

# Thomas Lochmatter

Extended Curriculum Vitae, 2016-03-25

## Personal Details

Name	Thomas Lochmatter
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Personal website	<a href="http://viereck.ch/thomas">http://viereck.ch/thomas</a>
Date and place of birth	1980-10-27, Brig-Glis, Switzerland
Marital status	Not married
Nationality	Swiss

## Formal Education

<b>2005-10 – 2010-01</b>	<b>PhD on Odor Source Localization with Mobile Robots</b> Distributed Intelligent Systems and Algorithms Laboratory (DISAL), EPFL, Lausanne, Switzerland PhD Advisor: Prof. Alcherio Martinoli Title: Bio-Inspired and Probabilistic Algorithms for Distributed Odor Source Localization using Mobile Robots
<b>2000-10 – 2005-09</b>	<b>Communication Systems</b> School of Computer and Communication Sciences, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland. Swiss engineering diploma / Master's degree (grade: 5.82 / 6).
<b>2003-10 – 2004-06</b>	<b>Allgemeine Didaktik (Teaching Methods)</b> Université de Fribourg (UniFr), Switzerland. Single course.
<b>2002-09 – 2003-05</b>	<b>Master's Program in Digital Communication Systems and Technology</b> Chalmers Tekniska Högskola (CTH), Göteborg, Sweden. Awarded a Master's degree with distinction.
<b>1995-08 – 2000-06</b>	<b>Matura, Type C (Scientific)</b> Kollegium Spiritus Sanctus, Brig, Switzerland (1995-1996 and 1998-2000) Collège des Creusets, Sion, Switzerland (1996-1998)

## Work Experience and Projects

<b>Since 2013-09</b>	<p><b>Condensation Data System</b></p> <p>A fully distributed data system based on conflict-free synchronization with end-to-end encryption.</p> <p>Software libraries and utility programs for various platforms (web, Android, iOS, Windows, servers). Main designer and developer.</p> <p><a href="https://condensation.io">https://condensation.io</a></p>
<b>Since 2013-09</b>	<p><b>Viereck</b></p> <p>Custom application design and development on various platforms and systems. Primarily Swiss customers from the private and public sector.</p>
<b>Since 2012-01</b>	<p><b>Croppola</b></p> <p>Development of apps and APIs around the Croppola image cropping technology. Used by people around the world to crop 100k+ pictures.</p>
<b>2014-04 – 2014-11</b>	<p><b>MakeSends</b></p> <p>End-to-end secure sending and sharing of files, using an early version of the Condensation library. Main developer.</p> <p><a href="https://www.makesends.com">https://www.makesends.com</a></p>
<b>1993 – 2013</b>	<p><b>LoThoSoft Lernsoftware GmbH (company)</b></p> <p>Educational software for kids (for ages 5-15). 16 computer programs sold in the German part of Switzerland, 5 in Germany and 2 in France. Co-founder, and main developer.</p> <p>Several thousand customers; among them the canton of Lucerne and the city of Zürich where the programs were available in all primary schools.</p> <p><a href="http://www.lothosoft.ch">http://www.lothosoft.ch</a></p>
<b>2010-02 – 2013-08</b>	<p><b>Wizzy Education Technologies SA (company)</b></p> <p>Educational platform (Wizbee) with learning activities (exercises and small games) for kids aged 5-15. Co-founder, co-leader, and developer.</p> <p><a href="http://www.wizbee.ch">http://www.wizbee.ch</a></p>
<b>2009 – 2011</b>	<p><b>Wireless camera trigger system based on GPS synchronization</b></p> <p>Device to trigger devices (mostly cameras) with microsecond precision in a distributed setting outdoor. Firmware development (in C).</p>
<b>1998 – 2010</b>	<p><b>Notenverwaltung</b></p> <p>Microsoft Excel application to manage and print the grades of primary school classes in the German part of the canton Valais, Switzerland.</p> <p>2005: Selected as the official application by the department of education, culture and sport of the canton Valais.</p> <p><a href="http://www.lothosoft.ch/notenverwaltung">http://www.lothosoft.ch/notenverwaltung</a></p>
<b>1995 – 2010</b>	<p><b>Radio transmission and/or ranking lists at various events</b></p> <p>Events include:</p> <ul style="list-style-type: none"> <li>– Eidgenössisches Jugendmusikfest 1995</li> <li>– Terrific 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004 (Crans-Montana)</li> <li>– Patrouille des Glaciers 2000, 2002, 2004, 2006, 2008, 2010</li> </ul>

- Rallye du Valais 2001, 2003, 2004, 2005, 2006
- Grand Raid Cristalp 2004

Main developer and architect of the software (first written in Visual Basic, then Perl) to create live online and paper ranking lists and to interface to the data radio.

<b>2008-09 – 2008-12</b>	<b>Resarch Internship at KITP, UCSB</b> 3-month internship in the Kavli Institute for Theoretical Physics (KITP) at UCSB (CA, USA), under the supervision of Prof. Massimo Vergassola.
<b>2005-03 – 2005-09</b>	<b>Master Thesis on Path Discovery in Ad Hoc Networks</b> Institute for Infocomm Research, Singapore Supervisor: Prof. Winston K. G. Seah Examiner: Prof. Patrick Thiran Title: Path Discovery with Snakes in Ad Hoc Networks
<b>2004 – 2005</b>	<b>Software for the APS (Antenna Positioning System) project</b> Program (C++) that steers an antenna to track an aircraft. Server/client architecture and real-time reconfiguration possibility. Initially written for Windows, then ported to Linux / Unix / Mac OS X. Side project: libmip - A Linux library for the maxon motor Positioning Control Units (MIP), <a href="http://viereck.ch/libmip">http://viereck.ch/libmip</a>
<b>1999 – 2005</b>	<b>Various Projects for “BAR Informatik AG, Brig-Glis”</b> Freelance work. Among the projects are: <ul style="list-style-type: none"> <li>– Interactive part of the website of the International Ski Federation (FIS), <a href="http://www.fis-ski.com">http://www.fis-ski.com</a></li> <li>– Database part of several smaller websites</li> <li>– Server administration tools and scripts</li> <li>– VoIP / SIP tests</li> </ul>
<b>1998 – 2004</b>	<b>FinishWEB CMS</b> Core developer of the web-based Content Management System (CMS), implemented in Perl for the Apache “mod_perl” module. <a href="http://www.finishweb.ch">http://www.finishweb.ch</a>
<b>2004</b>	<b>Live GPS position in TerraExplorer</b> Glue software for visualizing the position of an athlete on the race track. Intended for mountain races like the Patrouille des Glaciers.
<b>2003-06 – 2003-12</b>	<b>Master Thesis on Base Stations in Ad Hoc Networks</b> Laboratory for Computer Communications and their Applications, EPFL, Lausanne, Switzerland Supervisors: Dr. Petteri Mannersalo, Prof. Patrick Thiran Examiner: Dr. Erik Ström Title: Placing Base Stations in Multi-Hop Hybrid Ad Hoc Networks
<b>2000 – 2003</b>	<b>Website for EWBN AG</b> Initial design and maintenance of the website for the company “EWBN AG” (now “EnBAG AG”) in Brig.
<b>1999 – 2001</b>	<b>AUnet – Austausch von Unterrichtshilfen im Internet</b> Technical realization and maintenance of an internet platform for the exchange of

teaching material ([www.aunet.ch](http://www.aunet.ch), active from 1999 to 2006).

About 1000 subscriptions from primary school teachers from the german part of Switzerland and several thousand documents within 2 years.

2001: Sold to the Swiss Education Server (<http://www.educa.ch>).

<b>1998 – 2001</b>	<b>Online book database</b> Initial programming (Perl) and maintenance. For the bookstore “ZAP Zur Alten Post” in Brig.
<b>2000</b>	<b>Lawa Susan and SusanServer</b> Java implementation of Susan (board game). Initially a course project for the Java programming course with Monika Lundell. <a href="http://sourceforge.net/projects/susan">http://sourceforge.net/projects/susan</a>
<b>1999 – 2000</b>	<b>Stundenverwaltung</b> Microsoft Access application for accounting work hours. Developed for the company “EWBN AG” (now “EnBAG AG”) in Brig.
<b>1999 – 2000</b>	<b>Vweb Webhosting and Internet Services</b> Small web hosting company. Co-founder, Linux system administrator, and developer.
<b>2000</b>	<b>Formation of “axygon Software &amp; Internet GmbH”</b> Co-founder. Later renamed to “LoThoSoft Lernsoftware GmbH”.
<b>1999</b>	<b>4 week internship at “Datacom AG” (now “VTX Datacomm AG”)</b> Basel, Switzerland. Hotline, web design, programming.
<b>1994</b>	<b>Bau-Manager</b> Software to manage and store information about building construction projects for the company “Studer Rieder AG, Brig”. Written in Visual Basic 3.0 for Windows 3.1.

## Teaching Experience

<b>2010 – 2014</b>	<b>External lecturer at EPFL</b> Spring 2014, "Programmation" in ENAC SSIE, introduction to C programming to 1st-year environmental science students Spring 2013, "Informatique II" in ENAC SSIE, introduction to C programming to 1st-year environmental science students Spring 2012, "Informatique II" in ENAC SSIE, introduction to C programming to 1st-year environmental science students Spring 2011, "Programming" in ENAC SSIE, introduction to Java programming to 1st-year environmental science students Spring 2010, "Programming" in ENAC SSIE, introduction to Java programming to 1st-year environmental science students
<b>2012-11 – 2013-04</b>	<b>iOS Course at HEPL</b> Supervision of iOS projects carried out by teachers.
<b>2005 – 2008</b>	<b>Teaching assistant</b> Summer semester 2008, "Systèmes Logiques II" (Prof. Eduardo Sanchez), supervision of exercise sessions. Winter semester 2007/2008, "Swarm Intelligence" (Prof. Alcherio Martinoli), head TA, supervision of course projects and exercise sessions. Summer semester 2007, "Computer Networking 1" (Prof. Matthias Grossglauser), supervision of exercise sessions, responsible for the course project. Winter semester 2006/2007, "Swarm Intelligence" (Prof. Alcherio Martinoli), supervision of course projects and exercise sessions. Winter semester 2005/2006, "Swarm Intelligence" (Prof. Alcherio Martinoli), supervision of course projects and exercise sessions.
<b>2006 – 2009</b>	<b>Supervision of student projects</b> Supervised students: Mehmet Erbas (2006), Vedran Coralic (2006), Laetitia Todesco (2006/2007), Vincent Salzgeber (2006/2007), Michael Devyver (2007), Michael Karlen (2007), Alexandre Herrmann (2007), Saurabh Indra (2007), Loïc Matthey (2007), Marc-Olivier Fleury (2008), Nicolas Heiniger (2008/2009), Mitra Bahadorian (2008), Hajir Roozbehani (2008), Ebru Aydin (2009), Pierre-François Laquerre (2009)
<b>2001 – 2007</b>	<b>Presentations to high school students about studying at EPFL</b> 2007-10: "Exchange years", to high school students in Brig, Valais, Switzerland 2007-02: "Communication Systems at EPFL", to students from various high schools in the french-speaking part of Valais, Sierre, Switzerland. 2005: "Exchange years" and "Communication Systems at EPFL", to students from various high schools in the french-speaking part of Valais, Sierre, Switzerland. 2004: "Exchange years", to students from various high schools in the french-speaking part of Valais, Sierre, Switzerland. 2001: "Communication Systems at EPFL", to students of the Kollegium Spiritus Sactus, Brig, Switzerland.
<b>2004</b>	<b>4 supervised lessons at the Gymnasium Heilig-Kreuz in Fribourg</b> As part of the teaching course taken at the Université de Fribourg, Switzerland.

**1994 – 1998**

**Courses about Microsoft Word, Microsoft Excel and Microsoft Publisher**

Assistant for technical questions and advanced features.

Courses given by my father Robert Lochmatter to school teachers.

## Information Technology Skills

### Operating Systems (that I have been working on for a significant amount of time)

Linux (Debian, Ubuntu, SuSE, RedHat), Apple Mac OS X, Microsoft Windows

### Software Protocols (that I have used in at least one project)

Condensation, HTTP, NMEA (GPS), APRS, SIP (VoIP), POP, SMTP, Maxon MIP Protocol, Ascom Didacom

### Programming and description languages (that I have used for at least one project)

Perl, JavaScript, C, Scala, C#, Python, C++, Java, Matlab, PHP, Visual Basic, Delphi, VHDL, Latex, HTML, SVG, ODF, PS

### Databases (that I have used in at least one project)

MySQL, Microsoft Access

### Embedded Systems and Microcontrollers (that I have worked with in at least one project)

Microchip dsPIC30, Microchip dsPIC33, Gumstix connex, Korebot

### Hardware Buses (that I have used in at least one project)

I2C, SPI, RS-232

### Various Software (that I have used for an extended amount of time)

git, LibreOffice, nginx web server, Apache web server, minicom/picocom, IntelliJ, Microsoft Visual Studio, Xcode, Inkscape

## Language Skills

German, Swiss German	Native language
French	Fluent in reading, writing and speaking
English	Fluent in reading, writing and speaking
Swedish	Basic

## Interests

Engineering	Self-organized, collaborative, distributed, probabilistic and information-theoretic algorithms and their applications in different areas Data systems, graphical programming languages Embedded systems, communication systems, sensor and actuator networks
Education	Learning processes, learning environments in the digital age
Psychology	Brain and mind processes during apparent precognition, as well as information-theoretic and statistical aspects of such phenomena



## Published Work

### Scientific Peer-Reviewed Conference Papers

Wireless GPS-based phase-locked synchronization system for outdoor environment. Frédéric Meyer, Alexander Bahr, Thomas Lochmatter, Fabio Borrani; Journal of Biomechanics (2011), doi: 10.1016/j.jbiomech.2011.09.014, September 2011

A Plume Tracking Algorithm based on Crosswind Formations. Thomas Lochmatter, Ebru Aydin, Iñaki Navarro Oiza, Alcherio Martinoli; International Symposium on Distributed Autonomous Robotic Systems, November 2010.

Theoretical Analysis of Three Bio-Inspired Plume Tracking Algorithms. Thomas Lochmatter, Alcherio Martinoli; 2009 IEEE International Conference on Robotics and Automation (ICRA 2009), May 2009.

Localizing an Odor Source and Avoiding Obstacles: Experiments in a Wind Tunnel using Real Robots. Thomas Lochmatter, Nicolas Heiniger, Alcherio Martinoli; 13th International Symposium on Olfaction and Electronic Nose, April 2009.

Simulation Experiments with Bio-Inspired Algorithms for Odor Source Localization in Laminar Wind Flow. Thomas Lochmatter, Alcherio Martinoli; 7th International Conference on Machine Learning and Applications (ICMLA 2008), December 2008.

Understanding the Potential Impact of Multiple Robots in Odor Source Localization. Thomas Lochmatter, Alcherio Martinoli; 9th Symposium on Distributed Autonomous Robotic Systems (DARS 2008), November 2008.

SwisTrack - A Flexible Open Source Tracking Software for Multi-Agent Systems. Thomas Lochmatter, Pierre Roudit, Chris Cianci, Nikolaus Correll, Jacques Jacot, Alcherio Martinoli; IEEE/RSJ 2008 International Conference on Intelligent Robots and Systems (IROS 2008), September 2008.

Tracking Odor Plumes in a Laminar Wind Field with Bio-Inspired Algorithms. Thomas Lochmatter, Alcherio Martinoli; 11th International Symposium on Experimental Robotics 2008 (ISER 2008), July 2008.

A Comparison of Casting and Spiraling Algorithms for Odor Source Localization in Laminar Flow. Thomas Lochmatter, Xavier Raemy, Loïc Matthey, Saurabh Indra, Alcherio Martinoli; 2008 IEEE International Conference on Robotics and Automation (ICRA 2008), May 2008.

### PhD Thesis

Bio-Inspired and Probabilistic Algorithms for Distributed Odor Source Localization using Mobile Robots. Thomas Lochmatter, PhD Thesis, February 2010.

### Master Theses

Path Discovery with Snakes in Ad Hoc Networks. Thomas Lochmatter, Master Thesis, September 2005.

Placing Base Stations in Multi-Hop Hybrid Ad Hoc Networks. Thomas Lochmatter, Master Thesis, 2004.

### Educational Software

Mathe 345 Puter. Rhaeto-roman translation by Balser Bazzell, LoThoSoft, 2002.

Mathe 345 Vallader. Rhaeto-roman translation by Balser Bazzell, LoThoSoft, 2002.

Mathe 345. Design by Patrick Venetz, LoThoSoft, 2001.

Deutsch 345. Database content by Robert Lochmatter and Hildegard Lochmatter, LoThoSoft, 2001.

Les Jeux de Thomas\*. French translation by Pierre Mercier, LogEdu, 2000.

Bonne chance 1, 2 und 3 mit Sprachausgabe (étapes 1-13). LoThoSoft, 2000.

Math 123\*. French translation by Pierre Mercier, LogEdu, 2000.

May I help you 1 + 2\*. LoThoSoft, 1999.

Bonne chance 1, 2 und 3, nouvelle édition (étapes 1-12)\*. LoThoSoft, 1998.

BridgeCAM\*. French translation by Stéphane Chevrier, LoThoSoft, 1998.

Mathe 123\*. LoThoSoft, 1997.

Deutsch 123\*. LoThoSoft, 1997.

Differix\*, Schnippy\*, Looky\*, Mosaik\*, Super 9\*. LoThoSoft, 1997.

Grundoperationendruck\*. LoThoSoft, 1997.  
1x1-Lernprogramm\*. LoThoSoft, 1995.  
Bonne chance 1, édition Lucerne (étapes 1-13)\*. LoThoSoft, 1995.  
Bonne chance 2 (étapes 17-32)\*. LoThoSoft, 1994.  
Bonne chance 1 (étapes 1-16)\*. LoThoSoft, 1993.  
\* End of product cycle. Not available in stores any more.

### Other Software

Khepera III Toolbox. A software toolbox for the Khepera III robot; Thomas Lochmatter, <http://sourceforge.net/projects/khepera3toolbox>, 2006 – 2008.  
SwisTrack 4.0. Cross-platform application for tracking objects on camera images; Nikolaus Correll, Thomas Lochmatter (main software architect / developer of version 4.0) and Pierre Roudit; <http://sourceforge.net/projects/swistrack>, 2006 – 2008.  
Notenverwaltung für den Kanton Wallis. Thomas Lochmatter; <http://www.lothosoft.ch/notenverwaltung>, 1998 – 2007.  
libmip – A Linux library for the maxon motor Positioning Control Units (MIP). C++ Library; Thomas Lochmatter; <http://viereck.ch/libmip>, 2005.  
Lawa Susan. Java implementation of the board game "Susan"; Thomas Lochmatter and Patrick Bizeau; <http://sourceforge.net/projects/susan>, 2001.

### Articles on the Web

Linux and MARK/SPACE Parity. Thomas Lochmatter; <http://viereck.ch/linux-mark-space-parity>, 2005.

### Magazine Articles

Geruchslokalisation mit Mobilien Robotern. Thomas Lochmatter, Xavier Raemy and Alcherio Martinoli; IT Business, number 1 (2007), p. 40 – 41.  
Odor Source Localization with Mobile Robots. Thomas Lochmatter, Xavier Raemy and Alcherio Martinoli; Bulletin of the Swiss Society for Automatic Control, number 46 (2007), p. 11 – 14.

## In the Media

### Television

February 2000 SFDRS, *10vor10* (News);  
Report about young entrepreneurs.

### Radio

2010-01 Radio Suisse Romande (RSR), interview about odor source localization  
2009-07 World Radio Switzerland (WRS), interview about odor source localization  
2006-12-22 Radio Rottu (RRO), *Zum Kaffee*;  
Short interview about odor source localization and research in general.  
2003-08-02 Radio Rottu (RRO), *Zum Kaffee*;  
Short interview about LoThoSoft.

### Newspaper

2012-06 "Klicken statt blättern?", *Bildung Schweiz* 6 | 2012;  
Short interview about educational software.  
2011-12 "Hausaufgaben am Smartphone", *Walliser Bote*;  
Short interview about educational software and robotics.  
2006-12-18 Press release: "Tracing scents to their source; A multi-robot olfactory detection system". Picture of the Month of the Swiss National Science Foundation (FNS/SNF).  
Articles published in about 25 newspapers, radio stations and magazines in and outside of Switzerland within 6 weeks after the press release.  
2000 *Le Nouvelliste*;  
Report about young entrepreneurs.  
1999 *RZ Oberwallis*;  
Report about young entrepreneurs.

## Awards

2009-04-30 Award for the "Best Poster in the Mobile and Distributed Robotics Category" for the poster "*Distributed Odor Source Localization*"; Thomas Lochmatter, Nicolas Heiniger, Alcherio Martinoli.  
EPFL Research Day 2009, Lausanne.  
2006-10-19 "Best Presentation Award" for the presentation "*Distributed Odor Source Localization*"; Thomas Lochmatter, Xavier Raemy, Alcherio Martinoli.  
MICS Scientific Conference 2006, Zürich.  
2005-03 Master's "Degree with Distinction" from Chalmers University of Technology.