Filip Marković, PhD

Curriculum Vitae

Academic Appointments

March 2025 – present	University of Southampton (Southampton, United Kingdom Lecturer (~Assistant Professor)
July 2022 – Feb. 2025	Max Planck Institute for Software Systems (Kaiserslautern, Germany 5) Postdoctoral Researcher
July 2020 – June 2022	Mälardalen University (Västerås, Sweden 📒) Postdoctoral Researcher

Education

2015 - 2020	Mälardalen University (Västerås, Sweden 🔀) PhD in Computer Science
2015 – 2018	Mälardalen University (Västerås, Sweden) Licentiate in Computer Science
2014 - 2015	Mälardalen University (Västerås, Sweden) MSc in Computer Science
2013 - 2014	■ Mediterranean University (Podgorica, Montenegro Specialist in Information Technologies
2010 - 2013	Mediterranean University (Podgorica, Montenegro BSc in Information Technologies

Awards

2025	T	Outstanding Reviewer Award IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), CORE Rank: A
2024	T	Outstanding Paper Award IEEE Real-Time Systems Symposium (RTSS), CORE Rank: A*
2022	T	Best Presentation Award IEEE Real-Time Systems Symposium (RTSS), CORE Rank: A*
	T	Best Poster Award Max Planck Institute for Software Systems (MPI-SWS) Awarded by MPI-SWS colleagues through an open public vote during the institute retreat.

- 2021 Outstanding Paper Award

 Euromicro Conference on Real-Time Systems (ECRTS), CORE Rank:
- 2015 **PhD Scholarship**Awarded by Erasmus Mundus+ (European Commission) following a competitive selection process. My

 PhD proposal was selected to be funded with approximately €85000 from 2015 to 2018.
- - Other prior awards: Scholarship for the *Best Student in Montenegro* (2013), Best CS Student of Municipality of Podgorica (2013), Scholarship for Talented Students of Montenegro (2011–2013)

Research Experience

2025 - present

- **University of Southampton**, Lecturer (~Assistant Professor)
 - Contributing to the design and development of LiME, a tool for automated inference of real-time task models from unmodified Linux workloads for latency debugging, validation of timing behaviour and continuous monitoring
 - ♦ Ongoing collaboration with NASA Ames Research Center where LiME is being integrated in their safety procedures and timing validation pipeline
 - Contributing to the Antarctic Demonstrator for the Advanced Particle-astrophysics Telescope (ADAPT) project, developing AstroRTS, a real-time analysis and scheduling framework for the timely observation of transient astronomical phenomena, such as gamma-ray bursts, novae and supernovae
 - ♦ Ongoing collaboration with TTTech Auto (part of NXP) on probabilistic scheduling control and analysis for networked real-time systems

Industrial Collaborations



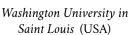


NASA Ames Research Center (USA)

TTTech Auto, part of NXP (Austria)

Academic Collaborations





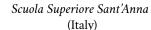


Max Planck Institute for Software Systems (Germany)











Mälardalen University (Sweden)

2022 - 2025

Max Planck Institute for Software Systems, Postdoctoral Fellow

Advisor: Björn B. Brandenburg

- Contributed to research in probabilistic scheduling analysis of real-time and embedded systems as part of the ERC Starting Grant project A Theory-Oriented Real-Time Operating System for Temporally Sound Cyber-Physical Systems (TOROS)
- ♦ Initiated a research direction on distribution-agnostic and correlation-aware timing analysis (recognised with the Outstanding Paper Award at RTSS 2024)
- Initiated a research direction on correlation-tolerant and rigorous Rocq-verified probabilistic analysis of real-time systems (RTSS 2023)

Collaborations





ONERA The French Aerospace Lab Saarland University (Germany)



TU Dortmund (Germany)



Scuola Superiore Sant'Anna (Italy)



Mälardalen University (Sweden)

Research Experience (continued)

2020 - 2022

Mälardalen University, Postdoctoral Fellow

School of Innovation, Design and Technology (IDT) Division of Networked and Embedded Systems (NES)

Advisor: Thomas Nolte

- Contributed to research in efficient and practical probabilistic analysis of realtime and embedded systems conducted in the project Practical Probabilistic Timing Analysis of Real-Time Systems (PARIS)
- ♦ Contributed to the state of the art in real-time systems by proposing an optimal polynomial-time distribution down-sampling and state-space reduction for $\mathcal{O}(n \log n)$ circular convolution, enabling space and time reductions in probabilistic analysis (recognised with the Outstanding Paper Award at ECRTS 2021)
- Advanced analytical approximations in probabilistic timing analysis by applying the Berry–Esseen theorem to derive safe distribution approximations and efficient quantile computation, achieving memory-efficiency improvements over state-ofthe-art convolution-based methods (Best Presentation Award at RTSS 2022)
- ♦ Contributed to the project Federated Choreography of an Integrated Embedded Systems Software Architecture (FIESTA)., conducted with several industrial partners: ABB, Arcticus Systems, Hitachi, Percepio, and Volvo Construction Equipment

Collaborations



ABB (CRC Sweden)

Arcticus Systems

Arcticus Systems (Sweden)

HITACHI

Hitachi Energy (Sweden)



(Sweden)

VOLVO

Volvo Construction Equpment (Sweden)

2015 - 2020

Mälardalen University, PhD student

School of Innovation, Design and Technology (IDT) Division of Computer Science and Engineering (CSE)

Thesis: "Preemption-Delay Aware Schedulability Analysis of Real-Time Systems" Advisors: Jan Carlson, Radu Dobrin, and Björn Lisper

- Conducted doctoral research in the field of real-time scheduling and cache-aware timing analysis, focusing on limited-preemptive scheduling strategies (algorithms that manage the interruption of threads at designated preemption points)
- Contributed to the state of the art in real-time systems by improving schedulability tests through more accurate cache-behaviour modelling, thereby reducing false negatives

Collaborations



University of Augsburg (Germany)

Ericsson (Sweden)

Research Experience (continued)

2015 - 2018

Mälardalen University, Licentiate*

School of Innovation, Design and Technology (IDT)

Division of Computer Science and Engineering (CSE)

Thesis: "Improving the Schedulability of Real-Time Systems under Fixed Preemption Point Scheduling"

Advisors: Jan Carlson, Radu Dobrin, and Björn Lisper

- Investigated timing analysis concerning cache-related preemption delay in unicore and multicore systems, employing limited-preemptive scheduling strategies
- ⋄ Contributed to the state of the art in real-time systems by improving the estimation of the influence of cache delays when employing fixed-preemption points

2014 - 2015

Mälardalen University, MSc student

School of Innovation, Design and Technology (IDT)

Division of Computer Science and Engineering (CSE)

Thesis: "Automated Test Generation for Structured Text Language Using UPPAAL Model Checker"

Advisors: Adnan Čaušević and Eduard Paul Enoiu

- Conducted MSc research focused on creating a test case generation framework for Structured Text (ST) language, used in PLC programming, employing the UPPAAL model checker to improve the logic coverage
- Collaborated with Bombardier, which led to improvements in test generation efficiency and resource utilization, providing a viable approach for industry adoption

Collaborations

BOMBARDIER

Bombardier (CRC Sweden)

^{*} The licentiate degree is a post-graduate, research degree, situated above the MSc degree and below the PhD degree. It is an intermediate academic qualification awarded in Sweden during PhD studies.

Research Publications

All publications are presented in reverse chronological order.

Disclaimer: In the field of Computer Science, specifically within Real-time and Embedded Systems, high-quality conference publications are valued more than journal articles.

Note on the provided rankings: Conference rankings are reported according to the CORE rankings as of the date of publication for each entry. These rankings categorize conferences as follows:

- A* flagship conference and a leading venue within a discipline,
- A excellent conference and highly respected within a discipline,
- **B** good to very good conference and well-regarded within a discipline,
- **C** other recognized conferences that meet minimum standards.

Table I: Summary of high-quality conference publications and awards over time

Time frame	Conference ranks	Awards
After PhD [2021, 2025]	A* A* A* A* A* A* A A A B	OPA OPA BPA ORA
During PhD $[2015,2020]$	AAB	
OPA - Outstanding Paper A	ward, BPA - Best Presentation Award, ORA	- Outstanding Reviewer Award

CSRankings score: Filip Markovic 0001 EMBEDDED 10 (#Pubs) 2.3 (#Adj.)

#Pubs stands for the total number of top conference publications (DBLP)

#Adj stands for the paper count divided by number of co-authors

Peer-reviewed conference contributions

1 Authors: D. Wang, M. Sudvarg, **F. Marković**, J. Buhler, S. Baruah, and G. Kehne

Title: "Probabilistic Response-Time-Aware Search for Transient Astrophysical Phenomena"

Venue: The 46th IEEE Real-Time Systems Symposium (RTSS)

Year: 2025 CORE rank: **A*** Accept. rate: 22%

Authors: B. B. Brandenburg, C. Courtaud, **F. Marković**, and B. Ye

Title: "LiME: The Linux Real-Time Task Model Extractor"

Venue: The 31st IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)

Year: 2025
CORE rank: A
Accept. rate: 27%

Notes: Authors listed in alphabetical order

Authors: A. Friebe, T. Cucinotta, **F. Marković**, A. V. Papadopoulos, and T. Nolte

Title: "Nip It In the Bud: Job Acceptance Multi-Server"

Venue: The 31st IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)

Year: 2025 CORE rank: A Accept. rate: 27% 4 Authors: **F. Marković**, G. von der Brüggen, M. Günzel, J.-J. Chen, and B. B. Brandenburg

Title: "A Distribution-Agnostic and Correlation-Aware Analysis of Periodic Tasks"

Venue: The 45th IEEE Real-Time Systems Symposium (RTSS)

Year: 2024 CORE rank: A* Accept. rate: 23%

Notes: Outstanding Paper Award

5 Authors: M. Zini, **F. Marković**, D. Casini, A. Biondi, and B. B. Brandenburg

Title: "In Search of Butterflies: Exceedance Analysis for Real-Time Systems under Transient Overload"

Venue: The 45th IEEE Real-Time Systems Symposium (RTSS)

Year: 2024
CORE rank: A*
Accept. rate: 23%

6 Authors: S. Bozhko, **F. Marković**, G. von der Brüggen, and B. B. Brandenburg

Title: *"What Really is pWCET? A Rigorous Axiomatic Proposal"*Venue: The 44th IEEE Real-Time Systems Symposium (RTSS)

Year: 2023 CORE rank: A* Accept. rate: 25%

A. Friebe, **F. Marković**, A. V. Papadopoulos, and T. Nolte

Title: "Continuous-Emission Markov Models for RT Applications: Bounding Deadline Miss Probabilities"
Venue: The 29th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)

Year: 2023 CORE rank: Accept. rate: 27%

8 Authors: F. Marković, P. Roux, S. Bozhko, A. V. Papadopoulos, and B. B. Brandenburg

Title: "CTA: A Correlation-Tolerant Analysis of the Deadline-Failure Probability of Dependent Tasks"

Venue: The 44th IEEE Real-Time Systems Symposium (RTSS)

Year: 2023 CORE rank: A* Accept. rate: 25%

Notes: First solution to a longstanding open problem from 1995

9 Authors: **F. Marković**, A. V. Papadopolous, and T. Nolte

Title: "Analytical Approximations in Probabilistic Analysis of Real-Time Systems"
Venue: The 43rd IEEE Conference on Real-Time Systems Symposium (RTSS)

Year: 2022 CORE rank: A* Accept. rate: 29%

Notes: Best Presentation Award

10 Authors: A. Friebe, **F. Marković**, A. V. Papadopoulos, and T. Nolte

Title: "Adaptive Runtime Estimate of Task Execution Times using Bayesian Modeling"

Venue: Int. Conf. on Embedded and Real-Time Computing Systems and Applications (RTCSA)

Year: 2021 CORE rank: B Accept. rate: 42%

11 Authors: **F. Marković**, A. V. Papadopolous, and T. Nolte

Title: "On the Convolution Efficiency for Probabilistic Analysis of Real-Time Systems"

Venue: The 33rd Euromicro Conference on Real-Time Systems (ECRTS)

Year: 2021 CORE rank: A Accept. rate: 19%

Notes: Outstanding Paper Award

Authors: S. M. Salman, S. Mubeen, **F. Marković**, A. V. Papadopolous, and T. Nolte "Scheduling Elastic Applications in Compositional Real-Time Systems"

Venue: The 26th IEEE Conference on Emerging Technologies and Factory Automation (ETFA)

Year: 2021

CORE rank: Not available

Accept. rate: 66%

Authors: F. Marković, J. Carlson, and R. Dobrin

Title: "Cache-Aware Response Time Analysis for Real-Time Tasks with Fixed Preemption Points"

Venue: The 26th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)

Year: 2020 CORE rank: Accept. rate: 27%

Notes: Part of PhD thesis

14 Authors: F. Marković, J. Carlson, R. Dobrin, and S. Altmeyer

Title: "Improving the Accuracy of Cache-Aware Response Time Analysis using Preemption Partitioning"

Venue: The 32nd Euromicro Conference on Real-Time Systems (ECRTS)

Year: 2020 CORE rank: A Accept. rate: 34%

Notes: Part of PhD thesis

15 Authors: **F. Marković**, J. Carlson, and R. Dobrin

Title: "Improved Cache-Related Preemption Delay Estimation for Fixed Preemption Point Scheduling"

Venue: The 23rd International Conference on Reliable Software Technologies (Ada-Europe)

Year: 2018 CORE rank: B Accept. rate: 37%

Notes: Part of PhD thesis

16 Authors: F. Marković, J. Carlson, R. Dobrin, B. Lisper, and A. Thekkilakattil "Probabilistic Response Time Analysis for Fixed Preemption Point Selection"

Venue: The 13th IEEE International Symposium on Industrial Embedded Systems (SIES)

Year: 2018

CORE rank: Not available Accept. rate: Not available

Peer-reviewed original articles

A. Friebe, **F. Marković**, A. V. Papadopoulos, and T. Nolte

Title: "A Comparison of Partitioning Strategies for Fixed Points Based Limited Preemptive Scheduling"

Journal: Real-Time Systems

Year: 2024

Volume: vol. 60 / no. 3

Impact Fac.: 1.3

Authors: **F. Marković**, J. Carlson, and R. Dobrin

Title: "A Comparison of Partitioning Strategies for Fixed Points Based Limited Preemptive Scheduling"

Journal: IEEE Transactions on Industrial Informatics

Year: 2019

Volume: vol. 15 / no. 2 Impact Fac.: 10.215

Notes: Part of PhD thesis

Peer-reviewed workshop contributions

1 Authors: **F. Marković**, J. Carlson, and R. Dobrin

Title: "Tightening the Bounds on Cache-Related Preemption Delay in Fixed Preemption Point Scheduling"

Venue: The 17th International Workshop on Worst-Case Execution Time Analysis (WCET)

Year: 2017

CORE rank: Not available

Accept. rate: 71%

Notes: Part of PhD thesis

Peer-reviewed research artifacts

Authors: F. Marković, A. V. Papadopoulos, and T. Nolte

Title: "On the Convolution Efficiency for Probabilistic Analysis of Real-Time Systems (Artifact)"

Journal: Dagstuhl Artifacts Series

Year: 2021 Volume: vol. 7 / 1 Impact Fac.: Not available

Theses

1 Author: F. Marković

Title: "Preemption-Delay Aware Schedulability Analysis of Real-Time Systems"

School: Mälardalen University

Year: 2020 Type: **PhD thesis**

Series: Mälardalen University Press Dissertations

ISBN: 978-91-7485-467-1

2 Author: F. Marković

Title: "Improving the Schedulability of Real Time Systems under Fixed Preemption Point Scheduling"

School: Mälardalen University

Year: 2018

Type: Licentiate thesis

Series: Mälardalen University Press Licentiate Theses

ISBN: 978-91-7485-390-2

3 Author: F. Marković

Title: "Automated Test Generation for Structured Text Language Using UPPAAL Model Checker"

School: Mälardalen University

Year: 2015 Type: **MSc thesis**

Academic Service

Organising Committees

2025 Euromicro Conference on Real-Time Systems (ECRTS), Shadow TPC Chair

- International Real-Time Scheduling Open Problems Seminar (RTSOPS), collocated with the Euromicro Conference on Real-Time Systems (ECRTS)

 Co-Chair
- 2024 ACM SIGBED International Conference on Embedded Software (EMSOFT)

 Publicity Chair
 - International Real-Time Scheduling Open Problems Seminar (RTSOPS), collocated with the Euromicro Conference on Real-Time Systems (ECRTS)

 Co-Chair
- 2021 **IEEE International Conference on Real-Time Networks and Systems (RTNS)** Session 5 Chair: Design and Verification.

Technical Program Committees

2025 IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)

Program Committee Member, Outstanding Reviewer Award

2024 IEEE Real-Time Systems Symposium (RTSS)

Program Committee Member

- IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), Brief Presentations Track Program Committee Member
- 2023 International Real-Time Scheduling Open Problems Seminar (RTSOPS)

 Program Committee Member
 - **IEEE Real-Time Systems Symposium (RTSS)**, Brief Presentations Track *Program Committee Member*
 - **Euromicro Conference on Real-Time Systems (ECRTS)**Program Committee Member
 - IEEE International Conference on Real-Time Networks and Systems (RTNS)

 Program Committee Member
- 2022 **IEEE International Symposium On Real-Time Distributed Computing (ISORC)**Program Committee Member
 - Workshop on Next Generation Real-Time Embedded Systems (NG-RES)

 Program Committee Member
 - **Euromicro Conference on Real-Time Systems (ECRTS)**Artifact Evaluation Committee
 - **Euromicro Conference on Real-Time Systems (ECRTS)** *External Reviewer*
 - IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS), Brief Presentations Track Program Committee Member
- 2021 IEEE Real-Time and Embedded Technology and Applications
 Symposium (RTAS)
 Artifact Evaluation Committee Member

Academic Service (continued)

▼ IEEE International Conference on Real-Time Networks and Systems (RTNS)Program Committee Member

2019 **IEEE International Conference on Industrial Technology (ICIT)**, Special Session on Advanced Solutions for Communication in Cooperative Cyber-Physical Systems *Program Committee Member*

Reviewing

- IEEE Transactions on Computers
- ACM Transactions on Embedded Computing Systems
- Journal of Systems Architecture
- Real-Time Systems Journal (Springer)

University administration

- ♦ Contributed to the development of an Erasmus+ grant application focused on student and staff mobility to support exchange between Sweden and non-EU countries
- ♦ Served as the local student support for the Erasmus+ project from 2016 to 2022, enhancing the exchange experience for the visiting students

Teaching Experience

2018 - 2022

Mälardalen University, Instructor, Teaching, and Lab Assistant

School of Innovation, Design and Technology (IDT)

Division of Computer Science and Engineering (CSE)

Module: Software Architecture

Responsibilities: Developed module materials and lectures, graded student work, and supervised lab sessions.

Mälardalen University, Teaching and Lab Assistant

School of Innovation, Design and Technology (IDT)

Division of Computer Science and Engineering (CSE)

Module: Software Development for Real-Time Systems

Responsibilities: Created lab materials, assessed student performance, and office hours.

2021 – 2022 Mälardalen University, Co-Instructor

School of Innovation, Design and Technology (IDT)

Division of Computer Science and Engineering (CSE)

PhD-level Module: Introduction to graduate education

Responsibilities: Prepared and delivered lectures, assessed student performance.

2020 – 2021 **Mediterranean University**, Module Instructor

Faculty for Information Technology

Module: Software Testing

Responsibilities: Managed module content, delivered lectures, and assessed student performance. Additional duties included developing and updating the module syllabus and creating lab exercises that complemented lecture material. Lectured in Montenegrin.

Teaching Experience (continued)

Mediterranean University, Module Instructor

Faculty for Information Technology

Module: Data Structures and Algorithms

Responsibilities: Managed module content, delivered lectures, and assessed student performance. Lectured in Montenegrin.

2018 - 2019

Mälardalen University, Teaching and Lab Assistant

School of Innovation, Design and Technology (IDT)

Division of Computer Science and Engineering (CSE)

Module: Component-Based Technologies

Responsibilities: Designed lab materials and graded assignments and projects. Conducted lab sessions to support student learning.

2021 - 2022

Mälardalen University, Supervisor of student projects

School of Business Society and Engineering

Division of Organization and Management Module: Technology-based Social Entrepreneurship

Responsibilities: Supervision of student projects and assistance with technology-related issues.

Student Advising

January 2023 - December 2024

May 2025 – present Co-supervisor of Hengrui Zhao, PhD student, University of Southampton

September 2020 – 2025 Co-supervisor of Anna Friebe, *PhD*, Mälardalen University PhD thesis defended in 2025, available here.

"Probabilistic Analysis and Scheduling of Real-Time Systems"

January 2021 – July 2022 Co-supervisor of Shaik Salman, *PhD*, Mälardalen University

Licentiate Thesis defended in 2022, available here.

"Integrating Elastic Real-Time Applications on Fog Computing Platforms"

July 2022 – *present* Co-advisor of Sergey Bozhko, *PhD student* at the Max Planck Institute for Software Systems (MPI-SWS)

Co-advisor of Matteo Zini, *Intern* at the Max Planck Institute for

Software Systems (MPI-SWS), January – July 2023, *PhD student* at the TeCIP Institute, Scuola Superiore Sant'Anna, Pisa, Italy

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January 2023 – July 2023 Co-advisor of Meenal Gupta, Intern at the Max Planck Institute for Software Systems (MPI-SWS), MSc student at the Birla Institute of Technology and Science, Pilani, Pilani Campus, India

Academic Visits and Invited Talks

1 May - 6 May 2025

NASA Ames Research Center, Mountain View, USA

- Invited to NASA Ames Research Center to initiate collaboration with Dr. Irfan Šljivo and the FRET research team on LIME and its inclusion in NASA's validation pipeline
- Presented LIME and ongoing research on timing analysis of probabilistic timing requirements, which are of use to FRET

18 November – 22 November 2024

Boston University (**BU**), Boston, USA

- ♦ Visited professors Richard West, Renato Mancuso and their research groups
- ♦ Presented the talk "Dealing with Time and Uncertainty in Cyber-Physical Systems"

18 October – 19 October 2024

University of Montenegro, Podgorica, Montenegro

- Invited by the University of Montenegro to participate in the event "Scientific Diaspora Days", where I presented two talks on my research
- 18 October 23 October 2024

Mediterranean University, Podgorica, Montenegro

- Invited by the Mediterranean University to present my research to the undergraduate students of the Faculty of Information Technology
- 13 February 17 February 2024

TU Dortmund (**TUD**), Dortmund, Germany

- ♦ Visited Professor Jian-Jia Chen and his research group
- ♦ Collaborated on a paper accepted to RTSS 2025

Recognitions and Funding

2025 S LiME in NASA: Launching the Future Grants

Awarded €1,000 pump-priming funding from ECS, University of Southampton, following a competitive selection process, to support a research visit to NASA Ames Research Center

📜 Royal Society Endorsement — Exceptional Talent

Endorsed by The Royal Society (UK) as meeting the criteria for Exceptional Talent under the Global Talent visa scheme

2019 – 2022 **Erasmus+ Project Application: Higher Education Student and Staff Mobility.**

Contributed to the development of an Erasmus+ grant application focused on student and staff mobility that was successfully funded, receiving €675,745 over three years to support exchanges between Sweden and non-EU countries

2015 – 2018 **Erasmus Mundus+ PhD Scholarship**

Funded by Erasmus Mundus+ (European Commission) following a competitive selection process. My PhD proposal was selected to be funded with approximately \leqslant 85000

Miscellaneous Experience

Public engagement and outreach

2025 **Project: Back2matica** "Science is coming back home".

Participated in a video interview for the national outreach initiative *Back2matica*, describing my research career trajectory and discussing opportunities for collaboration between Montenegro and the international research community

2019 Montenegrin Science Promotion Foundation (PRONA).

I was one of the lecturers at PRONA's Science Summer School in Lovćen, Montenegro, engaging with elementary and high-school students during a three-day course

Attended Summer Schools

14 June - 16 June 2016

■ Uppsala Programming for Multicore Architectures Research Center (UPMARC) Summer School. Uppsala University, Uppsala, Sweden

27 June - 1 July, 2016

Timing Analysis on Code Level (TACLe) Summer School, Yspertal, Austria

^{*} The licentiate degree is a post-graduate, research degree, situated above the MSc degree and below the PhD degree. It is an intermediate academic qualification awarded in Sweden during PhD studies.