

Laurent Bindschaedler

RESEARCH GROUP LEADER AT THE MAX PLANCK INSTITUTE FOR SOFTWARE SYSTEMS · MPI-SWS

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Research Interests

SYSTEMS FOR BIG DATA, GRAPH PROCESSING, AND MACHINE LEARNING. MACHINE LEARNING FOR SYSTEMS. DISTRIBUTED SYSTEMS. STORAGE TECHNOLOGIES. DATABASES. CLOUD COMPUTING.

Education

EPFL (Ecole Polytechnique Fédérale de Lausanne)

Lausanne, Switzerland

PH.D. IN COMPUTER SCIENCE

Sep. 2015 – Sep. 2020

- Ph.D. Thesis: An Architecture for Load Balance in Computer Cluster Applications. Supervised by Prof. Willy Zwaenepoel.
- Viva voce passed on March 19, 2020.
- 30 ECTS credits. Depth area: Systems.
- Classes: Principles of Computer Systems (CS-522), Applied Data Analysis (CS-401), Natural Language Processing (CS-431).

EPFL (Ecole Polytechnique Fédérale de Lausanne)

Lausanne, Switzerland

M.S. IN COMPUTER SCIENCE

Sep. 2009 – Jun. 2011

- GPA: 5.54 (out of 6). 125 ECTS credits.
- M.S. Thesis: Track Me If You Can. Hosted by: Nokia Research Center. Supervised by Prof. Jean-Pierre Hubaux.

EPFL (Ecole Polytechnique Fédérale de Lausanne)

Lausanne, Switzerland

B.S. IN COMPUTER SCIENCE

Sep. 2006 – Jun. 2009

- GPA: 5.59 (out of 6). 189 ECTS credits.
- B.S. Thesis: Secure SMS. Supervised by Prof. Jean-Pierre Hubaux.

Employment History

MPI-SWS (Max Planck Institute for Software Systems)

Saarbrücken, Germany

RESEARCH GROUP LEADER

Nov. 2022 –

- Data Systems Group (DSG), Operating Systems Lab. Director Peter Druschel.

MIT (Massachusetts Institute of Technology)

Cambridge, MA, USA

POSTDOCTORAL FELLOW

Sep. 2020 – Oct. 2022

- Data Systems Group (DSG), Computer Systems and AI Lab (CSAIL). Prof. Tim Kraska.
- Projects: Real-Time Graph Pattern Mining, Benchmarking Learned Data Management Systems, Synthesizing Graph Database from Production Logs.

EPFL (Ecole Polytechnique Fédérale de Lausanne)

Lausanne, Switzerland

DOCTORAL ASSISTANT

Sep. 2015 – Sep. 2020

- Ph.D. Candidate in the Operating Systems Laboratory (LABOS), IC. Supervised by Prof. Willy Zwaenepoel.
- IT administrator for the laboratory (since 2018), in charge of support, maintenance, and purchases.

EPFL (Ecole Polytechnique Fédérale de Lausanne)

Lausanne, Switzerland

RESEARCH ASSISTANT

Mar. 2014 – Aug. 2015

- Operating Systems Laboratory (LABOS), IC. Prof. Willy Zwaenepoel.
- Technical coordinator for the Data Center Observatory, a small state-of-the-art data center for researchers at EPFL, ETHZ, and USI.
- Designer of Chaos, a graph processing system that enables analytics on very large graphs using secondary storage.
- Developer and Maintainer of X-Stream, a single-machine graph processing system based on streaming partitions.

Lobnek Wealth Management

Geneva, Switzerland

IT CONSULTANT – ACTING HEAD OF IT

Jul. 2013 – Feb. 2014

- Oversaw the modernization of the IT infrastructure, including the design and development of new interactive analytics for customers.
- Implemented data integration and daily transactions reconciliation from different custodians into internal systems.

LakeMind

Lausanne, Switzerland

CO-FOUNDER AND VP OF ENGINEERING

Aug. 2011 – Jun. 2013

- LakeMind makes cloud services more reliable by automatically troubleshooting and repairing service outages. As a result, the duration of service downtimes is drastically reduced and developers spend less time fixing problems.
- LakeMind was an incubating company at EPFL in LABOS and NAL, supported by an Innovation Grant and Venture Kick.
- I designed and implemented the software stack for LakeMind consisting of an event processing pipeline, distributed in-memory dependency graph data structures, and several signal processing and machine learning algorithms. My responsibilities also involved coordinating the software development efforts involving several interns and business development in Europe and the US.
- Cloud service troubleshooting was too early to gain traction in its market segment and we did not attract the venture capital required to develop a minimum viable product. Recently, this market segment has seen significant activity.
- The two co-founders retain full ownership of the Intellectual Property and software developed.

Nokia Research Center

Lausanne, Switzerland

INTERN

Jan. 2011 – Jul. 2011

- Designed and implemented the prototype for a location privacy-preserving service for smartphones, which was a key component in the Nokia-EPFL NIC Trial that took place in 2011 and involved ~ 100 participants for 4 months.
- Demonstrated and published practical attacks on context-based identifier changes in such mobile networks.

Swiss Armed Forces

Morges, Switzerland

IT PIONEER — Chief of Staff, 1st Army Region

Jul. 2006 – Dec. 2018

Publications

[ICDE '23] Unshackling Database Benchmarking from Synthetic Workloads. [PDF]

Peer-reviewed International Conference.

Parimarjan Negi*, Laurent Bindschaedler*, Mohammad Alizadeh, Tim Kraska, Jyoti Leeka, Anja Gruenheid, Matteo Interlandi.

[CompAuto '22] Accurate Automatic Camera Calibration on Low-Quality CCTV Traffic Video Streams. [PDF]

Peer-reviewed International Conference.

Audhav Durai, Sankarshanaram Vempati, Laurent Bindschaedler.

[EuroSys '21] Tesseract Distributed, General Graph Pattern Mining on Evolving Graphs.* [PDF]

Peer-reviewed International Conference (acceptance rate 21%).

Laurent Bindschaedler, Jasmina Malicevic, Baptiste Lepers, Ashvin Goel, and Willy Zwaenepoel.

[SMDB '21] Towards a Benchmark for Learned Systems.* [PDF]

Peer-reviewed International Conference.

Laurent Bindschaedler, Andreas Kipf, Tim Kraska, Ryan Marcus, and Umar Farooq Minhas.

[THESIS] An Architecture for Load Balance in Computer Cluster Applications. [PDF]

Doctoral Dissertation, EPFL, 2020. Laurent Bindschaedler.

Ph.D. Committee: Alain Wegmann, Edouard Bugnion, Dushyanth Narayanan, Ashvin Goel, and Willy Zwaenepoel.

[ASPLOS '20] Hailstorm: Disaggregated Compute and Storage for Distributed LSM-based Databases.* [PDF]

Peer-reviewed International Conference (acceptance rate 18%). Best Presentation Award.

Laurent Bindschaedler, Ashvin Goel, and Willy Zwaenepoel.

[EuroSys '18] Rock You like a Hurricane: Taming Skew in Large Scale Analytics.* [PDF]

Peer-reviewed International Conference (acceptance rate 16%).

Laurent Bindschaedler, Jasmina Malicevic, Nicolas Schiper, Ashvin Goel, and Willy Zwaenepoel.

[SOSP '15] Chaos: Scale-out Graph Processing from Secondary Storage.* [PDF]

Peer-reviewed International Conference (acceptance rate 17%).

Amitabha Roy, Laurent Bindschaedler, Jasmina Malicevic, and Willy Zwaenepoel.

[REPORT] Benchmarking X-Stream and Graphchi. [PDF]

Technical Report. EPFL. 2014

Laurent Bindschaedler, and Amitabha Roy.

[PerCom '12] Big Brother Knows Your Friends: on Privacy of Social Communities in Pervasive Network. [PDF]

Peer-reviewed International Conference.

Igor Bilogrevic, Murtuza Jadliwala, Istvan Lam, Imad Aad, Philip Ginzboorg, Valtteri Niemi, **Laurent Bindschaedler**, and Jean-Pierre Hubaux.

[NDSS '12] Track Me If You Can: On the Effectiveness of Context-based Identifier Changes in Deployed Mobile Networks. [PDF]

Peer-reviewed International Conference (acceptance rate 18%).

Laurent Bindschaedler, Murtuza Jadliwala, Igor Bilogrevic, Imad Aad, Philip Ginzboorg, Valtteri Niemi, and Jean-Pierre Hubaux.

[MobileHCI '11] Making Mobile Augmented Reality A Reality. [PDF]

Peer-reviewed International Conference.

Laurent Bindschaedler, Hendrik Knoche, and Jeffrey Huang.

Supervision of Students

Master Semester Projects

MARIO BUCEV — Graph Ingestion Engine for Evolving Graphs.

Spring 2019

DIEGO ANTOGNINI — Scalable Decentralized Storage System Design.

Spring 2016

VLAD HAPRIAN — Load Balancing Techniques for Chaos.

Spring 2016

Summer Internship Project

JUNYAO ZHAO — HDFS Support for X-Stream.

Summer 2015

Teaching Activities

EPFL, Real-time Systems (CS-321)

Lausanne, Switzerland

GUEST LECTURER

Fall 2019

- Undergraduate level, ~ 50 students. Taught in French.
- Gave a 1-hour lecture on ContikiOS and protothreads.

EPFL, Operating Systems Introduction (CS-323)

Lausanne, Switzerland

GUEST LECTURER

Spring 2018, Spring 2019

- Undergraduate level, ~ 100 students. Taught in English.
- Gave a 2-hour lecture on Virtual Machines.

EPFL, Real-time Systems (CS-321)

Lausanne, Switzerland

TEACHING ASSISTANT

Fall 2019

- Undergraduate level, ~ 50 students. Taught in French.
- Head Teaching Assistant.
- Designed and led lab sessions.

EPFL, Operating Systems Introduction and Implementation (CS-323 & CS-323a)

Lausanne, Switzerland

TEACHING ASSISTANT

Spring 2017, Spring 2018, Spring 2019

- Undergraduate level, ~ 100 students in Introduction class, ~ 30 students in Implementation class. Taught in English.
- Part of a team of 4 Ph.D. Teaching Assistants.
- Led exercise and answers sessions, graded exams, and held office hours in the Introduction class.
- Designed and graded 4 mini-projects in the Implementation class.

EPFL, Calculus III (MATH-203)

Lausanne, Switzerland

TEACHING ASSISTANT

Fall 2018

- Undergraduate level, ~ 300 students. Taught in French.
- Part of a team of 4 Ph.D. Teaching Assistants coordinating ~ 20 undergraduate TAs.
- Led exercise and answers sessions, graded exams, and held office hours.

EPFL, Information, Computation, Communication (CS-119)

Lausanne, Switzerland

TEACHING ASSISTANT

Fall 2016, Fall 2017

- Undergraduate level, ~ 200 students. Taught in French.
- Part of a team of 4 Ph.D. Teaching Assistants coordinating ~ 20 undergraduate TAs.
- Designed and graded exams, led exercise and answers sessions, held office hours.

EPFL, System Oriented Programming (CS-207)

Lausanne, Switzerland

TEACHING ASSISTANT

Spring 2016

- Undergraduate level, ~ 150 students. Taught in French.
- Head Teaching Assistant coordinating 8 undergraduate TAs.
- Designed and graded exercises, projects, and exams.

EPFL, Various Undergraduate Classes

Lausanne, Switzerland

STUDENT TEACHING ASSISTANT

Fall 2009 - Spring 2011

- Information Technology (French), Systems Programming (English), and Software Engineering (English).

Professional Service

Dec. 2023	Program Committee , Spring Deadline for ACM/IFIP International Middleware Conference (Middleware)	Bologna, Italy
Jul. 2023	Program Committee (Heavy) , USENIX Annual Technical Conference (ATC)	Boston, MA, USA
May. 2023	Program Committee , ACM International Workshop on Edge systems, Analytics and Networking (EdgeSys)	Rome, Italy
Feb. 2023	Evaluator , FRQNT - Comité d'évaluation Programme Établissement de la relève professorale	Quebec, Canada
Oct. 2023	Program Committee , Fall Deadline for Architectural Support for Programming Languages and Operating Systems (ASPLOS)	Vancouver, Canada
Jun. 2023	External Program Committee , Summer Deadline for Architectural Support for Programming Languages and Operating Systems (ASPLOS)	Vancouver, Canada
Mar. 2023	External Program Committee , Spring Deadline for Architectural Support for Programming Languages and Operating Systems (ASPLOS)	Vancouver, Canada
Apr. 2022	Program Committee , Workshop on Machine Learning and Systems (EuroMLSys)	Rennes, France
Jul. 2022	Program Committee (Heavy) , USENIX Annual Technical Conference (ATC)	Carlsbad, CA, USA
Nov. 2021	Program Committee , International Workshop on AI in Networks and Distributed Systems (WAIN)	Milan, Italy
Jul. 2021	External Reviewer , USENIX Symposium on Operating Systems Design and Implementation (OSDI)	Santa Clara, CA, USA
Jul. 2021	Program Committee , USENIX Annual Technical Conference (ATC)	Santa Clara, CA, USA
Jun. 2021	Program Committee , ACM SYSTOR	Haifa, Israel
Apr. 2021	Program Committee , Workshop on Machine Learning and Systems (EuroMLSys)	Edinburgh, UK
Sep. 2020	Reviewer , ACM Transactions on Computer Systems (TOCS)	(Journal)
Jul. 2020	External Reviewer , USENIX Annual Technical Conference (ATC)	Boston, MA, USA
Apr. 2020	Organizer and PC Chair , 1st European Workshop on Graph Processing Systems (EuroGraph)	Heraklion, Greece
Feb. 2018	External Reviewer , ACM Principles and Practice of Parallel Programming (PPoPP)	Vienna, Austria

Prizes, Awards, Fellowships

May. 2020	Early Postdoc.Mobility Fellowship: P2ELP2_195136 , Swiss National Science Foundation
Mar. 2020	Best Presentation Award , ASPLOS'20
Dec. 2017	Teaching Assistant Award , EPFL IC Faculty
Dec. 2017	Public Prize Winner , Exposure Science Movie Hackathon
Sep. 2015	Ph.D. Fellowship , EPFL EDIC
Jan. 2012	Venture Kick 1st Round , LakeMind

Talks

Mar. 2023	Machine Learning (m)eats Software,	<i>BWInf 2023</i>
Oct. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>Aalborg University</i>
Apr. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>NTNU</i>
Mar. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>Imperial College</i>
Mar. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>U. Amsterdam</i>
Mar. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>Rochester University</i>
Mar. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>TU München</i>
Mar. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>U. Reykjavik</i>
Mar. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>U. Radboud</i>
Feb. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>U. Saarland & MPI-SWS</i>
Feb. 2022	Designing Scalable, Interactive, and Autonomous Big Data Systems,	<i>SMDB'21</i>
May. 2021	LOKI, Towards a Benchmark for Learned Systems	<i>U. Sydney</i>
Jun. 2021	Tesseract, Fast, Scalable Graph Pattern Mining on Evolving Graphs	<i>EuroSys'21</i>
Apr. 2021	Tesseract, Fast, Scalable Graph Pattern Mining on Evolving Graphs	<i>ASPLOS'20</i>
Mar. 2020	Hailstorm, Disaggregated Compute and Storage for Distributed LSM-based Databases	<i>U. Toronto</i>
Oct. 2019	Tesseract, Fast, Scalable Graph Pattern Mining on Evolving Graphs	<i>EcoCloud'19</i>
May. 2019	Tesseract, Fast, Scalable Graph Pattern Mining on Evolving Graphs	<i>EcoCloud'18</i>
Jun. 2018	Rock You Like a Hurricane, Taming Skew in Large Scale Analytics	<i>EuroSys'18</i>
Apr. 2018	Rock You Like a Hurricane, Taming Skew in Large Scale Analytics	<i>SOSP'15</i>
Oct. 2015	Chaos, Scale-out Graph Processing from Secondary Storage	<i>VentureKick'12</i>
Jul. 2012	LakeMind, Making Cloud Service More Reliable	<i>NDSS'12</i>
Jan. 2012	Track Me If You Can, on the Effectiveness of Context-based Identifier Changes in Mobile Networks	<i>MobileHCI'11</i>
Sep. 2011	ARLO, Making Mobile Augmented Reality a Reality	

Language Skills

- French **Fluent**, Mother tongue
- English **Fluent (C2)**, Cambridge Certificate of Proficiency
- German **Basic Knowledge (B2)**, Zertifikat Deutsch

Personal Skills / Hobbies

Improvisational Theatre

FOUNDING MEMBER OF L'IMPROSTURE, AN IMPROV TEAM ACTIVE IN FRENCH-SPEAKING SWITZERLAND

Chess

JUNIOR CHESS PLAYER IN THE GENEVA CHESS CLUB. ELO-RATED. HOBBYIST TO THIS DAY.

Piano

CLASSICAL AND POP PLAYER.