ETH zürich

Department of Computer Science

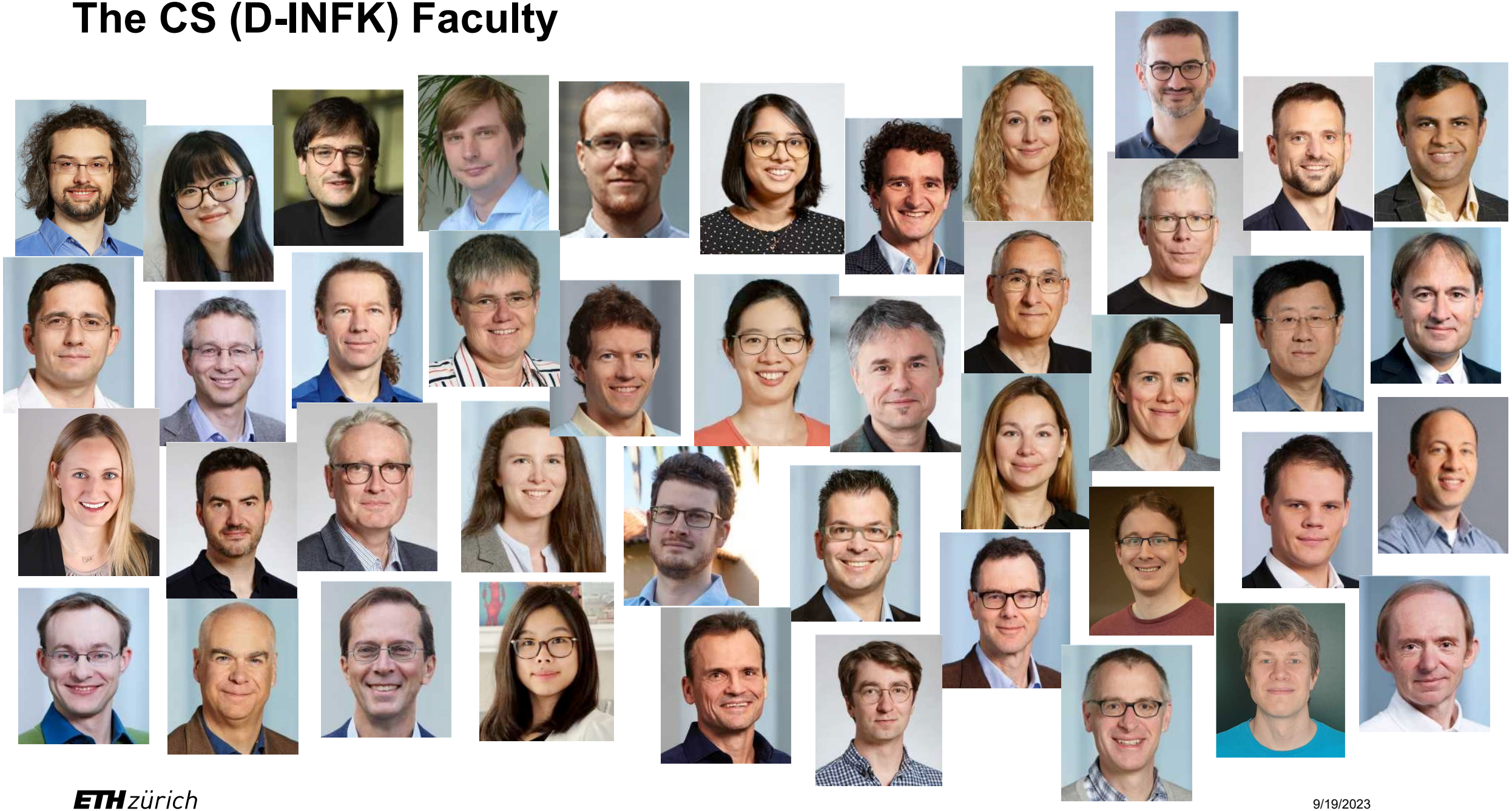
Welcome to the Department!

Zhendong Su
Director of Studies

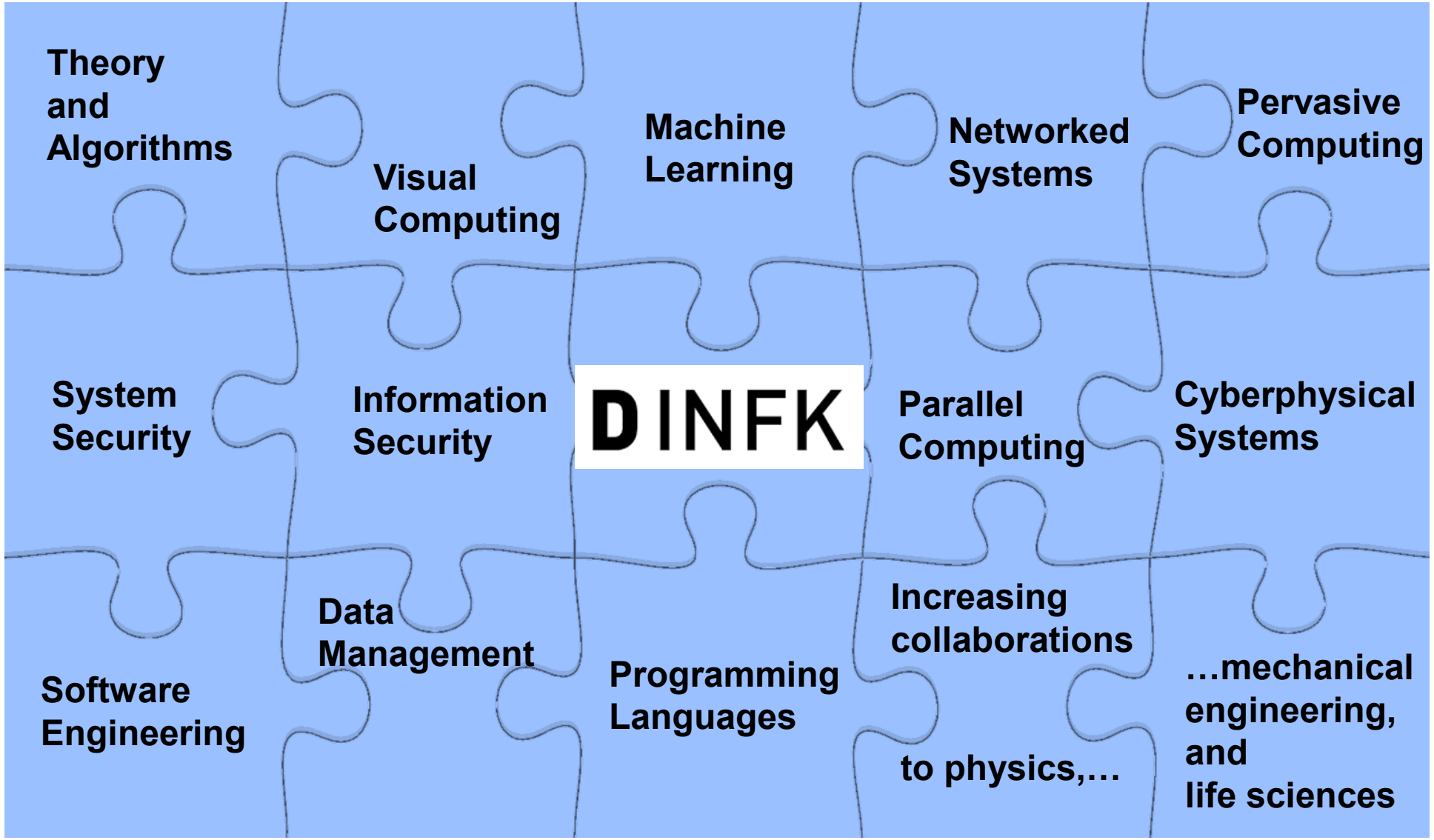
18 September 2023

D INFK

The CS (D-INFK) Faculty



Broad Topics in Research and Education



Worldwide Top-Ranked CS Department

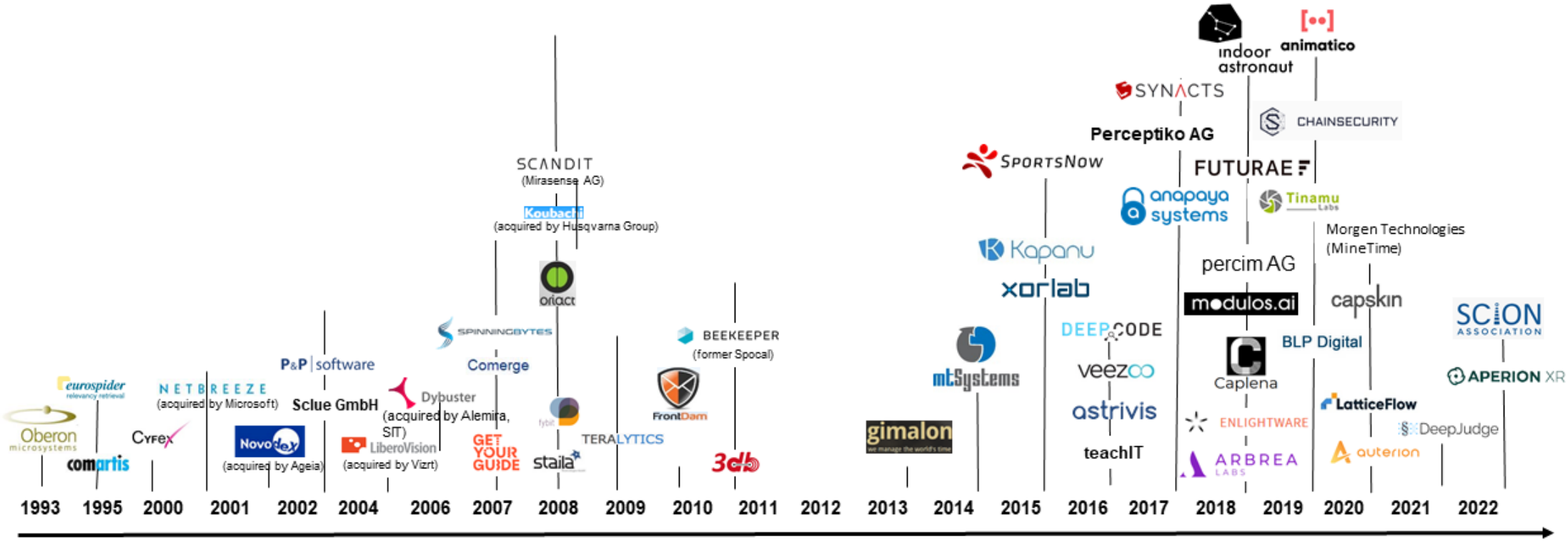
THE WORLD UNIVERSITY RANKINGS

Rank 2023	Institution	Country
1	University of Oxford	United Kingdom
2	Massachusetts Institute of Technology	United States
3	Stanford University	United States
4	**ETH Zurich**	**Switzerland**
5	Carnegie Mellon University	United States

Start Your Own Company

53 D-INFK Spin-offs founded since 1993

Establishment of Academic ETH Spin-offs



D-INFK Master Programs

MSc Data Science

75 new students

MSc Computer Science

287 new students

MSc Cyber Security

37 new students

Some Quick Advice

- Take advantage of the unique opportunity of studying at ETH
- Attend classes, interact with your peers, TAs, and faculty
- Work hard, practice self-reflection, seek help when needed
- Make this not only a degree, but a major step in your life and career
- Stay positive and have fun!

ETH zürich

Introduction to ETH Master’s in CS

Dr. Malte Schwerhoff
Lecturer & Educational Developer

D INFK

My Journey to ETH

A-Level | Apprenticeship | Bachelor (FH) | Master (ETH) | PhD (ETH) | Lecturer

Let’s Get Started

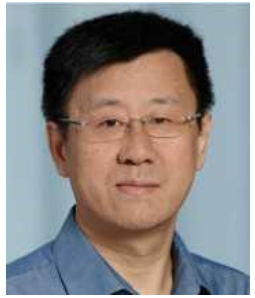
Studies Administration

- Study related administrative issues
- Issues concerning examinations
- Transcripts, degrees, …
- Issues concerning military service (Swiss only)

↳ studiensekretariat@inf.ethz.ch

Who is Who

Prof. Kenny Paterson
Department Head



Prof. Zhendong Su
Director of Studies

Denise Spicher
Studies Administration

and several others

Master’s Programme in Computer Science

Take a look inside!

Credit System

- ECTS credits (European Credit Transfer System)
- Course completed successfully
  ↳ then full number of credits is awarded (none otherwise)
- 30 credits per semester

- ETH's master's programme in CS has 120 credits
  - Expected duration: 4 semesters
  - Max. duration: 8 semesters (including Master's thesis)

Grading System

6 Very good

5 Good

4 Sufficient

3 Insufficient

2 Poor

1 Very poor

- **Pass**: grade ≥ 4.0
- **Fail**: grade < 4.0
- Grading scale: 0.25

Repetition of exams:
Every examination can be repeated *once*

Master’s Programme Structure

Master ETH Zurich in Computer Science	120
Major	26
Core Courses Core Electives	16
Minor	18
Inter Focus Courses	16
Seminar	2
Practical Work	8
Free Elective Courses	
Science in Perspective	2
Master's Thesis	30

Choose one of five majors:

- Data Management Systems
- Machine Intelligence
- Secure & Reliable Systems
- Visual & Interactive Computing
- Theoretical Computer Science

Courses per major: see “Core courses catalogue” PDF on the Master’s programme’s web site

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plus 10 credits from Core Courses or Core Electives

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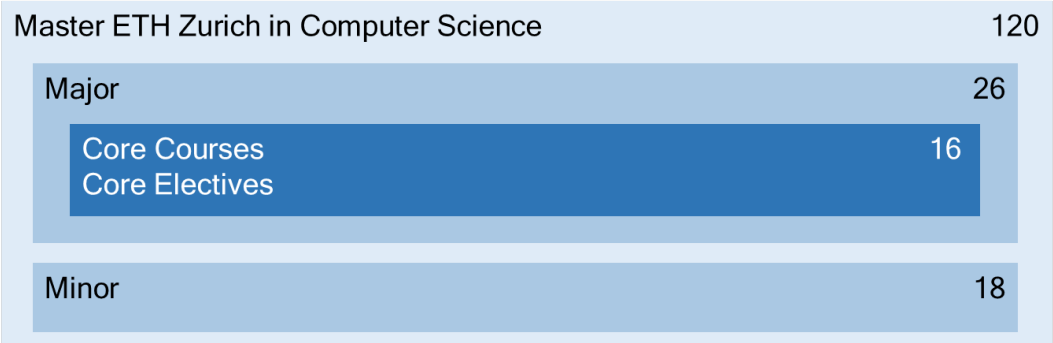
plus 10 credits from
Core Courses or
Core Electives

Σ = 102, plus 18 credits from all categories
except seminars, practical work, thesis

Majors



- Must choose major within **first four** semester weeks
- Major may be changed **once** (no study duration extension)
- Choice is made via mystudies.ethz.ch

Permitted Combinations of Majors & Minors

	Computer Graphics	Computer Vision	Data Management	Information Security	Machine Learning	Networking	Programmeming Languages and Software Engineering	Systems Software	Theoretical Computer Science
Data Management Systems	✓	✓	×	✓	✓	✓	✓	×	✓
Machine Intelligence	✓	×	✓	✓	×	✓	✓	✓	✓
Secure and Reliable Systems	✓	✓	✓	×	✓	✓	×	✓	✓
Visual and Interactive Computing	×	×	✓	✓	✓	✓	✓	✓	✓
Theoretical Computer Science	✓	✓	✓	✓	✓	✓	✓	✓	×

Minors

- Courses count for specific minors
- At end of MSc, chosen courses must sum up to a suitable minor
- Thus:
  - Minor can be “changed” any time
  - **Your responsibility** to ensure choice yields suitable minor

252-0535-00L Advanced Machine Learning

Catalogue data | Performance assessment | Learning materials | Courses | Groups | Restrictions | Offered in

Programme	Section
CAS in Computer Science	Focus Courses and Electives
Computational Biology and Bioinformatics Master	Data Science
⋮	
Computer Science Master	Minor in Data Management
Computer Science Master	Minor in Machine Learning
Computer Science Master	Minor in Theoretical Computer Science

Minor in Computer Vision

Number	Title
263-3210-00L	Deep Learning Number of participants limited to 320.
263-5902-00L	Computer Vision

Inter Focus Courses - “The Labs”

- You need ≥ 16 ECTS from labs
- Four labs offered, each worth 8 credits → two labs
  - Autumn semester: Algorithms Lab, Information Security Lab
  - Spring semester: Computational Intelligence Lab, Advanced Systems Lab
- Repetition *can* require re-enrolling
  ↳ repetition only possible a year later
- At most four attempts in total
  ↳ **failing more than two attempts means dropping out**
- Labs are difficult and mean a lot of work during the semester
- **Failed labs are the main reason for drop-outs**
- Advice**:** Take *one* lab *each* semester – and allocate enough time
- Strong recommendation: Pass *at least* one lab within one year

data analytics lab ETH zürich

Computational Intelligence Lab 2023

The goal of the Computational Intelligence Lab is to enable master level students to connect their mathematical background in linear algebra, analysis, probability, and optimization with their basic knowledge in machine learning and their general skill set in Computer Science to gain a deeper understanding of models and tools of great practical impact.

This includes the often underestimated step of conceptualization and critical modeling of the problem at hand, i.e. reflecting on assumptions and simplifications and justifying the appropriateness of the approach taken. It also includes replacing computation by calculation where possible. It is very hard to understand what may happen, when we run code over data so to speak. What biases are introduced? What guarantees can be made? When will the method work, when fail? What would we even look for empirically to measure success? To answer such crucial questions, we need a mathematical model and not just a computational toolbox in which the model remains opaque to our understanding.

CIL is hence a lab in to regards: (1) it teaches “hands-on” use of mathematical methods and (2) it provides “hands-on” training in programming through practical projects. In contrast to other classes in machine learning and data science, the emphasis is not on comprehensive coverage of topics and content. Rather the course works with a compilation of relevant, weakly interconnected topics, which are exemplary in nature. The goal is to enable students to independently apply the learned skills to models and topics not covered.

We will not provide a systematic introduction to the mathematics needed. One can consult excellent undergraduate textbooks or machine-inspired textbooks such as Mathematics for Machine Learning. As far as programming goes, we will make use of Python, its scientific computing library NumPy and some more specialized libraries such as PyTorch when it comes to neural network models.

Useful Links

- Lecture Notes

Practical Work

- Individual semester project of 8 ECTS, **or** one lab course (not “The Labs”), ECTS according to the course catalogue
- Supervised by a professor from D-INFK
- Graded as pass/fail
- Find potential projects by
  - Talking to professors and their research groups
  - Checking department’s/institutes’/ professors’ websites

Further information can be found in the PDF [Memo Practical Work](#).

Course units | Catalogue data | Courses

Number	Title
252-0570-00L	Game Programming Laboratory
252-0817-00L	Distributed Systems Laboratory
263-4630-00L	Computer-Aided Modelling and Reasoning
252-0811-00L	Applied Security Laboratory
252-0817-00L	Distributed Systems Laboratory
263-0650-00L	Practical Work

Game Programming Laboratory

The goal of this course is the in-depth understanding of the technology and programming underlying computer games. Students gradually design and develop a computer game in small groups and get acquainted with the art of game programming.

Schedule › | Project structure ›
FAQ › | Games ›

Game Programming Laboratory

Free Elective Courses

- “Free” as in “see the fine-print”
  - All **Master’s level** courses **in the area of computer science**
  - or a closely related field (e.g. D-MATH, D-ITET)
  - offered by ETH Zurich, EPFL, or University of Zurich

- **At most one** *mandatory focus course* (“Kernfächer”) from our Bachelor's curriculum
  - **No** *elective courses* from our Bachelor's curriculum

- A research project in computer science may be conducted (5 ECTS). There are specific prerequisites for this registration, see PDF [Memo Research in Computer Science](#).

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https://inf.ethz.ch/studies/forms-and-documents.html

Practical Work

- Memo Practical Work download (PDF, 51 KB)

Research in Computer Science

- Memo Research in Computer Science download (PDF, 112 KB)

Science in Perspective

- Must obtain **two ECTS at D-GESS**
  (Department of Humanities, Social and Political Sciences)
- Course catalogue: see VVZ, programme “Science in Perspective”

- At most **six credits** can be accredited in this category
- At most **three credits** through language courses
  (including those obtained in your ETH Bachelor’s programme)

- Language courses offered by the language centre **that are explicitly accredited** by D-GESS have an 851-XXXX-XX course number

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ETH zürich

Course Catalogue

Courses | Lecturers | Time and Place

Course units | Catalogue data | Courses

Number	Title	Type	ECTS	Hours	Lecturers
853-0725-00L	History Part One: Europe (The Cradle of Modernity, Britain, 1789-1914)	W	3 credits	2V	H. Fischer-Tiné
851-0105-00L	Background Knowledge Arabic World	W	2 credits	2V	U. Gösken
052-0801-00L	Global History of Urban Design I	W	2 credits	2G	T. Avermaete
851-0157-28L	Life and Death Particularly suitable für students of D-BIOL, D-HEST, D-CHAB, D-USYS	W	3 credits	2V	M. Hagner
851-0426-00L	Paul Feyerabend's Anarchistic Theory of Knowledge	W	3 credits	2S	M. Hagner, M. Han

Getting started: Step by Step

General Information

- Master’s programme’s web site
- Specifically:
  - Study Guide
  - Core Course Catalogue
- List of courses: vvz.ethz.ch
- Fellow students
- Study Administration
- Your tutor
- …

Homepage › Studies › Master's Programmes › Computer Science

Master in Computer Science

The Master's programme in computer science offers a profound and in-depth education in the core areas of computer science. The wide range of available courses and the flexible structure allow students to tailor their studies to meet their particular interests, needs, and goals.

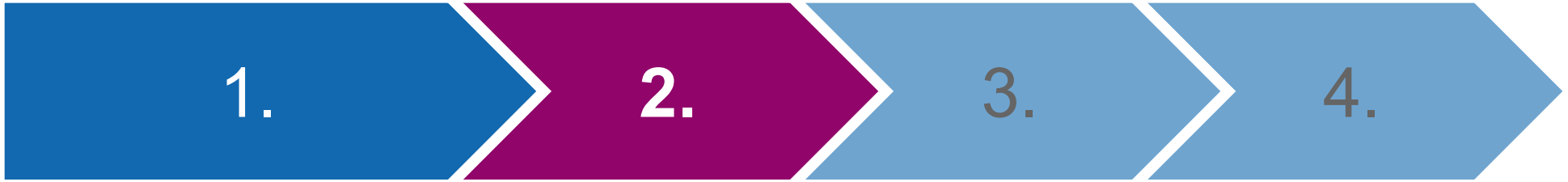
Step 1: Choose Major

- Choose major on myStudies: mystudies.ethz.ch
- **Within first four** semester weeks
- Remember: can only be changed **once**

Step 2: Your Personal Study Plan

Roughly **plan** your studies:

- Which courses sound interesting? → Course list: vvz.ethz.ch
- When is which course offered? → Distribute workload across semesters
- Which minors could I achieve with these courses?
  - See PDF on D-INFK's MSc website (or VVZ)
  - Consult study administration or tutor, if necessary



Step 3: Study

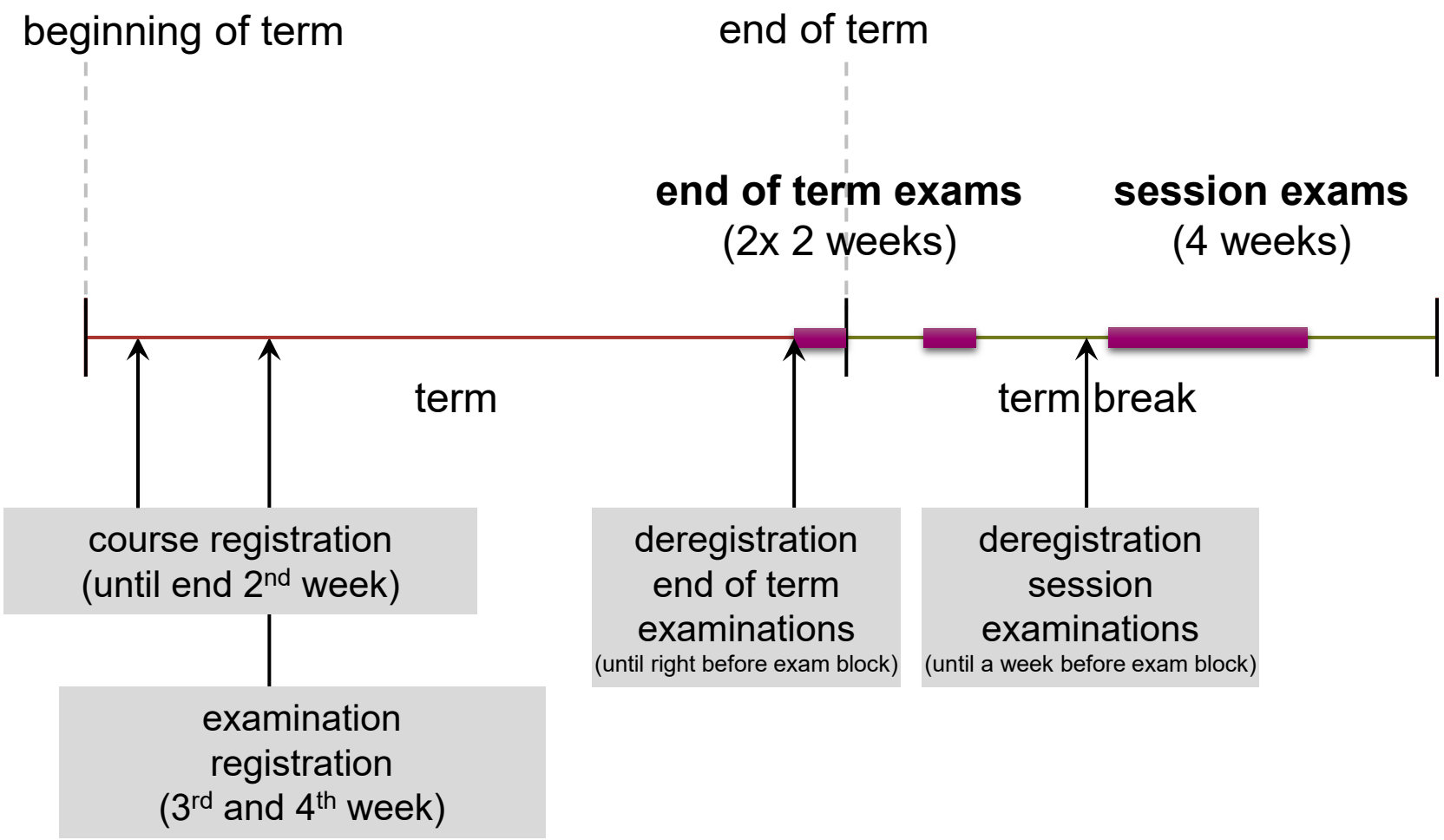
- Enrol for courses: mystudies.ethz.ch
- Revise your study plan, if necessary

Step 4: Thesis

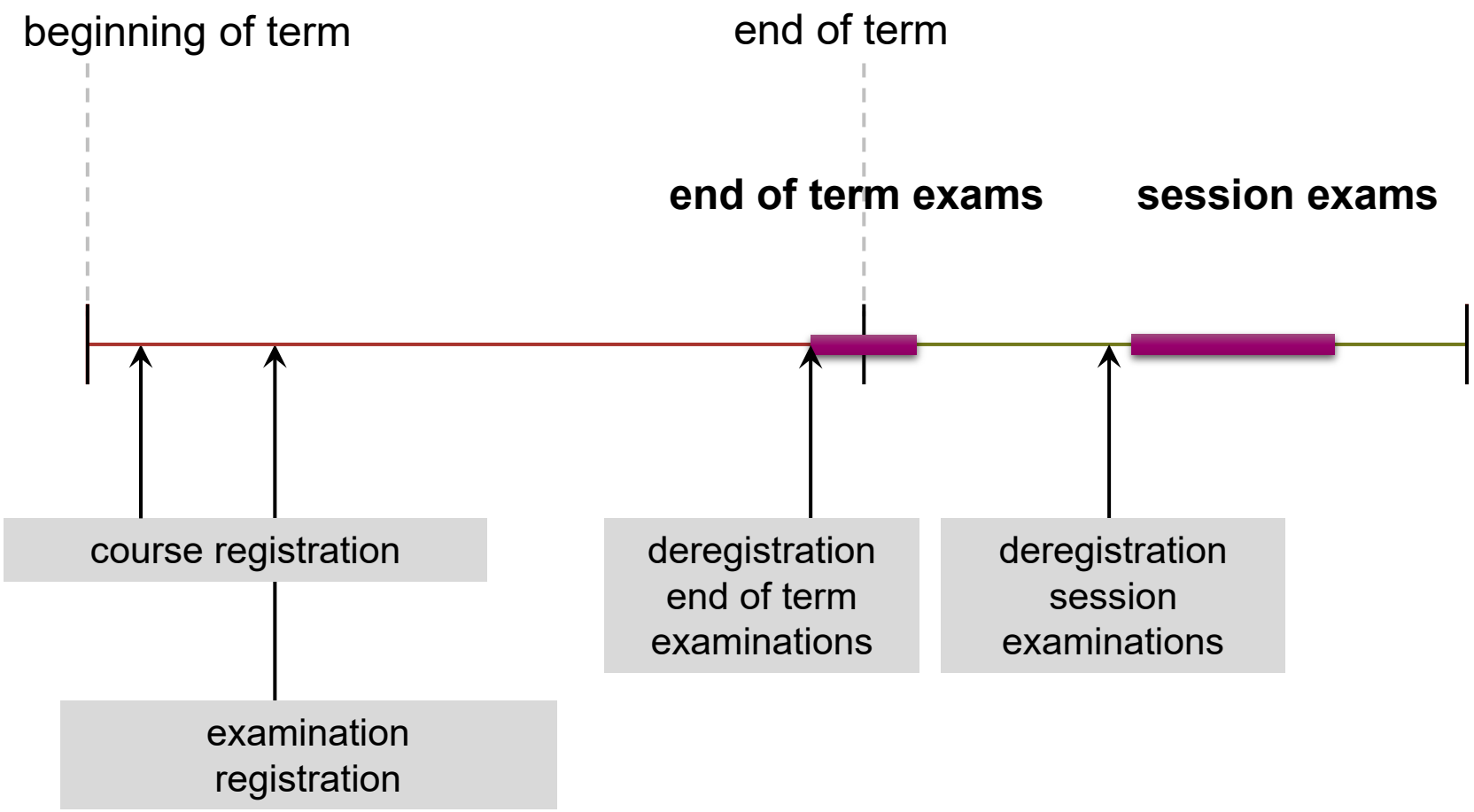
- Duration: at most 6 months
- Full-time → taking courses in parallel is not recommended
- Admission requirements
  - All additional requirements completed
  - Major completed (26 credits)
  - Inter Focus Courses (“the labs”, 16 credits) completed
  - At most 8 credits missing in total (besides thesis’ credits)

Semesters & Examinations

Autumn Semester



Spring Semester

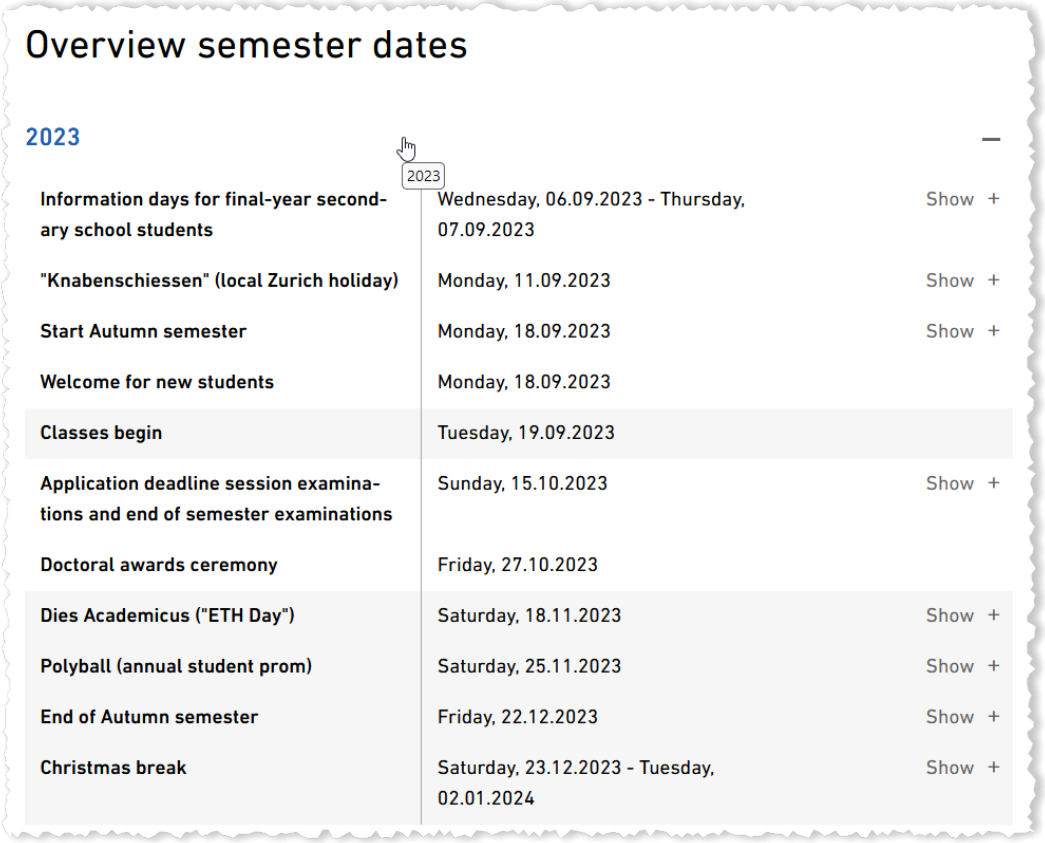


Deadline Announcements

- Important *deadlines* (course registrations, exam registration and deregistration, etc.)
  are *always* announced ahead of time via email

  ↳ **Check your ETH email address regularly**

- Also see website, e.g. for
  - Dates and deadlines
  - Academic calendar



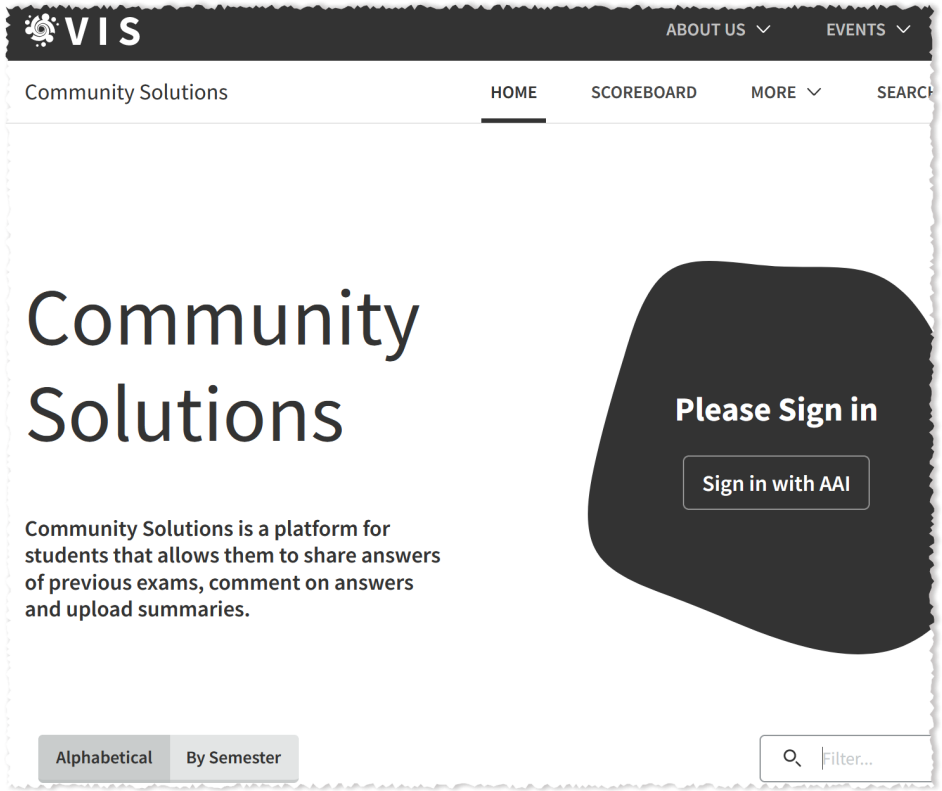
Overview semester dates

2023

Information days for final-year secondary school students	Wednesday, 06.09.2023 - Thursday, 07.09.2023	Show +
"Knabenschiessen" (local Zurich holiday)	Monday, 11.09.2023	Show +
Start Autumn semester	Monday, 18.09.2023	Show +
Welcome for new students	Monday, 18.09.2023	
Classes begin	Tuesday, 19.09.2023	
Application deadline session examinations and end of semester examinations	Sunday, 15.10.2023	Show +
Doctoral awards ceremony	Friday, 27.10.2023	
Dies Academicus ("ETH Day")	Saturday, 18.11.2023	Show +
Polyball (annual student prom)	Saturday, 25.11.2023	Show +
End of Autumn semester	Friday, 22.12.2023	Show +
Christmas break	Saturday, 23.12.2023 - Tuesday, 02.01.2024	Show +

Preparing Examinations

- Solve the *exercises* during the semester
- Solve *old examinations:*
  - Available from the student body, i.e. VIS
  - Maybe also from courses' websites
- *Oral examinations*: Get minutes of former examinations from VIS
- If you have *questions*, ask your fellow students or the assistants



Bring Your Own Device (also to Exams)

- Project BYOD is still under construction

- Specific hardware *recommended* as of Autumn 2023
- Most likely *obligatory* as of Autumn 2024
- Might affect you if you have to repeat courses

Homepage › Studies at ETH Zurich › Bachelor's degree studies › Beginning your studies › Bring your own device

Bring your own device

Recommended for new students starting Fall 2023

ETH Zurich recommends that students who start a study program in the fall semester 2023 have their own laptop available for this purpose. A minimum configuration is recommended for the laptops; of course, other devices that exceed this minimum configuration are equally suitable.

For students entering a study program in the fall semester of 2024, laptops will most likely be obligatory.

The following is the minimum configuration starting fall semester 2023. This minimum configuration is guaranteed to be sufficient for your studies for ten consecutive semesters, starting with the announcement ahead of the respective fall semesters.

Component	Mininum requirement
Processor	AMD R5, Intel Core i5, Apple M1
Main memory	16 GB
SSD capacity	512 GB SSD
Display size and resolution	13" / Full HD
Battery runtime	7h at everyday use
Charging	supports charging via USB-C
Ports	1x USB-C plus 1x USB-A or USB-C
Operating System	Windows 11 or current macOS
WiFi Standard	standard 5 GHz; 6 GHz (WiFi 6E) recommended
Keyboard	physical
WebCam	yes

Last but not Least: Starting Times

- Classes *typically* start a quarter past the full hour
- Example: Class stated to take place from 8 till 10
  - Starts at 08:15
  - Usually has a break from 09:00-09:15
  - Ends at 10:00

- Above does *not* apply to
  - Exams, meetings, etc.
  - Hönggerberg (ETH's "remote" campus)

Lecture times

Lectures generally last for 45 minutes. The left column of the table indicates the times published in the course catalogue.

Entries in Course Catalogue/ Roomreservation	Zentrum All buildings	Hönggerberg HIF, HIL	Hönggerberg All other buildings
08:00–09:00	08:15-09:00	08:00-08:45	07:45-08:30
09:00–10:00	09:15-10:00	08:50-09:35	08:45-09:30
10:00–11:00	10:15-11:00	09:45-10:30	09:45-10:30
11:00-12:00	11:15-12:00	10:45-11:30	10:45-11:30
12:00–13:00	12:15-13:00	11:45-12:30	11:45-12:30
13:00–14:00	13:15-14:00	12:45-13:30	12:45-13:30
14:00–15:00	14:15-15:00	13:45-14:30	13:45-14:30
15:00–16:00	15:15-16:00	14:45-15:30	14:45-15:30
16:00–17:00	16:15-17:00	15:45-16:30	15:45-16:30
17:00–18:00	17:15-18:00	16:45-17:30	16:45-17:30
18:00–19:00	18:15-19:00	17:45-18:30	17:45-18:30
19:00-20:00	19:15-20:00	18:45-19:30	18:45-19:30

All the best for your studies!