



Martin Saska

Head of Multi-robot Systems Group

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EDUCATION

March 2006 – October 2010 **Dr.rer.nat. (=Ph.D.) - Julius Maximilians Universität Würzburg, Germany.** International Doctorate Program „Identification, Optimization and Control with Applications in Modern Technologies“ within the **Elite Network of Bavaria**. *Topic of thesis:* „Trajectory planning and optimal control for formations of autonomous robots“.

September 1999 – February 2005 **Ing. (=M.Sc.) - Czech Technical University in Prague,** Faculty of electrical engineering. Master program: Electrical Engineering and Information Technology, Branch of study: Technical Cybernetics (**thesis defended with honours**).

WORK EXPERIENCE

January 2015 – now Senior researcher. Founder and head of Multi-robot Systems Group (10 full-time employees: 6 PhD students, 3 postdocs, 1 senior researcher; & 10-15 master and bachelor students employed part-time) *http://mrs.felk.cvut.cz/people*

June 2009 – December 2014 Research fellow at Czech Technical University in Prague

March 2006 – April 2009 Research fellow at Julius Maximilians Universität Würzburg

RESEARCH STAY ABROAD AND SEMINARS

September 2011 – October 2011 & June 2013 & April 2016 **University of Pennsylvania, USA**
Short research stays at GRASP laboratory (cooperation with group of Prof. Vijay Kumar). Scientific work within a joint CZ-US project COLOS (Control and Localization for Swarms of low-cost helicopters). Scientific results obtained in USA published with US colleagues at conference (3) and imp. journals (5).

March 2008 – May 2008 **University of Illinois at Urbana-Champaign, USA**
Short research stay at Control and Decision Group of the Coordinated Science Laboratory. Scientific results obtained in USA published with US colleagues at a conference and imp. journal.

September 2007 – February 2008 **Julius Maximilians Universität Würzburg, Germany**
German courses: Grundstufe I, Grundstufe II, Mittelstufe I

September 2006 – June 2009 **Elite Network of Bavaria, Germany**
IDP Summer-School I, IDP Summer-School II, IDP Winter-School: presentations of top scientists with topic: Identification, Optimization and Control with Applications in Modern Technologies.

PROJECTS

Principal investigator:

- Czech Grant Agency project "Stabilization and control of teams of relatively-localized micro aerial vehicles in high obstacle density areas"
- Joint project of CTU in Prague, University of Pennsylvania and University of Lincoln of total funding 200k USD provided by Khalifa University in Abu Dhabi "Multi MAV team for the MBZIRC 2017 competition"
- Czech Grant Agency project "Stabilization of micro-UAV swarms under decentralized relative localization"
- Czech Grant Agency project "Methods for identification and visualization tunnels for flexible ligands in dynamic proteins"
- CESNET project "System for multi-sensor scanning of historical building by unmanned helicopters"
- Joint project of CTU in Prague and CNRS in Toulouse "Cooperative surveillance and environment monitoring by heterogeneous teams of unmanned aerial vehicles"
- SGS project "Motion planning, navigation and stabilization of formations of quad-rotors"

Research coordinator: Joint project of CTU in Prague and University of Pennsylvania "COLOS - Control and Localization for Swarms of Low-cost Autonomous Robots" (principal investigator L. Přeučil)

Team member: EU FP7 project Sybrion, MŠMT project SyRoTek

AWARDS

- 1st prize in MBZIRC 2017 competition (the 3rd challenge) - team leader
- 2nd prize in MBZIRC 2017 competition (the 1st challenge) - team leader
- 3rd prize in MBZIRC 2017 competition (the Grand challenge) - team leader
- IEEE ETFA 2017 - Best Paper Award (first author)
- ICUAS 2013 - Best Paper Award (first author)
- ICRA 2008 - Best Paper Award honoured finalist (first author)
- MSc. thesis awarded the Dean's prize

INVITED TALKS

- IEEE ICRAI 2016 Keynote
- UAV workshop in Paris 2015 Keynote
- Winter school at University of Buenos Aires 2015 (total 18 hours of lectures in the field of advanced motion planning)
- Lakeside Research Days 2013
- IDP Summer-School III 2009
- GRASP laboratory – University of Pennsylvania 2011&2016, Universitat Politècnica de Catalunya 2017, Bournemouth University 2008, University of Illinois 2008

STUDENT WORKS

PhD students: 4 running

Master thesis: 8 at CTU (2 awarded by the Dean's prize), 2 at University of Wuerzburg

Bachelor thesis: 32 at CTU

EDITORIAL ACTIVITIES

Program committee member: IEEE IROS 2017, ICUAS 2017, IEEE ICRA 2016, ICUAS 2016, ICUAS 2015, RA 2007, FLAIRS-29, FLAIRS-28, FLAIRS-27, IDC 2013

Reviews in imp. journals: IEEE trans. on automatic control, IEEE trans. on automation science and engineering, IEEE Trans. on Industrial Electronics, Journal of intell. & robotic syst., Autonomous robots, Swarm intelligence, IEEE Systems, Man and Cybernetics: Systems, Neurocomputing, European journal of control, Journal of the franklin institute, Engineering and applied mathematics.

Project evaluations: TAČR (>10 proposals of application oriented projects)

10 SELECTED PUBLICATIONS (WoS: 49 publications, 276 citations, H-Index 10; Google Scholar: 80 publications, 1412 citations, **H-Index 21**)

- **Saska, M.** - Vonásek, V. - Krajník, T. - Přeučil, L. Coordination and navigation of heterogeneous MAV-UGV formations localized by a 'hawk-eye'-like approach under a model predictive control scheme. **International Journal of Robotics Research (IJRR)**, 33(10):1393-1412, 2014.
- **Saska, M.** - Baca, T. - Thomas, J. - Chudoba, J. - Preucil, L. - Krajník, T. - Faigl, J. - Loianno, G. - Kumar, V. System for deployment of groups of micro aerial vehicles in GPS-denied environments using onboard visual relative localization. **Autonomous Robots (AURO)**, 41(4):919-944, 2017.
- **Saska, M.** - Spurný, V. - Vonasek, V. Predictive control and stabilization of nonholonomic formations with integrated spline-path planning. **Robotics and Autonomous Systems (RAS)**, 75(Part B):379-397, 2016.
- Vonasek, V. - **Saska, M.** - Kosnar, K. - Preucil, L. Motion planning with adaptive motion primitives for modular robots. **Applied Soft Computing (ASC)** 34(1):678-692, 2015.
- Vonasek, V. - **Saska, M.** - Winkler, L. - Preucil, L. High-level motion planning for CPG-driven modular robots. **Robotics and Autonomous Systems (RAS)** 68:116 - 128, 2015.

- **Saska, M.** - Vonásek, V. - Chudoba, J. - Thomas, J. - Loianno, G. - Kumar, V. Swarm Distribution and Deployment for Cooperative Surveillance by Micro-Aerial Vehicles. **Journal of Intelligent & Robotic Systems**, first online, 2016.
- **Saska, M.** - Krajník, T. - Vonásek, V. - Kasl, Z. - Spurný, V. - Přeučil, L.: Fault-tolerant formation driving mechanism designed for heterogeneous MAVs-UGVs groups, **Journal of Intelligent & Robotic Systems**, 73(1-4): 603-622, 2014.
- **Saska, M.** - Mejía, J. S. - Stipanović, D. M. - Vonásek, V. - Schilling, K. - Přeučil, L.: Control and navigation in manoeuvres of formations of unmanned mobile vehicles, **European Journal of Control**, 19(2):157–171, March 2013.
- **Saska, M.** - Vonasek, V - Preucil, L.: Trajectory Planning and Control for Airport Snow Sweeping by Autonomous Formations of Ploughs. **Journal of Intelligent and Robotic Systems** 72(2):239–261, 2013.
- Krajnik, T - Nitsche, M - Faigl, J - Vanek, P - **Saska, M** - Preucil, L - Duckett, T - Mejail, M. A Practical Multirobot Localization System. **Journal of Intelligent & Robotic Systems** 76(3-4):539-562, 2014.

For a complete list of my Web of Science publications see <http://mrs.felk.cvut.cz/people/martin-saska>