Czech Technical University in Prague
Department of Cybernetics
Multi-Robot Systems & Fly4Future
✉ *petracekpav@gmail.com*
+420 739 757 519
mrs.felk.cvut.cz/pavel-petracek
GitHub *Google Scholar*
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Pavel Petráček

Personal information

Nationality	Czech
Date of birth	November 26, 1994
Languages	Czech (native speaker), English

Education

2019–2024 **PhD in Mobile Robotics,** Department of Cybernetics, Faculty of Electrical Engineering, Czech Technical University in Prague (FEE CTU)
— **dissertation**: Robust UAV localization in perception-degraded environments (pdf)
— **supervisor**: doc. Ing. Martin Saska, Dr. rer. nat.
— **publication count** since 2019: 14 impacted journals, 3 conference proceedings
— **h-index**: 9 in WoS, 15 in Google Scholar, **citations count**: 220+ in WoS, 740+ in Google Scholar

2017–2019 **Engineer in Cybernetics and Robotics,** FEE CTU

2014–2017 **Bachelor in Cybernetics and Robotics,** FEE CTU

Experience: Academia

2019–present **Researcher at Multi-Robot Systems laboratory,** FEE CTU
— **research:** resilient autonomy of aerial robots in real-world settings | distributed multi-robot coordination
— **experience:** co-development of the MRS UAV System (Github) | research applied in real practice (heritage preservation, speleology, search & rescue, firefighting) | robotic experiments and competitions | demos for investors, industrial partners, students, and media | student supervision | project management | field popularization | academic teaching | events organization (summer schools and workshops)

Research projects & robotic competitions

2020–2022 **DARPA Subterranean Challenge (web):** Exploring unknown subterranean environments with a cooperative team of ground and aerial autonomous robots
— **contributions:** novel methods of onboard perception, localization, and mapping of UAVs in perception-degraded environments | UAV system design | real-time systems integration | system evaluation and testing | key member for in situ deployment of aerial robots

2018–2022 **Dronument (video):** Documenting interiors of historical structures with autonomous aerial teams
— **contributions:** reliable **autonomous UAV team cooperating in interiors of historical structures** | robustness to geometrical symmetricity and other perceptual degradation | direct use in heritage preservation: deployed for documenting 18 historical objects (including 2 UNESCO sites)

2017-2024 **Swarming (video):** Decentralizing communication-less control of UAVs among obstacles
— **contributions:** novel bio-inspired algorithms for communication-less perception-aware coordination of UAV teams in obstacle-filled environments

2020–2024 **DOFEC (video):** Extinguishing fires in aboveground floors using an autonomous UAV
— **contributions:** detection and localization of fires from on-board sensors | mission planning

International stays

2023 **Autonomous Robots Lab at NTNU:** 2 months research stay, cooperation on doctoral topic with prof. Kostas Alexis

2017 **Aerospace Information Technology at University of Würzburg, Germany:** summer school

Experience: Industry

2023–present **Fly4Future s.r.o.:** R&D projects leader

Utilizing my field experience in transferring state-of-the-art research in aerial robotics to industry

- [2024–present, grant TAČR Trend] Innovating autonomous interior inspection in project INDAIR
- [2025–present, grant TAČR Sigma] Finding and saving roe deers during haymaking with robots

2016-2017 **CertiCon a.s.:** learned how to properly think about and write automated software tests | gained experience in corporate project management and scheduling

2012-2014 **KD planeta s.r.o.:** first-hand experience with robotic automation — interaction between human operators, robotic manipulators, and CNC machinery

Honors & awards

2025 **Werner von Siemens price:** my dissertation was selected as top (**link**) out of 243 STEM-related works in Czechia in 2023-2024

2024 **Dean's price:** my dissertation was evaluated as top 1% works at (**link**) FEE CTU that year

2022 **Methodology M17+:** excellent international evaluation of our Dronument solution (**link**)

2021 **DARPA Subterranean Challenge:** team CTU-CRAS-NORLAB competing with international universities and companies (e.g., Caltech, MIT, ETH Zürich) in multi-robot search & rescue operations in underground environments

— 1st place among non-funded teams in the Urban Circuit, real-world deployment ($500k)
— 2nd place among all teams in the Final Round, virtual deployment ($500k)

2019 **Dean's price for Master thesis**

— **topic:** Design, localization and position control of a specialized UAV platform for documentation of historical monuments

2017 **Dean's price for Bachelor thesis**

— **topic:** Decentralized model of a swarm behavior Boids in ROS

Academic activities

Teaching
- Algorithms and Programming: Python and basic programming algorithms for Bachelor students
- Multi-Robot Aerial Systems: for Master students, author of UAV swarming task #3

Workshops
- Seminar tasks introduction, *In IEEE RAS Summer School on Multi-Robot Systems*, 2022.
- Dronument workshop (organizer and speaker), *hosted at FEE CTU*, 2021.
- Importance Sampling: Degradation-Aware Alternative to Voxelization in Robot Pose Estimation, *In IEEE IROS IPPC **and** ROPEM workshops*, 2023.
- Cooperative UAV Autonomy of Dronument: New Era in Cultural Heritage Preservation, *In IEEE IROS IPPC workshop*, 2023.
- Decentralized Aerial Swarms Using Vision-Based Mutual Localization, *In IEEE IROS (Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy)*, 2018.

Conference committee
- Co-chair of session *Micro and Mini UAS I* at ICUAS'22 (chair: prof. Subodh Bhandari).

Reviewer for journals and conferences

- Transactions on Cybernetics
- Transactions on Robotics (T-RO)
- Transactions on Field Robotics (T-FR)
- Robotics and Automation Letters (RA-L)
- International Conference on Robotics and Automation (ICRA)
- International Conference on Intelligent Robots and Systems (IROS)

Supervised students

Ing. **Vojtěch Nydrle,** Cybernetics and robotics, FEE CTU
— thesis: Extinguishing of indoor fires by an autonomous UAV

Martin Fischer, Cybernetics and robotics, FEE CTU
— thesis: Matching of multimodal features

Bc. **Vojtěch Nydrle,** Cybernetics and robotics, FEE CTU
— thesis: Design of a specialized UAV platform for the discharge of a fire extinguishing capsule (Dean's price for astounding Bachelor thesis)

Martin Fischer, Cybernetics and robotics, FEE CTU
— thesis: Lidar and multi-camera calibration and fusion (Dean's price for astounding Bachelor thesis)

Azat Mukhametshin, Open informatics, FEE CTU
— thesis: World management and coverage path planning in the MRS UAV System