

Curriculum Vitae

First and Last Name: **Jürgen Leitner**

Date of birth: **July 27, 1983**

Nationality: **Austrian**

Gender: **Male**

Spoken Languages: English (fluent), German (native), Swedish (intermediate)

Italian (advanced beginner), Finnish, Japanese, Portuguese (very basic)

Current Position

Young Graduate Trainee, European Space Agency

September 2009 - August 2010

At the **Advanced Concepts Team** of the European Space Agency (ESA). Technical analysis of strategic and advanced concepts for "Space for Security", to investigate possible dual-use technologies. Projects included neuro-controller (ANN) for autonomous docking, multi-agent simulation for fractionated spacecraft concepts as well as studies regarding disaster management assistance. <http://www.esa.int/act>

University Education

Summer School, International School in Robotics and Intelligent Systems

July 2009

Organized by the European Centre for Secure Information and Systems, the University of Edinburgh (UK) and the *Technical University of Iasi* (Romania). The school had a 5-day lecture/workshop program focusing on **Assistive robots and systems** including surgical robots, Human-Robot-Interaction (HRI), prosthetics and adaptive robotics. <http://www.isris.info/isris09.html>

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

For completing this 120 ECTS ERASMUS-Mundus Double Degree Programme, I received a "**Master of Science in Technology**" from the **Helsinki University of Technology** (TKK), with a major in *Space Robotics & Automation*. After starting at the **University of Würzburg** (JMUW) in 2007, I attended courses at the **Luleå Technical University** (LTU), from which I will receive a "**Master of Science**" degree. The research leading to these degrees was in the field of multi-robot cooperation, focusing on adaptive behaviours and machine learning. This was partly done during a research stay at the *Intelligent Space Systems Laboratory* of the **University of Tokyo** (東京大学). <http://www.spacemaster.eu/>

Bachelor of Science, Software & Information Engineering

June 2007

A 180 ECTS BSc degree from the **Vienna University of Technology** in Computer Science, with courses in Machine Learning, Artificial Intelligence, and Software Engineering. Thesis title: "**Processing: A New Kind of Visual Programming**". <http://www.cs.tuwien.ac.at/>

Exchange Program, ATHENS, Instituto Superior Técnico, Lisboa, Portugal

March 2007

Attendance of an intense course in Robotics at ISR/IST's Computer Vision lab.

<http://www.ist.utl.pt/>

Exchange Program, ERASMUS, Royal Institute of Technology (KTH), Sweden

2005-2006

Course participation in Distributed Intelligent Agents, Ubiquitous Computing, Artificial Neural Networks, Theory of Automata and Mobile Application Dev. <http://www.kth.se/>

Course Participation, University of Vienna, Austria

2003-2005

Attended various courses in the field of Astronomy and Physics.

<http://astro.univie.ac.at/>

(on hold) Master of Science, Computational Intelligence,

Vienna University of Technology

A 120 ECTS degree in Computer Science, with courses in Theoretical Computer Science, Machine Learning and Artificial Intelligence. Finished more than 80 ECTS before starting the SpaceMaster programme, I am still enrolled as *student-on-leave*. <http://www.cs.tuwien.ac.at/>

Previous Experience

Co-Founder, SpaceMaster Robotics Team

February 2008 to (ongoing)

Projects involved include: Development of a LEGO prototype for a Student Design Competition at the **HRI 2008** conference. We designed an assistant robot for space exploration. Implementation of a stratospheric balloon project, flown on the **HALE mission** in Reno, NV (USA) 2008. The main objective of this project, named XGRAVLER (REEL-E) was to test the feasibility of micro-gravity generation due to a robotic reeling system. The project was funded mainly by the Austrian Space Applications Program and LEGO. The follow up mission, called **reel.SMRT**, was done with a sponsorship of the European Space Agency (ESA), DLR and some private sponsors (e.g. RUAG) on-board a **BEXUS** balloon. A bigger structure was used to generate a reusable micro-gravity research platform for ESA's BEXUS balloon launch campaigns. The SMURFS project, a society of multiple robots for research on multi-robot cooperation and reconfiguration with a focus on space exploration was presented during the *International Joint Conference on AI (IJCAI 2009)*. <http://smrt.name/>

Programmer/Researcher, Instituto Superior Técnico, Lisboa, Portugal

July to September 2007

A 3D stereo vision algorithm to compute depth maps of the scenery was implemented in C++ using OpenCV libraries and the iCub robot access modules. The algorithm used a gaussian filter and multiple shifted images for generating the depth maps quite fast (near-realtime). <http://vislab.isr.ist.utl.pt/>

Consultant/eBusiness Dev, Wyeth Whitehall Export GmbH, Vienna, Austria

March to July 2007

As .NET eBusiness Developer I implemented various modules for the intranet as well as internet pages focusing on Customer Relations Management and B2B communication. <http://www.wyeth.at/>

Student Assistant, Vienna University of Technology, Austria

October 2006 to June 2007

For 2 semesters I worked at the *Designing Comfort (DECO)* research group at the INSO Institute, handling student report submission, student interviews and organizing student consultation hours for courses in "User Interface Design" and "Usability Engineering". <http://deco.inso.tuwien.ac.at/>

Consultant/IT Manager, MLCompany GmbH, Wilhelmsburg, Austria

October to December 2006

Planning, obtaining and installing of a complete IT infrastructure, based on Linux servers and Thin Clients for a 5-10 person company. Including webpage and eMail setup. <http://www.mlcompany.at/>

Consultant/Project Assistant, Mondi Business Paper, Vienna, Austria

June - August 2006

Evaluation of the intranet structure and development of a new concept to update their system. I assisted the project team as IT expert, investigating and reviewing their design, proposing new alternatives and writing project reports.. <http://www.mondibp.com/>

PHP Developer, Sphinx Managed Services GmbH, Vienna, Austria

August - September 2006

Implementing a PHP/web front end for displaying data from their server monitoring software, allowing for easier user interface, faster loading and faster querying of data. <http://www.sphinx-ms.at/>

Founder, EDV-Experts.at, Türrnitz, Austria

2002 - (ongoing)

A small IT company, providing computer related services, from consulting to webpages and computer system installations. <http://www.edv-experts.at/>

Summer Internships/Placements, Vienna, Austria

1999-2001

Internships in various companies. Mainly programming Visual Basic, creating task automation tools, designing/creating webpages on Linux/Apache/mysql/PHP systems and help out in administration.

Research Interests

Space Robotics: robotic space exploration, autonomous space crafts, in-orbit and planetary construction tasks and astronaut assistance

Multi-Robot Systems: especially collaboration and cooperation as well as optimization, re-configurable robots and self-adapting systems

Human Robot Interactions, AI, Swarm Intelligence and Machine Learning, Space Exploration and Space Technology, Ubiquitous/Pervasive Computing and Augmented Reality

Research Papers

(published or presented)

Jürgen Leitner. **Robot Formations for Area Coverage. Second International Conference on Intelligent Robotics and Applications.** Singapore December 2009

Jürgen Leitner. **Multi-Robot Formations for Area Coverage in Space Applications. M.Sc. thesis, Helsinki University of Technology.** Espoo, Finland August 2009

Jürgen Leitner. **Multi-Robot Cooperation in Space: A Survey. 8th ECSIS Symposium on Learning and Adaptive Behavior in Robotic Systems (LAB-RS).** Iasi, Romania July 2009

Jürgen Leitner. **A Survey of Multi-Robot Cooperation in Space. Automation, Robotics and Control Systems (ARCS-09) Conference.** Orlando, FL July 2009

Jürgen Leitner, David Leal Martínez. **The REEL-E Project (done for the HALE launch campaign) - Results and Lessons Learned. Austrian Space Applications Program. Report,** Türrnitz, Austria June 2009

Jürgen Leitner, Alexandre Bernardino and José Santos-Victor. **A Benchmark on Stereo Disparity Estimation for Humanoid Robots. 8th Conference on Autonomous Robot Systems and Competitions.** Aveiro, Portugal April 2008

David Leal Martínez, Jürgen Leitner. **Universal Robot-Human-Operations Cooperative Unit. 3rd Human Robot Interaction Conference.** Amsterdam, The Netherlands. *Student Design Competition.* March 2008

Jürgen Leitner. **Processing - The New Way of Visual Programming. B.Sc. thesis, Vienna University of Technology.** Vienna, Austria June 2007

References

Professor Shinichi Nakasuka, Intelligent Space Systems Laboratory 2009
Hongo 7-3-1, Bunkyo-ku, Tokyo, Japan, 113-8656 nakasuka@space.t.u-tokyo.ac.jp

Professor Aarne Halme, Automation Technology Laboratory, TKK 2008 - 2009
TUAS building, room 2565, PL 5500, 02015 TKK, Finland +358 9 451 3300 aarne.halme@tkk.fi

Tomi Ylikorpi, SpaceMaster Academic Coordinator, TKK 2008 - 2009
TUAS building, room 2577, PL 5500, 02015 TKK, Finland +358 9 451 5622 tomi.ylikorpi@tkk.fi

Professor Alexandre Bernardino, Instituto de Sistemas e Robótica (ISR), IST 2007
ISR/IST, Torre Norte 7º, 1049-001 Lisboa, Portugal +351 218418293 alex@isr.ist.utl.pt

René Neubach, eBusiness Manager, Wyeth Austria 2007
Storchengasse 1, 1150 Wien, Austria +43 1 89 114 0 neubacr@wyeth.com

Thomas Költringer, BSc Thesis Tutor and DECO Director 2006-2007
Wien, Austria thomas@koeltringer.at

Personal Skills

Programming: started with BASIC in '95, programming and education in C/C++/Java since '97, Perl for scripting and recently started using Ruby (RoR) & Python, implemented projects ranging from small to middle sized applications

Project Management: have been heavily involved in project management, from 2-3 person teams to 10+ person projects, involving international, interdisciplinary groups

Software and Mobile Application Development: wrote design documents for almost all the projects I worked on, knowledge of standard SW development processes, very good knowledge of (distributed) code revision/storage systems (SVN, Git)

Image Processing: working experience with OpenCV (IBM-support open source library for computer vision) which I used to implement a depth-perception algorithm using 2 cameras on a platform designed for humanoid robots, used SDL Layer for simulator development for my MSc thesis, some minor 3D implementations with OpenGL and DirectX, interested in PhotoShop and image enhancement (e.g. satellite pictures)

Theoretical Computer Science: knowledge in complexity and DB theory, formal methods,...

Space Science and Technology: CanSat project participation, involved in 2 balloon missions, theoretical knowledge of spacecraft systems, space dynamics and spacecraft environment interactions (radiation, plasma, ...)

Linux/Windows Server Management: including HTTP and DB server management, e.g. MySQL, Apache/Lighttpd, MS SQL Server, ...

Web Design: PHP, HTML, CSS, a bit of RubyOnRails (*developed various websites since 1999*)

Mandatory Civil Service

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

Elementary Education

HTBLuVA - Higher Technical and Vocational College, St. Pölten, Austria 1997 to 2002
A vocational and technical high-school with education in programming, project management, business management & organization, database systems and networking technology. <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), Türnitz, Austria 1989 to 1993