer Between Robots with Similar Dynamics for High-Accuracy Impromptu Trajectory Tracking," in *2019 European Control Conference (ECC)*, Naples, Italy, 2019, pp. 1–8. doi:[10.23919/ECC.2019.8796140](https://doi.org/10.23919/ECC.2019.8796140), video:tiny.cc/DNN
- [5] **A. Sarabakha** and E. Kayacan, "Online Deep Learning for Improved Trajectory Tracking of Unmanned Aerial Vehicles Using Expert Knowledge," in *2019 IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, 2019, pp. 7727–7733. doi:[10.1109/ICRA.2019.8794314](https://doi.org/10.1109/ICRA.2019.8794314), video:tiny.cc/DNN-FLS

- [4] C. Fu, **A. Sarabakha**, E. Kayacan, C. Wagner, R. John, and J. M. Garibaldi, “Similarity-Based Non-Singleton Fuzzy Logic Control for Improved Performance in UAVs,” in *2017 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, Naples, Italy, 2017, pp. 1–6. doi:[10.1109/FUZZ-IEEE.2017.8015440](https://doi.org/10.1109/FUZZ-IEEE.2017.8015440), video:tiny.cc/T1-FLC
- [3] **A. Sarabakha**, C. Fu, and E. Kayacan, “Double-Input Interval Type-2 Fuzzy Logic Controllers: Analysis and Design,” in *2017 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, Naples, Italy, 2017, pp. 1–6. doi:[10.1109/FUZZ-IEEE.2017.8015485](https://doi.org/10.1109/FUZZ-IEEE.2017.8015485), video:tiny.cc/DI-IT2-FLC
- [2] C. Fu, **A. Sarabakha**, E. Kayacan, C. Wagner, R. John, and J. M. Garibaldi, “A Comparative Study on the Control of Quadcopter UAVs by Using Singleton and Non-Singleton Fuzzy Logic Controllers,” in *2016 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, Vancouver, Canada, 2016, pp. 1023–1030. doi:[10.1109/FUZZ-IEEE.2016.7737800](https://doi.org/10.1109/FUZZ-IEEE.2016.7737800)
- [1] **A. Sarabakha** and E. Kayacan, “Y6 Tricopter Autonomous Evacuation in an Indoor Environment Using Q-Learning Algorithm,” in *2016 IEEE 55th Conference on Decision and Control (CDC)*, Las Vegas, USA, 2016, pp. 5992–5997. doi:[10.1109/CDC.2016.7799189](https://doi.org/10.1109/CDC.2016.7799189), video:tiny.cc/QLearning

INVITED TALKS

Workshops

- [2] “Artificial Neural Network-Based Controllers for Fast and Agile UAV Flight,” at *IROS 2019 workshop on Fast Neural Perception and Learning for Intelligent Vehicles and Robotics*, November 4, 2019, Macau.
- [1] “Learning Control of Unmanned Aerial Vehicles Using Artificial Intelligence-Based Methods,” at *LUCID 2017 workshop on Uncertainty in Data and Decision Making*, July 18, 2017, Rothley, UK.

Tutorials

- [2] “Vision-Based Control of UAVs Using Type-1 and Type-2 FLCs with ROS,” at *Computational Intelligence Chapter*, May 20, 2017, Nanyang Technological University, Singapore.
- [1] “Vision-Based Control of UAVs by Using Type-1 and Type-2 FLCs with ROS” at *FUZZ-IEEE 2017*, July 9, 2017, Naples, Italy.