

EPFL IC Overview

James Larus
Dean IC
School

swissnex

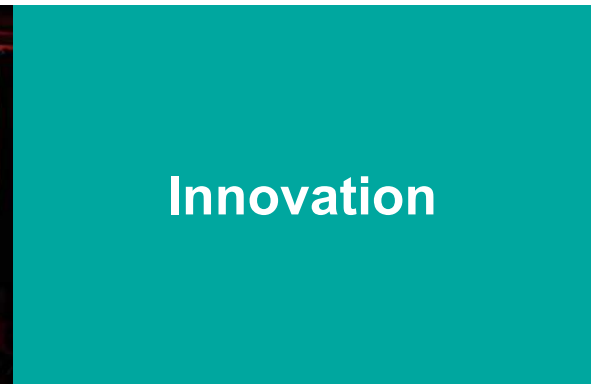
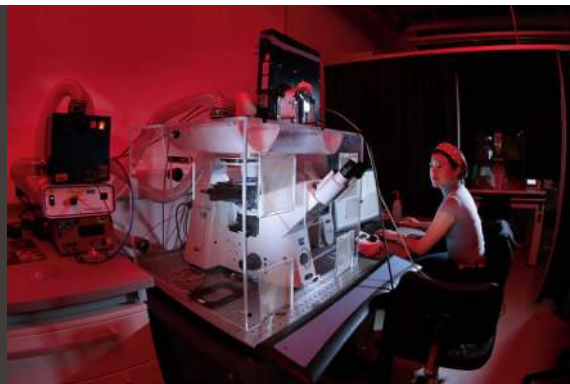
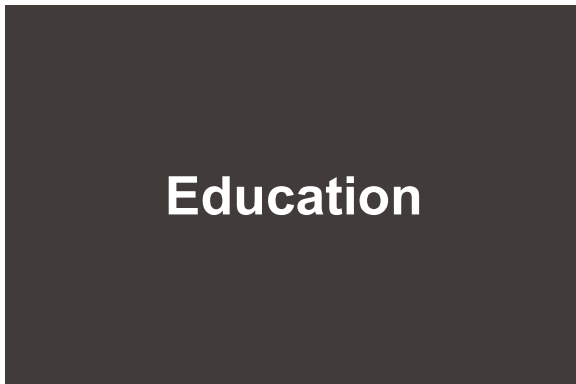
San Francisco CA
June 27, 2019

EPFL's three missions according to the Federal Act

Education

Innovation

Research



EPFL today



■ Campus

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

■ Structure

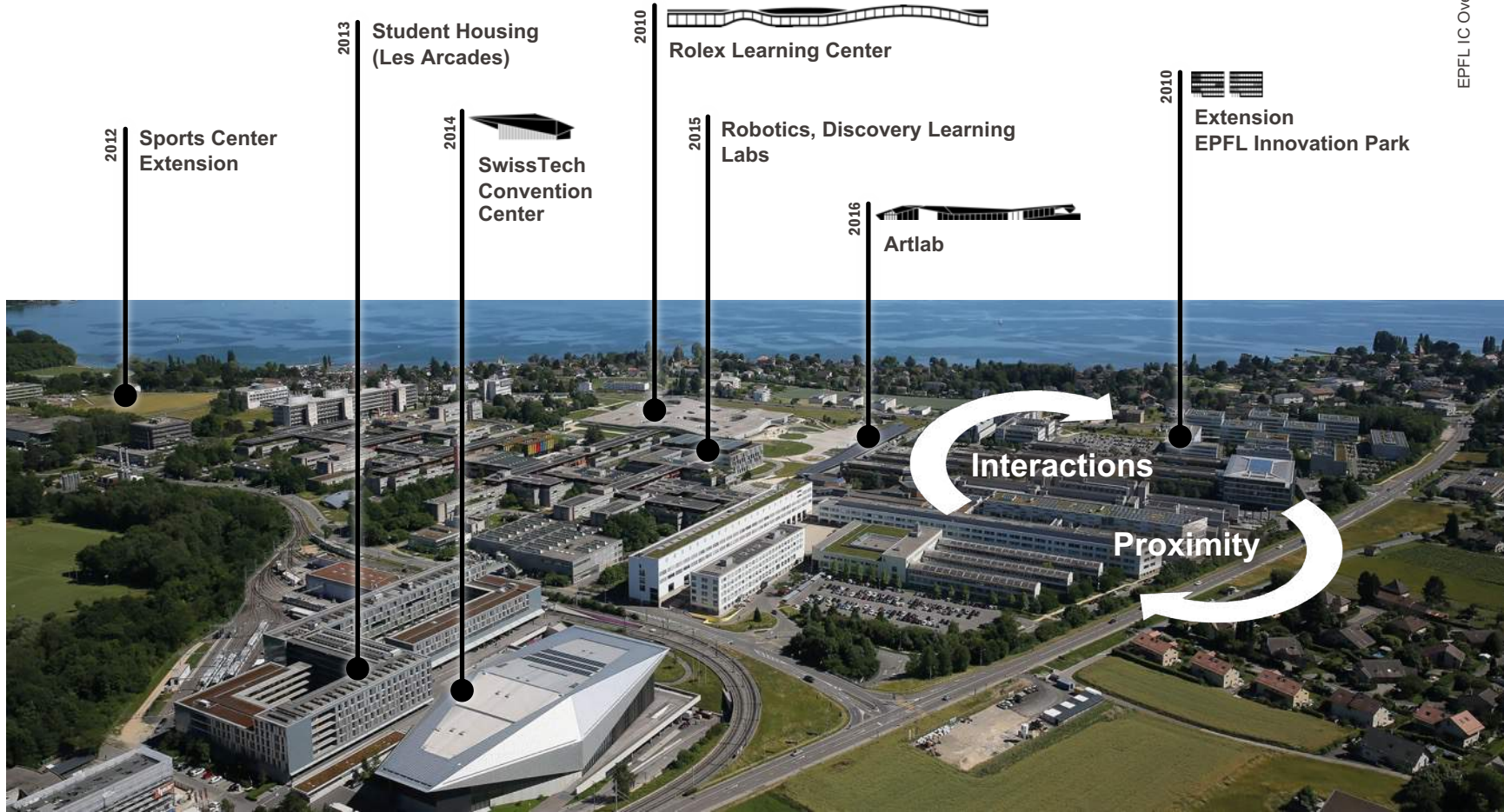
- 5 schools (13 programs leading to MSc degree)
- 2 colleges
- 26 institutes
- >15 interdisciplinary centers
- >350 laboratories and research groups



- President of EPFL since Jan 2017
- Professor in IC School (to date)

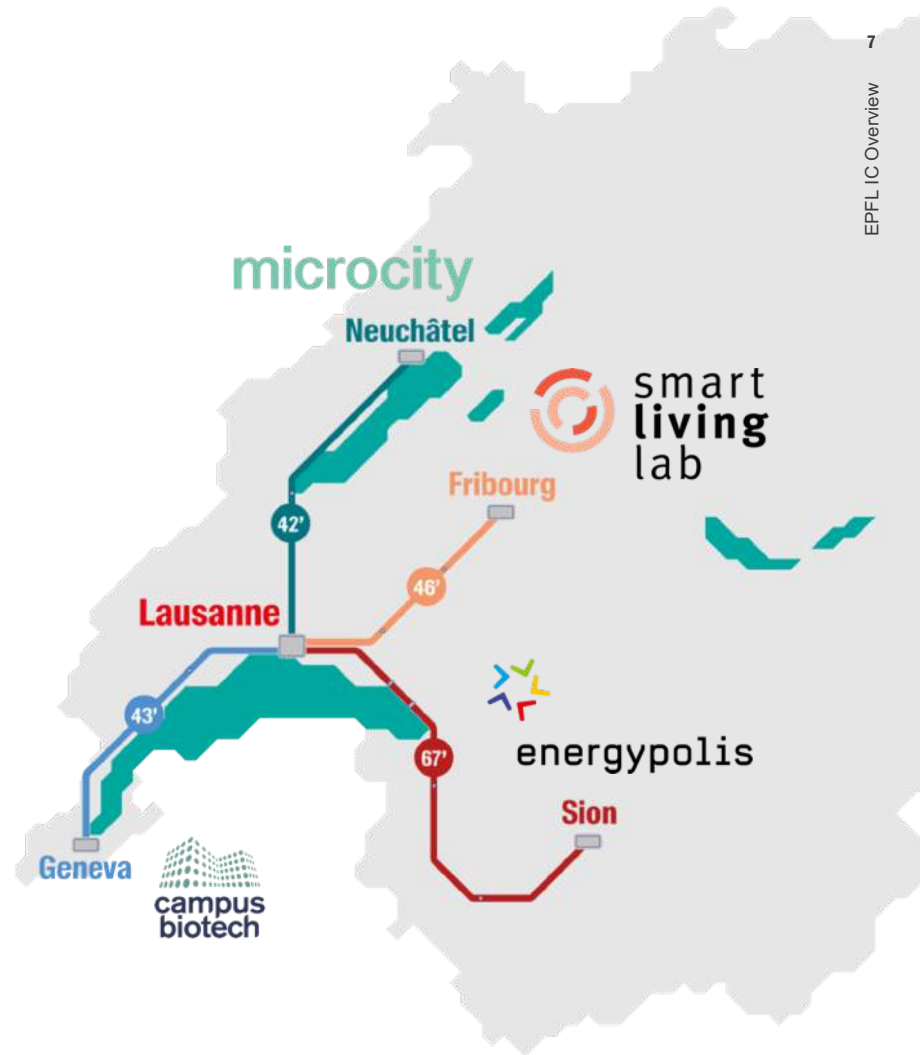
13 Study Programs 350 Research Labs

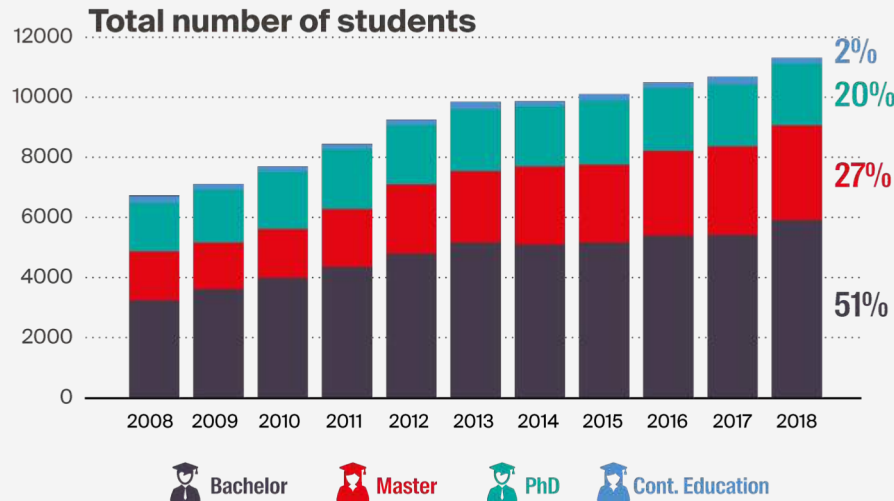




Extended campus

- 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)

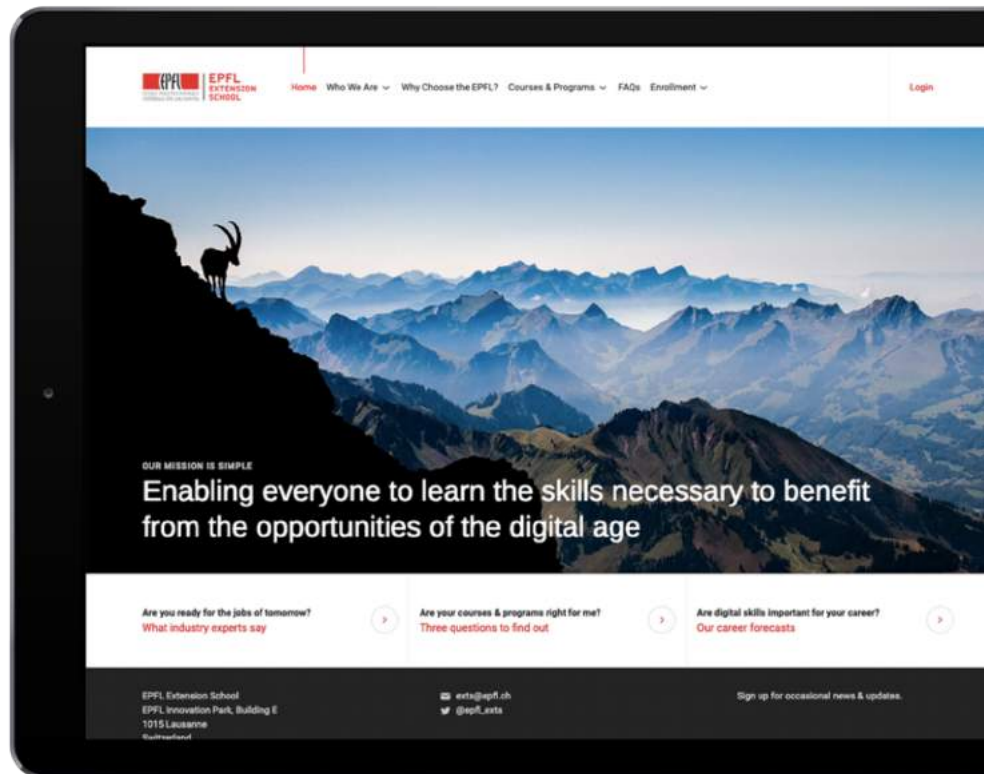
EPFL #1 MOOCs provider in Europe

103 MOOCs:

- >2 million registered users
- 2/3 are not students
 - 90% are employed



- 10 courses
- 2 COS programs
- 10 courses under development for launch in 2018-2019
- >200 enrolled learners





Center for Learning Sciences

Innovation

The World's Most Innovative Universities 2018, Reuters

TOP 100 UNIVERSITIES | 2018 RANKINGS

1	Stanford University	USA
2	Massachusetts Institute of Technology (MIT)	USA
3	Harvard University	USA
4	University of Pennsylvania	USA
5	University of Washington	USA
6	University of Texas System	USA
7	KU Leuven	Belgium
8	Imperial College London	United Kingdom
9	University of North Carolina Chapel Hill	USA
10	Vanderbilt University	USA
11	Korea Advanced Institute of Science & Technology (KAIST)	South Korea
12	Federal Institute of Technology in Lausanne (EPFL)	Switzerland
13	Pohang University of Science & Technology (POSTECH)	South Korea

3rd
in Europe



12th

EPFL moved up from
place 19 in the
**European Patent
Office Annual Report**

EPFL Innovation Park



- >120 start-ups
- >75 venture projects in incubators
- 25 innovation labs of large corporations
- Logitech and Nestlé centers



CREDIT SUISSE



AC Immune

maxon motor

logitech

la Mobilière



Firmenich

PSA
GROUPE

MERCK



teamnet



VALTRONIC

Namiki
PROVISION OF EUROPE SA

Viasat



School of Computer and Communication Sciences - IC

- 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

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

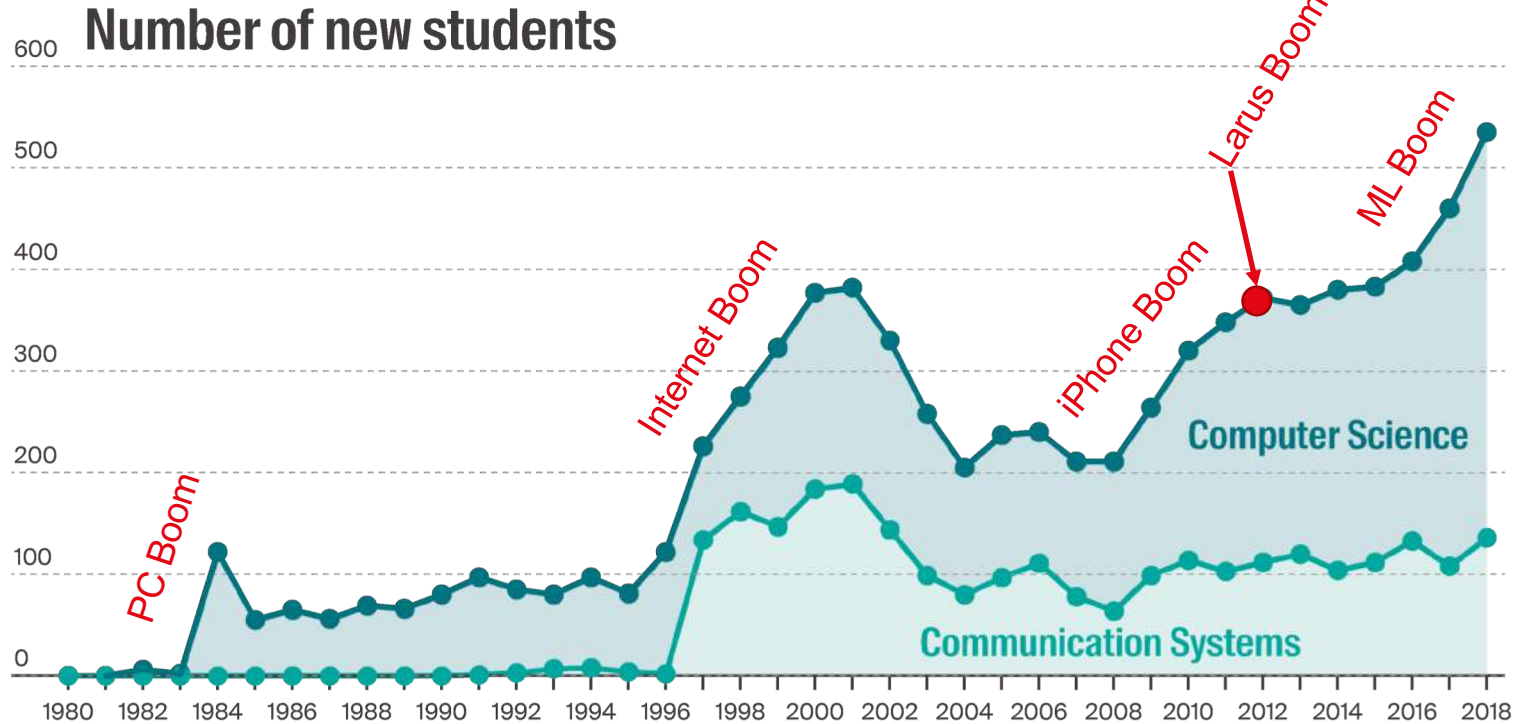
Signal & Image Processing

Systems

QS World University Rankings 2019 in Computer Science & Information Systems

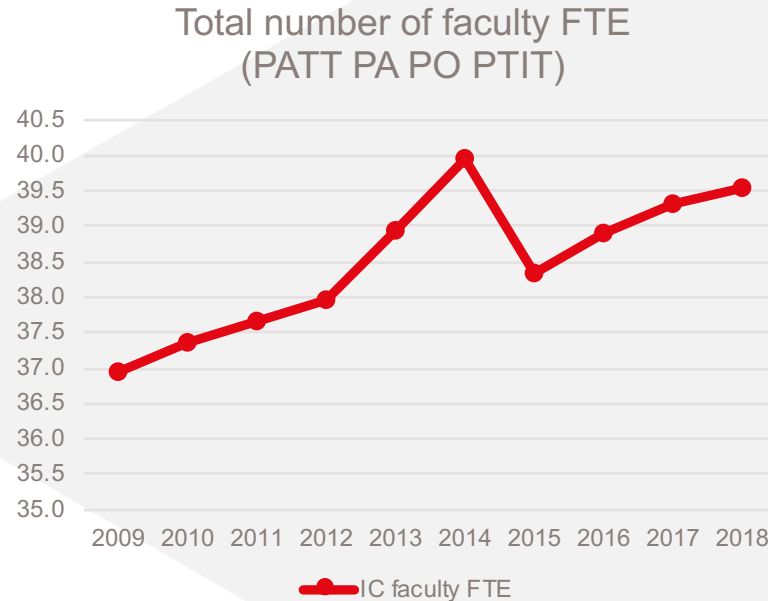
Computer Science & Information Systems			
1		Massachusetts Institute of Technology (MIT)	More United States
2		Stanford University	More United States
3		Carnegie Mellon University	More United States
4		University of California, Berkeley (UCB)	More United States
5		University of Cambridge	More United Kingdom
6		University of Oxford	More United Kingdom
7		Harvard University	More United States
8		EPFL - Ecole Polytechnique Federale de Lausanne	More Switzerland
9		ETH Zurich - Swiss Federal Institute of Technology	More Switzerland
10		National University of Singapore (NUS)	More Singapore

CS Rapidly growing



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

Institution	PE5 (2007)	PE6 (2008-16)	Total
INRIA	2	36	38
CNRS	3	15	18
EPFL	0	16	16
Oxford	0	16	16
Technion	2	12	14
ETHZ	1	9	10

+ 2 PE7 + 1 SNSF ERC

Institutions that received 10 or more grants (Starting, Consolidator and Advanced) 2007-16 in “Computer Science and Informatics”

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



FINANCE &
ECONOMY



HEALTH



DEMOCRACY &
HUMANITARIAN



CRITICAL
INFRASTRUC-
TURES



DIGITAL
INFORMATIO
N



PRIVACY
PROTECTION
CRYPTOGRAPHY



SMART
CONTRACTS
BLOCKCHAIN



SOFTWARE
VERIFICATION

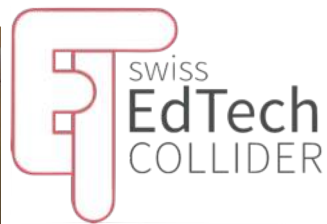


SYSTEM
SECURITY



MACHINE
LEARNING





edtech-collider.ch



EPFL

EPFL

FONDATION HENRIMOSER

JACOBS FOUNDATION
Our Promise to Youth

swiss EdTech COLLIDER

CVC I
CHAMBRE VAUDOISE
DU COMMERCE ET
DE L'INDUSTRIE

digitalswitzerland

swisscom

78+ EdTech startups

DUAL

CVCube

explore-it



become
processbee
learn ahead

coopacademy

MATRIX



TOTALYMAGE

ADVENTURES-LAB
augmented studio

CIKUMAS



APPSCHO



Collaboration Design



TEACHY

lillup
lead your life



educabay

Classtime

Simulation

the experience accelerator

Calerga

eSkills
DIGITAL LEARNING SOLUTIONS



kanasi.org

Reallience

testwe

PocketCampus

Dybuster

mobsya

fuel

Little Vista

better study

hilyte

m²

Klewel
the webcasting company

NEOCOSMO

SLX
Swiss Learning Exchange

GalliLearn



KIVIX

MOBILE TIC

Little Vista

Rosie

MEGAVERSE

AURA

elever

RITA.global

tthf
media

LYADIS



UbiSim

smartravel

isyflow

taskbase

workseed
succeed with

bulbee
www.bulbeetpp.ch

ayaru



WeWent

InnovaKods

AIM
FBK

KiNAPS

EPFL
EXTENSION
SCHOOL

we are play lab

AURA

LANTERN.ch

Simpliquity



GOODWALL

Center for Intelligent Systems

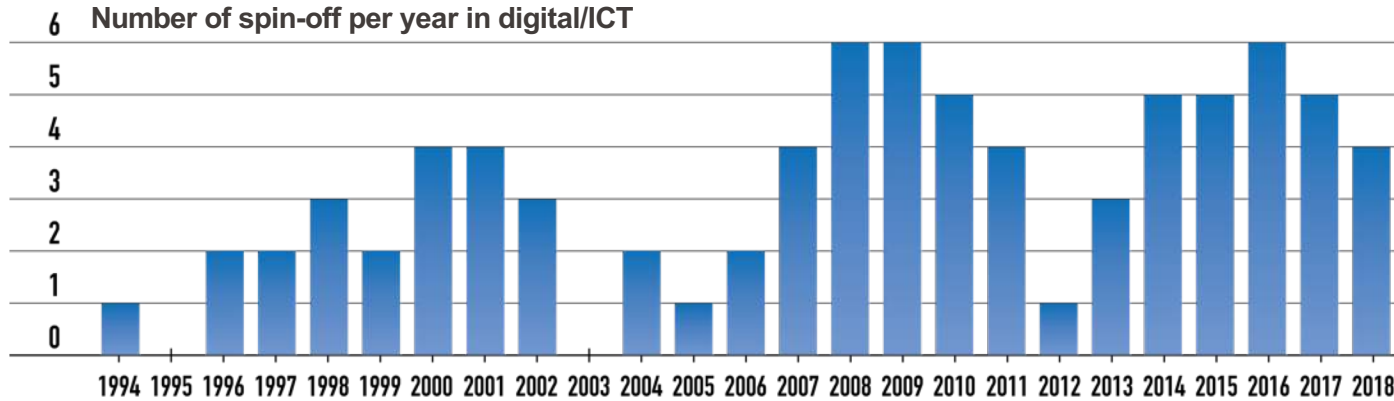
Coming Soon!

Joint venture by IC, STI, and SB

Build upon existing strengths

- Intelligent Systems
- Foundational theory
- Modelling
- Machine learning

EPFL digital/ICT spin-offs



Funding in 2018



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

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