

Curriculum Vitae

First and Last Name: **Jürgen LEITNER** Nationality: **Austrian** Date of birth: **July 27, 1983**
Spoken Languages: English (fluent), German (native), Italian (intermediate), Swedish (basic)

Current Position

Post-doctoral Research Fellow, Robotics, Vision and Actions since Nov 2014

Queensland University of Technology (QUT), Centre of Excellence in Robotic Vision: creating robots that see by investigating novel approaches for integrating machine learning, computer vision & robotics, I develop robotic vision systems & demonstrators for (mobile) manipulation (visual serving, visual behaviour based control), human robot interaction in various application areas (from medical to space exploration) <http://roboticvision.org>

Research Interests

Artificial Intelligence: deep-learning, reinforcement learning, adaptive learning agents & embodied intelligence,

Autonomous and Adaptive Robots: self-adapting robotics, sensorimotor coordination, developmental and evolutionary robotics, cognitive robotics, sensorimotor development, integration of action and perception

Computer Vision: real-time object detection, machine learning and vision, genetic programming for computer vision and image processing, intent detection, action inference, visual control of manipulation, vision for HRI

Space Exploration: autonomous spacecraft & rovers, orbital/planetary construction tasks & astronaut assistance, multi-robot collaboration and cooperation, Human-Agent-Robot-Teams (HART)

Neuroscience, Space Science & Space Technology, Pervasive Computing and Augmented Reality

Research Experience

Researcher, Artificial Intelligence and Robotics Oct 2010 - Sep 2014

Istituto Dalle Molle di Studi sull'Intelligenza Artificiale (IDSIA): first author of 10+ publications on the lab's cutting-edge research in robotics, computer vision machine learning and control, within various EU projects (STIFF, IM-CLeVeR, WAY), mainly applied on the iCub humanoid <http://www.idsia.ch/~leitner/>

Young Graduate Trainee, European Space Agency Oct 2010 - Sep 2014

Advanced Concepts Team (ACT): research on neuro-controller for autonomous spacecraft (s/c) docking, multi-agent simulation of fractionated s/c, "Space for Security": technical analysis of strategic & advanced concepts, reporting/studies on possible dual-use technologies in disaster response <http://www.esa.int/act>

Co-Founder, SpaceMaster Robotics Team 2008 - 2010

development of projects: design of prototype assistant robot for space operations (Student Design Competition, **HRI 2008**), development & integration of stratospheric balloon payload (**HALE mission**, Reno), testing the feasibility of micro-gravity generation with a robotic reeling system (funding: Austrian Space Applications Program) and follow up mission *reel.SMRT* with ESA/DLR sponsorship flown on **BEXUS, SMURFS** project on multi-robot cooperation and reconfiguration for space exploration (**IJCAI 2009**) <http://smrt.name/>

Programmer/Researcher, Instituto Superior Técnico, Lisboa, Portugal Jul - Sep 2007

implementing/testing fast 3D stereo vision algorithms in OpenCV/C++ on the iCub <http://vislab.isr.ist.utl.pt/>

University Education

PhD Programme, Artificial Intelligence and Robotics 2011 - 2014

Università della Svizzera Italiana: Dissertation: intelligent, autonomous and adaptable humanoid robots
Supervisors: Dr. Alexander Förster, Prof. Jürgen Schmidhuber <http://www.inf.usi.ch/>

Joint European Master Degree, Space Science & Technology (SpaceMaster) 2007 - 2009

Helsinki University of Technology: *Master of Science in Technology*, Space Robotics and Automation

Luleå Technical University: *Master of Science, Space Technology*

MSc Thesis: "Multi-Robot Cooperation for Area Coverage in Space Exploration"

Supervisors: Tapio Taipalus, Prof. Shinichi Nakasuka, Prof. Kalevi Hyyppä, Prof. Aarne Halme

Study Abroad: *Intelligent Space Systems Laboratory*, **University of Tokyo** (東京大学) <http://www.spacemaster.eu/>

BSc Degree, Software & Information Engineering 2003 - 2007

Vienna University of Technology: Bachelor of Science (180 ECTS) in Computer Science

Instituto Superior Técnico (IST), Portugal: ATHENS exchange (1 month) <http://www.cs.tuwien.ac.at/>

Selected Publications

full list at <http://Juxi.net/papers/>

- Fangyi Zhang, *Jürgen Leitner*, Michael Milford, Ben Upcroft, Peter Corke. **Autonomously Learning For Vision-Based Robotic Reaching Using Deep Q Networks.** *International Conference on Robotics and Automation (IROS)*. (submitted)
- Jürgen Leitner*, Simon Harding, Alexander Förster, Peter Corke. **Interactive Computational Imaging for Deformable Object Analysis.** *Frontiers in Robotics and AI. Vol 3:26*. May 2016
- Donald G. Dansereau, Surya PN Singh, *Jürgen Leitner*. **Interactive Computational Imaging for Deformable Object Analysis.** *International Conference on Robotics and Automation (ICRA)*. May 2016
- William Chamberlain, *Jürgen Leitner*, Peter Corke. **A Distributed Robotic Vision Service.** *International Conference on Robotics and Automation (ICRA)*. May 2016
- Jürgen Leitner*, Donald G. Dansereau, Sareh Shirazi, Peter Corke. **The Need for Dynamic & Active Datasets. The Future of Datasets in Vision Workshop at the Computer Vision and Pattern Recognition (CVPR) Conference.** Boston Jun 2015
- Jürgen Leitner*, Mikhail Frank, Alexander Förster, Jürgen Schmidhuber. **Reactive Reaching and Grasping on a Humanoid Towards Closing the Action-Perception Loop on the iCub.** *International Conference on Informatics in Control, Automation and Robotics (ICINCO)*. Sep 2014
- Jürgen Leitner*, Alexander Förster, Jürgen Schmidhuber. **Improving Robot Vision Models for Object Detection Through Interaction.** *World Congress on Computational Intelligence -- International Joint Conference on Neural Networks (IJCNN): Robotics and Vision*. Jul 2014
- Jürgen Leitner*, S. Harding, M. Frank, A. Förster, J. Schmidhuber. **Humanoid Learns to Detect Its Own Hands.** *Congress on Evolutionary Computing (CEC)*. Jun 2013
- S. Harding, *Jürgen Leitner*, J. Schmidhuber. **Cartesian Genetic Programming for Image Processing (CGP-IP).** in: *Genetic Programming Theory and Practice X (Genetic and Evolutionary Computation Series)*. pp 31-44. Springer. 2013
- Jürgen Leitner*, P. Chandrashekhariah, S. Harding, M. Frank, G. Spina, A. Förster, J. Triesch, J. Schmidhuber. **Autonomous Learning Of Robust Visual Object Detection And Identification On A Humanoid.** *IEEE Conference on Development and Learning (ICDL) / EpiRob. (Excellence Award)* San Diego Nov 2012
- Jürgen Leitner*, S. Harding, M. Frank, A. Förster, J. Schmidhuber. **Learning Spatial Object Localisation from Vision on a Humanoid Robot.** *Int'l. Journal of Advanced Robotics Systems (ARS). Vol.9*. 2012
- Jürgen Leitner*, S. Harding, M. Frank, A. Förster, J. Schmidhuber. **Transferring Spatial Perception Between Robots Operating In A Shared Workspace.** *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Oct 2012
- Jürgen Leitner*, C. Ampatzis, D. Izzo. **Evolving ANNs for Spacecraft Rendezvous and Docking.** *International Symposium on AI, Robotics & Automation in Space (i-SAIRAS)*. Sep 2010

Honors, Grants and Awards

- Queensland University of Technology, Small Equipment Grant (LunaRoo) 2015
- Queensland University of Technology, Capital Equipment Grant Medical Robotics (50k) 2015
- EU FET Empowering Young Researchers Science Incubator, Selected Finalist 2014
- Association for the Advancement of AI (AAAI) "Shakey" Video Awards, Best Student Video 2013
- IEEE Robotics and Automation Society, Summer School Travel Grant 2012
- Joint Conference on Development and Learning and Epigenetic Robotics, Paper of Excellence 2012
- Associate Fellow, Marie Curie Robotics for Development of Cognition (RobotDoc) 2012
- SpaceMaster Global Partnership, ERASMUS Mundus Mobility Grant 2010
- Austrian Space Applications Program (ASAP), Research Project Funding 2009
- European Space Agency (ESA) Scholarship, SpaceMaster course 2008
- ATHENS Scholarship, Short International Research Stay 2007
- ERASMUS Scholarship, Study Abroad Scholarship 2005 - 2006
- NÖ Top Stipendium, Study Abroad Scholarship 2005
- AKNÖ Award, High School Graduation Project 2002

Professional Activities / Teaching

- Workshop Organizer, "Deep Learning and its Applications in Vision and Robotics", R:SS 2016 2016
Australasian Joint Conference on Artificial Intelligence (AI) <http://Juxi.net/workshop/deep-learning-rss-2016/>

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- Workshop Organizer, "Deep Learning and its Applications in Vision and Robotics", AI 2015** 2015
Australasian Joint Conference on Artificial Intelligence (AI) <http://Juxi.net/workshop/deeplearning-applications-vision-robotics-2015/>
- Guest Lectures, Queensland University of Technology (QUT)** 2015 - 2016
(space) robotic lectures "Impact of IT" and "Introduction to Science"
- Winter School Co-Organizer, Queensland University of Technology (QUT)** 2015
responsible for outreach, robotic demonstration and the hands-on robotic program/session <http://Juxi.net/WinterSchool/2015>
- Workshop Co-Organizer, Robotic Vision Summer School (RVSS)** 2015, 2016
creating the program for and running the hand-son robotics workshop <http://roboticvision.org/events/rvss-summer-school/>
- Research Advisor, Queensland University of Technology (QUT)** 2014 - 2016
for VRES and final year projects, computer vision and robotics <http://Juxi.net/students>
- FET Empowering Young Explorers, "Lab Surfing" & "Science Incubator"** 2014
took part in tutorials on preparing Horizon2002 FET proposals and project management techniques <https://fet-eye.eu/>
- Research Co-Advisor, Università della Svizzera Italiana (USI)** 2013 - 2014
for BSc and MSc student diploma projects, including quad-rotors, vision and HRI <http://Juxi.net/students>
- Teaching Assistant, Università della Svizzera Italiana (USI)** 2011 - 2014
for "Systems Programming", responsible for the "Lab", reviewing/grading homework <http://www.idsia.ch/~leitner/>
- Student Assistant, Vienna University of Technology, Austria** 2006 - 2007
for the courses "Usability Engineering" and "User Interface Design" <http://deco.inso.tuwien.ac.at/>
- American Institute of Aeronautics and Astronautics (AIAA), Member** since 2012
- IEEE Robotics and Automation Society (RAS), Member** since 2012
- European Network for the Advancement of Artificial Cognitive Systems, Interaction and Robotics (EUCog), Member** since 2011
- Reviewer:** various top-level conferences and journals, e.g. Journal of Field Robotics (JFR), ACM Trans. on Autonomous and Adaptive Systems, Robotics and Automation Letters (RA-L), ICRA, IROS,...

Extracurricular Studies

- IEEE RAS Summer School, "Robot Vision and Applications"** Dec 2012
tutorials on state-of-the-art Computer & Robot Vision techniques <http://www.amtc.cl/summerschool/>
- Summer School, The iCub Summer School, "Veni Vidi Vici"** Jul 2012
development of the iCub code base and get-together of researchers <http://icub.org/summerschool/>
- Summer School, Neural Dynamics Approaches to Cognitive Robotics** Sep 2011
tutorials on dynamic neural fields and application in humanoid robotics <http://www.robotics-school.org/>
- Summer School, JAIST International Robotics Summer School** Aug 2010
tutorials on locomotive and cooperative robotic systems <http://www.jaist.ac.jp/robot/lcr2010/>
- Summer School, International School in Robotics and Intelligent Systems** Jul 2009
tutorials on assistive robots & systems, incl. surgical and adaptive robots <http://www.isris.info/isris09.html>
- Degree Studies, Computational Intelligence** 2005 - 2007
Vienna University of Technology: finished 75% (of the 120 ECTS) before joining SpaceMaster
courses in Computer Science, Machine Learning and Artificial Intelligence <http://www.cs.tuwien.ac.at/>
- Exchange Program, ERASMUS** Royal Institute of Technology (KTH), Sweden 2005-2006
courses in Distributed AI, Ubiquitous Computing, Artificial Neural Networks <http://www.kth.se/>
- Astronomy Programme, BSc** University of Vienna, Austria 2003-2005
attended various courses in the field of Astronomy and Physics <http://astro.univie.ac.at/>

Work Experience

- Consultant/eBusiness Developer, Wyeth Whitehall GmbH**, Vienna, Austria Mar - Jul 2007
implementing 10+ modules for a .NET based eBusiness back-end <http://www.wyeth.at/>
- Consultant/IT Manager, MLCompany GmbH**, Wilhelmsburg, Austria Oct - Dec 2006
planning/installing complete IT/network infrastructure based on Linux servers <http://www.mlcompany.at/>

- Consultant/Project Assistant, Mondi Business Paper**, Vienna, Austria Jun - Aug 2006
evaluating and reporting on the intranet structure, development of new concept <http://www.mondibp.com/>
- PHP Developer, Sphinx Managed Services GmbH**, Vienna, Austria Aug - Sep 2006
implementing a front-end for server monitoring and fast querying of system status <http://www.sphinx-ms.at/>
- Founder, EDV-Experts.at**, Türrnitz, Austria 2002 - 2010
consulting, development of webpages, implementation of IT systems/networks <http://www.edv-experts.at/>
- Summer Internships/Placements**, Vienna, Austria 1999 - 2001
internships in various companies. programming and development of task automation tools, designing/creating webpages on Linux/Apache/mysql/PHP systems and helping out in server/IT administration

Primary Education

- HTBLuVA - Higher Technical and Vocational College, St. Pölten**, Austria 1997 to 2002
vocational, technical high-school in computer science and business management <http://edvo.htlstp.ac.at/>
- Federal Grammar School (BRG), Lilienfeld**, Austria 1993 to 1997
(Junior) high-school with focus on natural science and mathematics. <http://www.bglilienfeld.ac.at/>
- Elementary School (Volksschule), Türrnitz**, Austria 1989 to 1993

Mandatory Civil Service

- Austrian Red Cross, Türrnitz and Lilienfeld**, Austria 2002 to 2003
Ambulance driver and paramedic in the Emergency Response Team of the local Red Cross stations.