

# Christophe Trefois

PhD, Dipl.-Ing.

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Date of birth: May 1, 1984



All scientific contributions can be found at  
<http://www.trefois.com/home/publications>

## Education

2010–2014

**PhD in Systems Biomedicine**, Luxembourg Centre for Systems Biomedicine (LCSB) – University of Luxembourg, Luxembourg, very good

Advisor: Prof. Dr Rudi Balling

2006–2008

**Master of Science in Communication Systems**, Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne, 5.32/6

Advisor: Prof. Jean-Pierre Hubaux

2003–2006

**Bachelor of Science in Communication Systems**, Ecole Polytechnique Fédérale de Lausanne (EPFL), Lausanne

Advisor: Prof. Dr Patrick Thiran

1996–2003

**Baccalauréat scientifique (Section B)**, Lycée Athénée de Luxembourg, Luxembourg, cum laude

## PhD dissertation

title *Detection and characterization of critical transitions in mitochondrial activity via high content screening*

supervisors Prof. Dr Rudi Balling and Dr Paul Antony

description Critical transitions exist in many dynamical systems, ranging from the Earth's climate system to microcosm populations. During a critical transition, the state of a dynamical system abruptly changes from one stable state to another, typically without obvious prior warning. In this thesis, we set out to study critical transitions in a simple cellular model using mitochondrial membrane potential as readout. To identify critical transitions, we established a modular high-content screening platform allowing systematic perturbation of oxidative phosphorylation. We showed that critical transitions are an intrinsic property of cellular systems and that two-component Gaussian mixture models adequately describe critical transitions dynamics.

url <http://orbilu.uni.lu/handle/10993/17706>

## Master thesis

title *Secure integration of wireless sensor networks into application*

supervisors Prof. Jean-Pierre Hubaux and Laurent Gomez

description Performed a risk analysis on integrating wireless sensor networks with business applications using NIST SP 800-30. We analyzed a security scheme which does not rely on complex operations guaranteeing end-to-end confidentiality of sensor data and provided both an *in silico* software demonstration and a hardware validation using physical components.

url <http://infoscience.epfl.ch/record/161912>

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## Experience

### Vocational

2014

**Research associate, *University of Luxembourg (LCSB)*, Luxembourg**

Leading a change management initiative around reproducible science for the institute (~200 people) in the bioinformatics core group led by Dr Reinhard Schneider. This coordination includes managing a team of 6 colleagues.

Main activities include:

- Setup and coordination of core virtualization platform for the LCSB for ~200 virtual machines;
  - Technologies: OpenStack, Puppet, Foreman, freIPA, Icinga 2, Xen.
- Creating data infrastructures for various data types of research labs;
  - Standardizing storage of > 1 PiB for microscopic images, spectrograms, genomics and life science related experimental data.
- Setting up research best practises and training for researchers in the form of workshops;
- Establishing policies on data management.
- Develop tools to assist researchers data analysis workflows and data protection.

2017

**LTS Lead Coach, *Luxembourg Tech School*, Luxembourg**

Lead coach for three high schools in the Luxembourg Tech School project. Coaching high school students in their 1-3 final years of high school to help them become the future digital leaders. Managing the teaching platform. [www.techschool.lu](http://www.techschool.lu)

2016–2017

**LTS Coach, *Luxembourg Tech School*, Luxembourg**

Coaching high school students in their 1-3 final years of high school to help them become the future digital leaders. Managing the teaching platform. [www.techschool.lu](http://www.techschool.lu)

2015

**IT Consultant, *IT for Translational Medicine (ITTM)*, Luxembourg**

Providing various consulting services around IT and medical IT with a focus on strategy, security and IT architecture.

2010–2014

**PhD candidate, *University of Luxembourg (LCSB)*, Luxembourg**

Obtained PhD and contributed to building up a new institute in the experimental neurobiology group led by Prof. Dr Rudi Balling.

Contributions to the institute included:

- Establishing an automated high content screening platform;
- Setting up a microscopic imaging database (OMERO);
- Setting up a laboratory information management system (LIMS) for tracking samples.

2008–2010

**Senior IT auditor and consultant, *Ernst & Young*, Luxembourg**

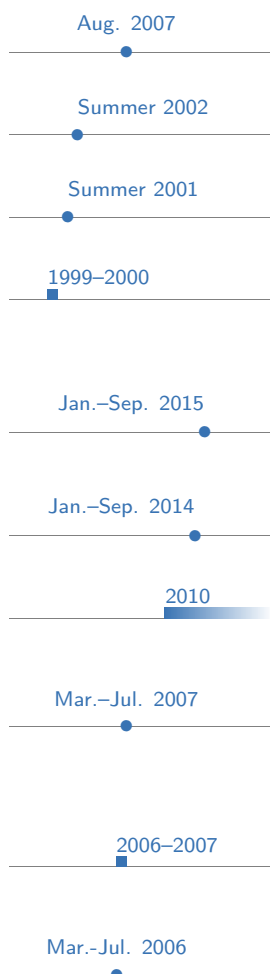
Worked in the IT risk & assurance team for various national and international clients. Activities included:

- IT effectiveness, cost optimization and service management;
- Risk assessment and modeling;
- Business process improvement;
- IT general controls, operations and infrastructure diagnostics;
- Change management audits, logical and physical access control security audits.

Feb.–Aug. 2008

**Research assistant, *SAP Labs France*, Sophia Antipolis, France**

Research assistant in the security and trust department of SAP Labs France. This work resulted in my Master thesis.



**Software developer**, *Ecole Polytechnique Fédérale de Lausanne*, Switzerland  
Development of a template based website using Groovy, Ajax, Java and HTML/CSS.

**Web developer**, *Web Technologies*, Luxembourg  
Development of a PHP based holiday planner for employees.

**Web developer**, *Web Technologies*, Luxembourg  
Development of an eCommerce platform.

**Fund support**, *State Street Bank*, Luxembourg  
Distribution of mail, sorting of print outs from various funds during two summer internships.

## Teaching

**Master thesis supervision**, *University of Luxembourg (LCSB)*, Luxembourg  
Co-supervision of a master student for the image analysis and programming part of his work.

**Master thesis supervision**, *University of Luxembourg (LCSB)*, Luxembourg  
Supervised a Master student for the computational and theoretical part of his work.

**Mendeley advisor**, Luxembourg  
Organized and presented four workshops for librarians and students on the benefits of using a reference manager with the help of Mendeley.

**Teaching assistant**, *Ecole Polytechnique Fédérale de Lausanne*, Switzerland  
Information and technology project course – Bachelor in communication systems. Helping students on their assignments and supervising groups of 2 students for their java programming project.

**Teaching assistant**, *Ecole Polytechnique Fédérale de Lausanne*, Switzerland  
Computer networking course – Bachelor in communication systems. Helping students on their assignments and projects and overseeing exams.

**Teaching assistant**, *Ecole Polytechnique Fédérale de Lausanne*, Switzerland  
Java object oriented programming course – Bachelor in communication systems. Helping students on their assignments, projects, overseeing and correcting exams.

## Languages

Luxembourgish	Native	French	Proficient
English	Proficient	German	Proficient

## Skills

Methodologies	ISO 27001, NIST SP 800-30 Rev.1, MONARC risk assessment methodology
Languages	Java, Python, C++, C#, Ruby, HTML/CSS
Databases	MySQL, MariaDB, PostgreSQL, MaxDB
Web	PHP, JSON, HAML, YAML, XML, Twitter Bootstrap, WebSockets, Ajax, Groovy
System administration	Puppet, Hiera, Foreman, freelPA, Icinga 2, Vagrant, Bash
Platforms	OpenStack, oVirt, Gitlab, Docker, OMERO, ownCloud, Joomla CMS
Tools & OS	L <sup>A</sup> T <sub>E</sub> X, Visual Code, Git, SVN, Vim, Eclipse, Visual Studio, R, oarsub, (Libre/Microsoft) Office, Windows, Linux (Ubuntu, CentOS), OS X
Laboratory	Cell culture, confocal & spinning disc microscopy, automatic liquid handling robotics, live cell imaging, high performance liquid chromatography
Techniques	Statistics, image analysis, high-performance computing

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## Activities

2016

**Secretary**, *Luxembourg Tech School ASBL*, Luxembourg  
Secretary of the Luxembourg Tech School association. [www.techschool.lu](http://www.techschool.lu)

2014–2016

**Vice-President**, *LuxDoc ASBL*, Luxembourg  
Vice-President of the Luxembourg young researchers association. [www.luxdoc.org](http://www.luxdoc.org)

2012–2014

**President**, *LuxDoc ASBL*, Luxembourg  
President of the Luxembourg young researchers association. [www.luxdoc.org](http://www.luxdoc.org)

1995–2003

**Percussionist**, *Just Music Bartreng ASBL*, Luxembourg  
Founding member of the music group and played various percussion instruments in a group of 5-8 people. Obtained the Bronze medal for services rendered to the Luxembourgish cultural life. [www.justmusic.lu](http://www.justmusic.lu)

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## Publications

2018

Herzinger, Sascha, Grouès, Valentin, Gu, Wei, Satagopam, Venkata, Banda, Peter, **Trefois, Christophe**, et al. (Sept. 2018) , “*Fractalis: a scalable open-source service for platform-independent interactive visual analysis of biomedical data*”. In: *GigaScience* 7.9.

2017

Heirendt, Laurent, Arreckx, Sylvain, **Trefois, Christophe**, Yarosz, Yohan, Vyas, Maharshi, Satagopam, Venkata P., et al. (Dec. 2017) , “*ARTENOLIS: Automated Reproducibility and Testing Environment for Licensed Software*”. In: *arXiv e-prints* 7.9, [arXiv:1712.05236](https://arxiv.org/abs/1712.05236), [arXiv:1712.05236](https://arxiv.org/abs/1712.05236).

2016

Biryukov, M., Groues, V., **Trefois, Christophe**, Satagopam, V., and Schneider, R. (Dec. 2016), “*Semantic web technologies for a knowledge base of biomedical facts extracted from scientific literature*”. In: *CEUR Workshop Proceedings*.

2015

Forster, J. I., Köglsberger, S., **Trefois, Christophe**, Boyd, O., Baumuratov, A. S., Buck, L., et al. (Dec. 2015) , “*Characterization of differentiated SH-SY5Y as neuronal screening model reveals increased oxidative vulnerability*”. In: *Journal of Biomolecular Screening* 21.5, [arXiv:1712.05236](https://arxiv.org/abs/1712.05236), pp. 496–509.

2015

**Trefois, Christophe**, Antony, Paul MA, Goncalves, Jorge, Skupin, Alexander, and Balling, Rudi (Aug. 2015) , “*Critical transitions in chronic disease: transferring concepts from ecology to systems medicine*”. In: *Current Opinion in Biotechnology* 34.5, [arXiv:1712.05236](https://arxiv.org/abs/1712.05236), pp. 48–55.

2014

Antony, Paul M. A., Boyd, Olga, **Trefois, Christophe**, Ammerlaan, Wim, Ostaszewski, Marek, Baumuratov, Aidos S, et al. (Nov. 2014) , “*Platelet mitochondrial membrane potential in Parkinson’s disease*”. In: *Annals of Clinical and Translational Neurology* 34.5, [arXiv:1712.05236](https://arxiv.org/abs/1712.05236), pp. 48–55.

2014

Biryukov, Maria, Antony, Paul MA, Krishna, Abhimanyu, May, Patrick, and **Trefois, Christophe** (Nov. 2014), “*Evaluation of Cell Line Suitability for Disease Specific Perturbation Experiments*”. In: *Studies in Classification, Data Analysis, and Knowledge Organization*. Springer.



2014 Fujita, Kazuhiro, Ostaszewski, Marek, Matsuoka, Yukiko, Ghosh, Samik, Glaab, Enrico, **Trefois, Christophe**, et al. (Feb. 2014) , “*Integrating pathways of Parkinson’s disease in a molecular interaction map.*” In: *Molecular Neurobiology* 49.1, arXiv:1712.05236, pp. 88–102.

2014 Krishna, Abhimanyu, Biryukov, Maria, **Trefois, Christophe**, Antony, Paul MA, Hussong, Rene, Lin, Jake, et al. (Dec. 2014) , “*Systems genomics evaluation of the SH-SY5Y neuroblastoma cell line as a model for Parkinson’s disease.*” In: *BMC Genomics* 15.1, arXiv:1712.05236, p. 1154.

2014 Samsi, Siddharth, **Trefois, Christophe**, Antony, Paul M A, and Skupin, Alexander (June 2014), “*Automated nuclei clump splitting by combining local concavity orientation and graph partitioning*”. In: IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI).

2013 Antony, Paul MA, **Trefois, Christophe**, Stojanovic, Aleksandar, Baumuratov, Aidos S, and Kozak, Karol (Jan. 2013) , “*Light microscopy applications in systems biology: opportunities and challenges.*” In: *Cell Communication and Signaling : CCS* 11.1, arXiv:1712.05236, p. 24.

2009 Sorniotti, Alessandro, Molva, Refik, Gomez, Laurent, **Trefois, Christophe**, Laube, Annett, and Scaglioso, Piervito (July 2009) , “*Efficient Access Control for Wireless Sensor Data*”. In: *International Journal of Wireless Information Networks* 16.3, arXiv:1712.05236, pp. 165–174.

2008 Gomez, Laurent, Laube, Annett, Ribiere, Vincent, Sorniotti, Alessandro, **Trefois, Christophe**, Valente, Marco, et al. (July 2008), “*Encryption-based access control for building management*”. In: Proceedings of the 5th Annual International Conference on Mobile and Ubiquitous Systems: Computing, Networking, and Services.

2007 Rumley, Sébastien, Gaumier, Christian, and **Trefois, Christophe** (July 2007), “*Distributed and Component Oriented Tools for Communication Networks Using Web Services*”. In: Proceedings of the 6th EUROSIM Congress on Modelling and Simulation.