

MARKUS RYLL

Postdoctoral Researcher

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Laboratory for Analysis and Architecture of Systems, CNRS, France

EDUCATION

- MPI for Biological Cybernetics / University of Stuttgart** | Dr.-Ing. (PhD) *2010 – 2014*
Control Theory, Grade: Magna cum laude, Advisors: P. Robuffo Giordano, H. Bühlhoff
- Ulm University of Applied Sciences** | Master of Engineering *2008 – 2010*
Medical Engineering, Grade: Outstanding, Advisors: Wolfgang Keck, Philip Köck
- Baden-Württemberg Cooperative State University** | Dipl.-Ing. (BA) *2005 – 2008*
Mechatronics, Grade: Outstanding, Advisor: Jörg Isele

PROFESSIONAL APPOINTMENTS

- Laboratory for Analysis and Architecture of Systems** | Postdoctoral Researcher *2014 – 2017*
Robotics and Interactions Group, Antonio Franchi Lab
- MPI for Biological Cybernetics** | PhD Student *2010 – 2014*
Department Human Perception, Cognition and Action, Paolo Robuffo Giordano Lab
- Karolinska Institute** | Master Student *2009 – 2010*
Department of Biosciences and Nutrition, Hans Hebert Lab with Dr. Philip Köck
- Karlsruhe Institute of Technology** | Research Intern *2005 – 2008*
Institute for Applied Computer Science, Jörg Isele Lab

HONORS AND FUNDINGS

- DFG grant** | Key personnel *2015 – 2016*
- Mini Graduate Schoole at Uni. Tübingen** | 6 PhD positions, PI Andreas Zell *2014 – 2016*
- Max Planck PhD fellowship** | Full stipend for graduate school *2010 – 2014*
- Leonardo Da Vinci grant** | Key personnel *2009 – 2010*

TEACHING

- Mobile Robots (Robotics II)** | Eberhard Karls University, Tübingen *2012 – 2014*
- Applied Mechanics** | Baden-Württemberg Cooperative State University, Stuttgart *2011 – 2012*

PROFESSIONAL SERVICE

- Ad-hoc Reviewer:** IEEE Transactions on Robotics | International Journal of Robotics Research | Journal of Field Robotics | Autonomous Robots | International Journal of Robust and Nonlinear Control | IEEE Transactions on Control Systems Technology | IEEE Control Systems Letters | MDPI Applied Sciences | MDPI Energies | IEEE International Conference on Intelligent Robots and Systems | IEEE International Conference on Robotics and Automation | IEEE Transactions on Automation Science and Engineering | International Symposium of Robotic Research | European Control Conference 2015 | IEEE Conference on Decision and Control | International Conference on Advanced Robotics
- Fellow Speaker:** PhD spokesperson at MPI for Biological Cybernetics *2010 – 2012*
- Editor of Ph.D. Max-Planck-Society magazine:** "the offspring" *2010*

PUBLICATIONS

Journal Publications Submitted and In Preparation

M. **Ryll**, G. Muscio, F. Pierri, E. Cataldi, G. Antonelli, F. Caccavale, and A. Franchi, “Novel approaches in 6d physical interaction with a fully actuated aerial robot,” (in preparation)

M. **Ryll** and A. Franchi, “Towards truly redundant aerial manipulators: Modeling and control of a fully actuated hexarotor equipped with a robotic arm,” (in preparation)

G. Michieletto, M. **Ryll**, and A. Franchi, “Hoverability-based analysis of rotor-failure robustness for multi-rotor aerial vehicles,” (submitted)

A. Franchi, R. Carli, D. Bicego, and M. **Ryll**, “Full-pose tracking control for aerial robotic systems with laterally-bounded input force,” (submitted)

Published Journal Publications

M. **Ryll**, H. Bühlhoff, and P. Robuffo Giordano, “A novel overactuated quadrotor unmanned aerial vehicle: Modeling, control, and experimental validation,” *IEEE Transactions on Control Systems Technology*, vol. 23, no. 2, pp. 540–556, 2015

A. Franchi, C. Secchi, M. **Ryll**, H. Bühlhoff, and P. R. Giordano, “Bilateral shared control of multiple quadrotors: Balancing autonomy and human assistance with a group of uavs,” *IEEE Robotics & Automation Magazine*, vol. 19, no. 3, pp. 57–68, 2012

A. Franchi, C. Masone, V. Grabe, M. **Ryll**, H. H. Bühlhoff, and P. R. Giordano, “Modeling and control of uav bearing-formations with bilateral high-level steering,” *The International Journal of Robotics Research*, pp. 32:1302–1322, 2012

Conference Publications

M. **Ryll**, G. Muscio, F. Pierri, E. Cataldi, G. Antonelli, F. Caccavale, and A. Franchi, “6d physical interaction with a fully actuated aerial robot,” in *2017 IEEE Int. Conf. on Robotics and Automation*, 2017

G. Michieletto, M. **Ryll**, and A. Franchi, “Control of statically hoverable multi-rotor aerial vehicles and application to rotor-failure robustness for hexarotors,” in *2017 IEEE Int. Conf. on Robotics and Automation*, 2017

M. **Ryll**, D. Bicego, and A. Franchi, “Modeling and control of fast-hex: a fully-actuated by synchronized-tilting hexarotor,” in *2016 IEEE/RSJ Int. Conf. on Intelligent Robots and System*, pp. 1689–1694, 2016

S. Rajappa, M. **Ryll**, H. H. Bühlhoff, and A. Franchi, “Modeling, control and design optimization for a fully-actuated hexarotor aerial vehicle with tilted propellers,” in *Robotics and Automation (ICRA), 2015 IEEE International Conference on*, pp. 4006–4013, IEEE, 2015

G. Gioioso, M. **Ryll**, D. Prattichizzo, H. Bühlhoff, and A. Franchi, “Turning a near-hovering controlled quadrotor into a 3d force effector,” *Robotics and Automation (ICRA), 2014 IEEE International Conference on*, pp. 6278 – 6284, 2014

M. **Ryll**, H. H. Bühlhoff, and P. R. Giordano, “First flight tests for a quadrotor uav with tilting propellers,” in *Robotics and Automation (ICRA), 2013 IEEE International Conference on*, pp. 295–302, IEEE, 2013

R. Spica, P. R. Giordano, M. **Ryll**, H. H. Bühlhoff, A. Franchi, *et al.*, “An open-source hardware/software architecture for quadrotor uavs,” in *2nd Workshop on Research, Education and Development of Unmanned Aerial System*, 2013

M. Ryll, H. H. Bühlhoff, and P. R. Giordano, “Modeling and control of a quadrotor uav with tilting propellers,” in *2012 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4606–4613, IEEE, 2012

Doctoral and master thesis

M. Ryll, “A novel overactuated quadrotor uav,” PhD Thesis, University of Stuttgart, Institut für Systemtechnik, Fakultät 7, February 2015

M. Ryll, “Protein structure determination from electron microscopic images of poorly ordered two-dimensional crystals,” Master Thesis, Ulm University of Applied Sciences, March 2010

INVITED PRESENTATIONS

ICRA 2017, Singapore | Workshop on Autonomous Structural Monitoring and Maintenance using Aerial Robots | *Interaction control with a fully actuated aerial platform* 2017

GT Uav, Aix-Marseille University | *Fully- and over-actuated Aerial Vehicles: Mechanical Design and Control Methods* 2016

LAAS-CNRS, Toulouse | *Overactuation in UAVs towards Aerial Manipulation - A Quadrotor with Tilting Propellers* 2013

6th International Workshop on Human-Friendly Robotics, Rome | *Overactuation in UAVs for enhanced Aerial Manipulation: A novel Quadrotor concept with Tilting Propellers* 2013

DGR-Tage, Berlin | *Overactuation in UAVs - Modeling and Control of a Quadrotor with Tilting Propellers* 2012

MEDIA COVERAGE

Article in French newspaper *La Dépêche*: [Le futur de la robotique est en marche](#) 2017

Article in French newspaper *20 minutes*: [Les premiers robots aériens au monde](#) 2017

Article in *CNRS NEWS*: [Robots Head for the Sky](#) 2017

Episode of French TV show *Qui cherche... cherche*: [Juan Cortès, algorithmicien, roboticien](#) 2016

Article on IEEE Spectrum: [Quadrotor With Tilting Propellers Can Twist in Midair](#) 2012

Radio interview on BBC: [Science in Action](#) (starting 15:00) 2012

REFERENCES

Antonio Franchi | Research Scientist
Lab. d’Analyse et d’Architecture des Systèmes
Centre National de la Recherche Scientifique
antonio.franchi@laas.fr
Postdoc Supervisor

Paolo Robuffo Giordano | Research Director
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PhD Supervisor

Heinrich Bühlhoff | Prof. Dr.
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PhD Supervisor

Gianluca Antonelli | Prof. Dr.
Dip. di Ingegneria Elettrica e dell’Informazione
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Collaborator