End-of-Thesis survey (all PhDs who succeeded in 2017/18):

**High degree of satisfaction** (but room for improvement)

- While carrying out PhD research I gained valuable methodological skills
- During my PhD studies I gained cutting-edge scientific knowledge
- I was satisfied with the support for my PhD (thesis direction, facilities,…)
- My PhD training will be a real asset in my future career
- EPFL has offered me sufficient preparation for my career

0% 20% 40% 60% 80% 100%

- Agree + strongly agree
- Disagree + strongly disagree
**No EPFL without EDOC**

- **Doctoral Programs**
  - Advanced Manufacturing: EDAM
  - Architecture and Sciences of the City: EDAR
  - Biotechnology and Bioengineering: EDBB
  - Computational and Quantitative Biology: EDCB
  - Civil and Environmental Engineering: EDCE
  - Chemistry and Chemical Engineering: EDCH
  - Digital Humanities: EDDH
  - Electrical Engineering: EDEE
  - Energy: EDEY
  - Finance: EDFI
  - Computer, Communication and Information Sciences: EDIC
  - Mathematics: EDMA
  - Mechanics: EDME
  - Microsystems and Microelectronics: EDMI
  - Management of Technology: EDMT
  - Materials Science and Technology: EDMX
  - Molecular Life Science: EDMS
  - Neuroscience: EDNE
  - Photonics: EDPO
  - Physics: EDPY
  - Robotics, Control, Intelligent Systems: EDRS

**What is the PhD?**

- Training at cutting-edge research
- Learning to face an unsolved problem
  - Resilience!
  - Strategy!
  - Resourcefulness!
- A lot of hard work
  - Hours can’t be estimated
  - Deal with frustration of research
- A diploma and therefore education
  - Some freedom implicit
  - Always question the value of the diploma
  - Learning environment
CHALLENGE ONE

The Job Market for PhD Graduates

“Behind one door is tenure - behind the other is flipping burgers at McDonald’s.”

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ARE WE TRAINING TOO MANY SCIENTISTS?

SUSTAINABLE
GOALS
17 GOALS TO TRANSFORM OUR WORLD

Have PhD
Finished 3 postdocs
Published 6 papers
Will work for food
Disposable lab workforce?

The rise of doctorates

Major expansion of higher education has boosted PhD output in many countries, shown here as average annual growth of doctoral degrees across all disciplines, 1990-2006.

The (Idealized) Job Market

Number of faculty positions needed every year if we start with 1000 in 2018 and every faculty member spawns a new student who needs a faculty position every 3 years.
EPFL

Challenge: what job?

Federal statistics office (2010)

PhDs feel they lack some communication, planning, organization, interdisciplinary, and social skills

EPFL: 15 new prof. / yr
450 new PhD / yr
→ 3% (for Europe this is even lower)
Eventually, a very large majority of EPFL’s PhDs go to the non-academic sector
Challenge: what job?

- After EPFL PhD studies, the starting salary is about the same as that of an MSc with 4 year work experience (doing a PhD is valued as much as work experience)
- PhDs increase slightly faster
- During the PhD studies they “lose” 100’000 CHF (which takes many years to recover)

But, they have a PhD!

Rem: research from Warwick U shows exactly same trend at EU level
Actions

- Pilot projects like EPFLinnovators
  - Test different requirements leading to graduate profiles sought by economy and society
- Revise transversal skills policy of EDOC
- Keep adding offer and structure to transversal skills
- Aim at keeping duration of PhD “at bay”

CHALLENGE TWO

A Mental Health Crisis?
The study states that 32% of PhD students are at risk of having or developing a common psychiatric disorder, especially depression. This number was significantly higher than those for the comparison groups.

These disorders can be linked to the work-family interface, job demands and job control, the supervisor’s leadership style, team decision-making culture, and perceptions of a career outside of academia.

Other factors also contribute, such as increased workloads intensification and the pace of change.

Work organization and mental health problems in PhD student
https://doi.org/10.1016/j.respol.2017.02.00
From 2019 EPFL Survey

Chart 32: Levels of depression reported, by gender

- Severe depression
- Moderately severe depression
- Moderate depression
- Mild depression
- Minimal depression

Female (303) vs Male (643)

The way ahead

Some directions to make it all better
We have no “magic wand” but …

- PhD experience revisited
  - Learn to build and use a network
  - A one-stop shop for problems
  - Develop a culture of fellowships

- Develop skills for all and “brand” PhD for its uniqueness
  - Career development should be a growing concern
  - Transversal skills should be encouraged. How?
  - Academia should highlight PhD for its unique value

- Leadership program
  - Many don’t go to academia? Great!
  - Encourage career paths that serve society