EPFL’s three missions according to the Federal Act

- Education
- Research
- Innovation
EPFL today

- Campus
  - 11,134 students, 2,216 PhD students
  - 347 faculty
  - 6,060 staff (incl. PhD)

- Structure
  - 5 schools (13 programs leading to MSc degree)
  - 2 colleges
  - 26 institutes
  - >15 interdisciplinary centers
  - >350 laboratories and research groups
Martin Vetterli

- President of EPFL since Jan 2017
- Professor in IC School (to date)
# 13 Study Programs

350 Research Labs

<table>
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<tr>
<th>Schools</th>
<th>SB</th>
<th>SV</th>
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<td>Life Sciences &amp; Technology</td>
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<tr>
<td>Bioengineering</td>
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<td>CDM</td>
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<td>Management of Technology</td>
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<td>Financial Engineering</td>
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<th>Interdisciplinary centers</th>
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<tr>
<td>CDH</td>
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<tr>
<td>Human &amp; Social Sciences</td>
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</tr>
</tbody>
</table>
Extended campus

- Neuchâtel – Microcity
- Fribourg – Smart Living Lab
- Lausanne – Main campus
- Sion – Energypolis campus
- Geneva – Campus Biotech
New Master programs:
- Cyber Security (2019), joint with ETH Zurich
- Robotics (2018)
- Data Science (2017)

New Doctoral programs:
- Computational and Quantitative Biology (2018)
- Digital Humanities (2017)
- Advanced Manufacturing (2016)
EPFL #1 MOOCs provider in Europe

103 MOOCs:
- >2 million registered users
- 2/3 are not students
  - 90% are employed
Extension School

- 10 courses
- 2 COS programs
- 10 courses under development for launch in 2018-2019
- >200 enrolled learners
Innovation
The World’s Most Innovative Universities 2018, Reuters

<table>
<thead>
<tr>
<th>Rank</th>
<th>University</th>
<th>Country</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Stanford University</td>
<td>USA</td>
</tr>
<tr>
<td>2</td>
<td>Massachusetts Institute of Technology (MIT)</td>
<td>USA</td>
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<tr>
<td>3</td>
<td>Harvard University</td>
<td>USA</td>
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<tr>
<td>4</td>
<td>University of Pennsylvania</td>
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<td>University of Washington</td>
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<tr>
<td>6</td>
<td>University of Texas System</td>
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<td>7</td>
<td>KU Leuven</td>
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<td>8</td>
<td>Imperial College London</td>
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<td>9</td>
<td>University of North Carolina Chapel Hill</td>
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<tr>
<td>10</td>
<td>Vanderbilt University</td>
<td>USA</td>
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<tr>
<td>11</td>
<td>Korea Advanced Institute of Science &amp; Technology (KAIST)</td>
<td>South Korea</td>
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<tr>
<td>12</td>
<td>Federal Institute of Technology in Lausanne (EPFL)</td>
<td>Switzerland</td>
</tr>
<tr>
<td>13</td>
<td>Pohang University of Science &amp; Technology (POSTECH)</td>
<td>South Korea</td>
</tr>
</tbody>
</table>


Source: The World’s Most Innovative Universities 2018, Reuters
EPFL Innovation Park

- >120 start-ups
- >75 venture projects in incubators
- 25 innovation labs of large corporations
- Logitech and Nestlé centers
School of Computer and Communication Sciences - IC
IC Overview

- 44 Professors (6 joint)
- 3 new hires in 2019-20
  - ML, theory, distributed systems

- 230 PhD students
  - 53 PhD awarded in 2017
- 882 Bachelor students (+12.4% in 1 year)
- 545 Master students (+11.5% in 1 year)
  - 81 in new Data Science MSc
IC at a Glance

- Algorithms & Theory
- Artificial Intelligence & Machine Learning
- Computational Biology
- Computer Architecture & Integrated Systems
- Data Management & Information Retrieval
- Graphics & Vision
- Human-Computer Interaction
- Information & Communication Theory
- Networking
- Programming Languages & Formal Methods
- Security, Privacy & Cryptography
- Signal & Image Processing
- Systems
QS World University Rankings 2019 in Computer Science & Information Systems

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<td>EPFL - Ecole Polytechnique Federale de Lausanne</td>
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<td>ETH Zurich - Swiss Federal Institute of Technology</td>
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<tr>
<td>10</td>
<td>National University of Singapore (NUS)</td>
<td>Singapore</td>
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</table>

Source: www.topuniversities.com
CS Rapidly growing

Number of new students

- PC Boom
- Internet Boom
- iPhone Boom
- ML Boom
- Larus Boom

Computer Science

Communication Systems
25 researchers have an h-index >40

Nr. 1 in Systems & Communication Engineering Panel (ranking of ERC grants)

Nr. 2 in Computer Science & Informatics Panel (ranking of ERC grants)
## IC ERCs in Perspective

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<tr>
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<tr>
<td>ETHZ</td>
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</table>

Institutions that received 10 or more grants (Starting, Consolidator and Advanced) 2007-16 in "Computer Science and Informatics" + 2 PE7 + 1 SNSF ERC
Broad impact on computer science

**ICML 2018**

17 Number of paper presented by EPFL

13th position with the most papers

7th position among universities

**NIPS 2018**

14 Number of paper presented by EPFL

17th position with the most papers

11th position among universities
Accelerating Impact

- 2019 Master in Cyber Security
- 2017 Master in Digital Humanities
- 2017 Center for Digital Trust
- 2017 Master in Data Science
- 2017 Swiss Data Science Center
- 2015 Extension School
- 2012 MOOCs
- 2012 Digital Humanities Laboratory
- 2004 Swiss Leading House Dual T
- 2003 ‘Internet pour les filles’
- 2002 School of Computer & Communication Sciences (IC)
- 1991 Section Communication Systems
- 1987 Computer Science Department
- 1981 Section Computer Science
Swiss Data Science Center (SDSC)

- Academic and industry research collaborations
- Partnerships with Bühler and Peugeot-Citroën
- RENKU, the SDSC analytics platform (Open Source)
- 1st SDSC Industry Day (November 2017)
- 1st IEEE Data Science Workshop (June 2018)

www.datascience.ch
EPFL as a Centre for Digital Trust

Overview

CRITICAL INFRASTRUCTURES

PRIVACY PROTECTION CRYPTOGRAPHY

SMART CONTRACTS BLOCKCHAIN

SOFTWARE VERIFICATION

SYSTEM SECURITY

MACHINE LEARNING

FINANCE & ECONOMY

HEALTH

DEMOCRACY & HUMANITARIAN

DIGITAL INFORMATION

SMART CONTRACTS BLOCKCHAIN

SOFTWARE VERIFICATION

SYSTEM SECURITY

MACHINE LEARNING

DIGITAL INFORMATION

www.c4dt.org
78+ EdTech startups
Center for Intelligent Systems

Joint venture by IC, STI, and SB

Build upon existing strengths
- Intelligent Systems
- Foundational theory
- Modelling
- Machine learning
EPFL digital/ICT spin-offs

Number of spin-off per year in digital/ICT
Funding in 2018

- **$10 M**
  - KANDOU BUS
- **$85 M**
  - inphero
- **$15 M**
  - AKSELOS
- **$10 M**
  - NEXTHINK
- **$11 M**
  - bestmile
Key Challenges: Intelligent Systems

- Next technological revolution will be systems built on AI, data science, ML
  - Bridge physical and cyber worlds
  - Perform actions previously left to humans
  - Continuously adaptive and improving

- Need to grow competencies in multiple areas:
  - Machine learning, artificial intelligence
  - Vision, audio/visual processing
  - Speech, natural language processing
  - Human-AI collaboration, agents
  - Planning
  - Complex systems
  - Programming models and tools, software verification
  - Security, trustworthiness, and privacy
Key Challenges: Foundation of Technology

- Moore’s Law is coming to its end
  - Still many opportunities to improve silicon-based devices
- Need new computational materials and models
- Quantum computing
  - Radically different computational paradigm
  - Needs new algorithms, programming languages and tools, verification techniques
- Biologically-inspired computing
  - New mechanisms to build power-efficient, robust, failure-tolerant computations
  - New models for computational intelligence
Key Challenges:
Reliable and Trustworthy Computation

- Integration of computing into society has created severe problems
  - Loss of personal privacy
  - Impaired trust in institutions
  - Safety of critical infrastructure
  - Educational mismatch and job displacement

- CS created technologies underlying these problems
  - Some have technical solutions
  - Others would benefit from CS involvement in formulating legal or political remediations
Merci James Larus