Swiss national “lab” for **education**: photonics master in Switzerland

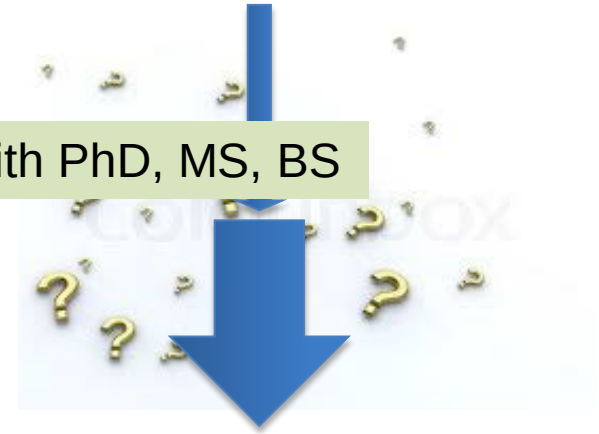
http://www.swissphotonics.net/swiss_national_photonics_labs.html

Prof. Christophe Moser, EPFL

Swiss photonics **Industry**

8,400 employees - 20-25% with academic degrees (PhD, Master and Bachelor)
CHF **2.4 billion** revenues
90 companies

Min 40/year to recruit with PhD, MS, BS



Today

EPFL: via microtechnique master (“optics track”), **~10** students/year

ETHZ: none

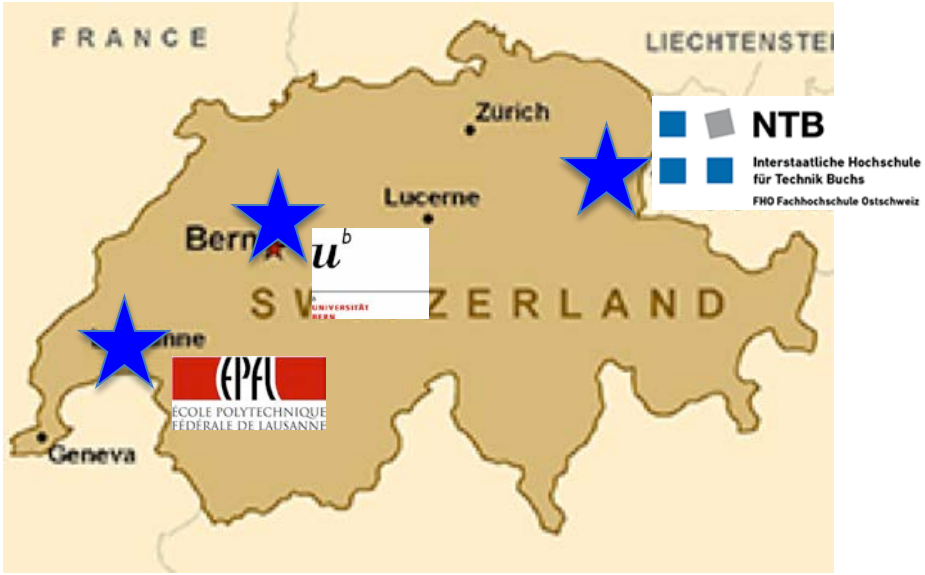
Uni: none

HES/(UAS): Yes, Buchs, **~2-5** students/year

Future

EPFL:	master photonics in preparation: **30 - 40** students/year
Uni:	master photonics in preparation a Uni Bern/ HES Burgdorf
HES/(UAS):	Buchs, **5-10** students/year

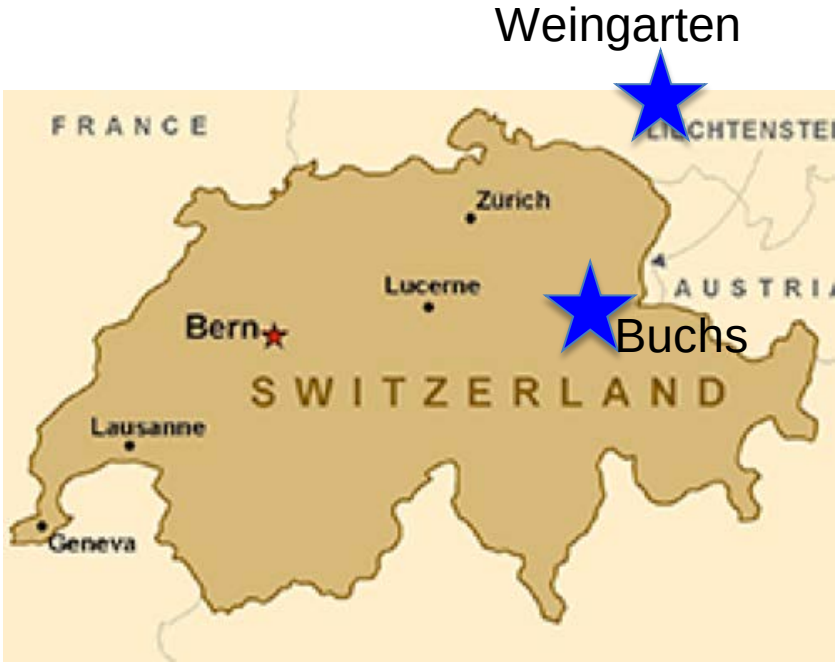
No other photonics master program in preparation known to date at ETH, Uni or UAS



Complimentary masters

ETH/UNI:	Problem solving, fundamentals, broad formation, cutting edge fields.
HES	Specific technical skills – “traditional“ fields.

UAS (HES)
Buchs/Weingarten(DE)
90 ECTS – over 5 semesters
Part time students (continued education)
CHF 3,500/semester
Language: german



Sponsors:

- FISBA Optik
- Swissoptics
- Hexagon Technology Center
- Vectronix

Study Plan by Modules:

M1, M2: Optical design (ray optics, aberration, tolerancing, software)

M3: Optical information, micro and integrated optics

M4: Laser, theory and applications

M5: Optical construction

M6: Laboratory techniques

M7: Master thesis (25 weeks)

UNIVERSITY BERN
90 ECTS – over 4 semesters
(T. Feurer, V. Romano)
Language: english and german

Goals

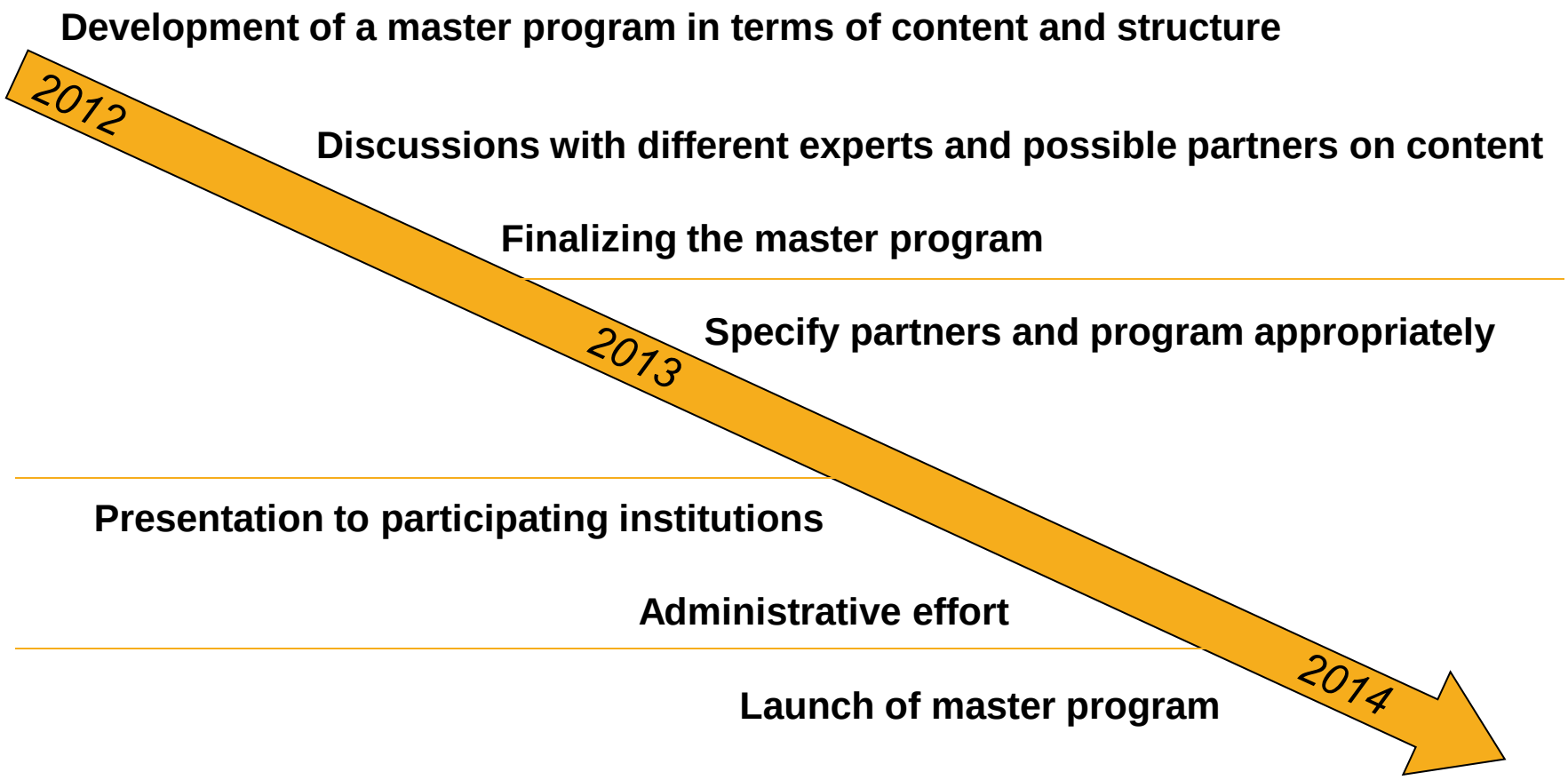
The curriculum aims at giving a thorough formation in the field of photonics.
Central themes are:

- General optics and optical technologies
- «**Green Photonics**»: photonics at the service of a sustainable development (e.g. photovoltaics)
- Modern Photonics for the demands of a developing society (IT systems and technologies)

Successful completion of this master course of studies:
- Industrial activity
- Continue with doctoral studies at a University.

The program details are in development by the «Zentrum Lehre» of the University of Bern

Master description (master proposal – target start: Spring 2014-5)



Current Microtechnique Master at EPFL

100 students

MASTER

11%
Applied Optics

Micro- 19% systems

Production Techniques 31%

Robotics 39%

1 1/2-year program	90 ECTS
Orientation	11 ECTS
Optional courses	19 ECTS
Projects	30 ECTS
Master's thesis	30 ECTS

including an 8-week internship in industry

COMPULSORY ORIENTATION - 11 ECTS	CODE	FACULTY	CREDITS	LANGUAGE
APPLIED OPTIC				
Advanced optics	MICRO-420	O.Martin	3	EN
Imaging optics	MICRO-421	M.Leutenegger; T.Lasser	3	EN
Lasers and optics of nanostructures	MICRO-422	T.Kippenberg; C.Moser	3	EN
Optique TP	MICRO-423	H.G.Limberger; O.Martin; C.Moser	2	FR
MICRO- AND NANOSYSTEMS				

Master proposal – target start: 2015

EPFL
120 ECTS – over 4 semesters
Expected # students: 30-40
faculty in photonics: 18 (9 in 2008)
Language: english

Masters in Photonics: 120 ECTS (70 ECTS courses + 20 ECTS projects + 30 ECTS thesis)

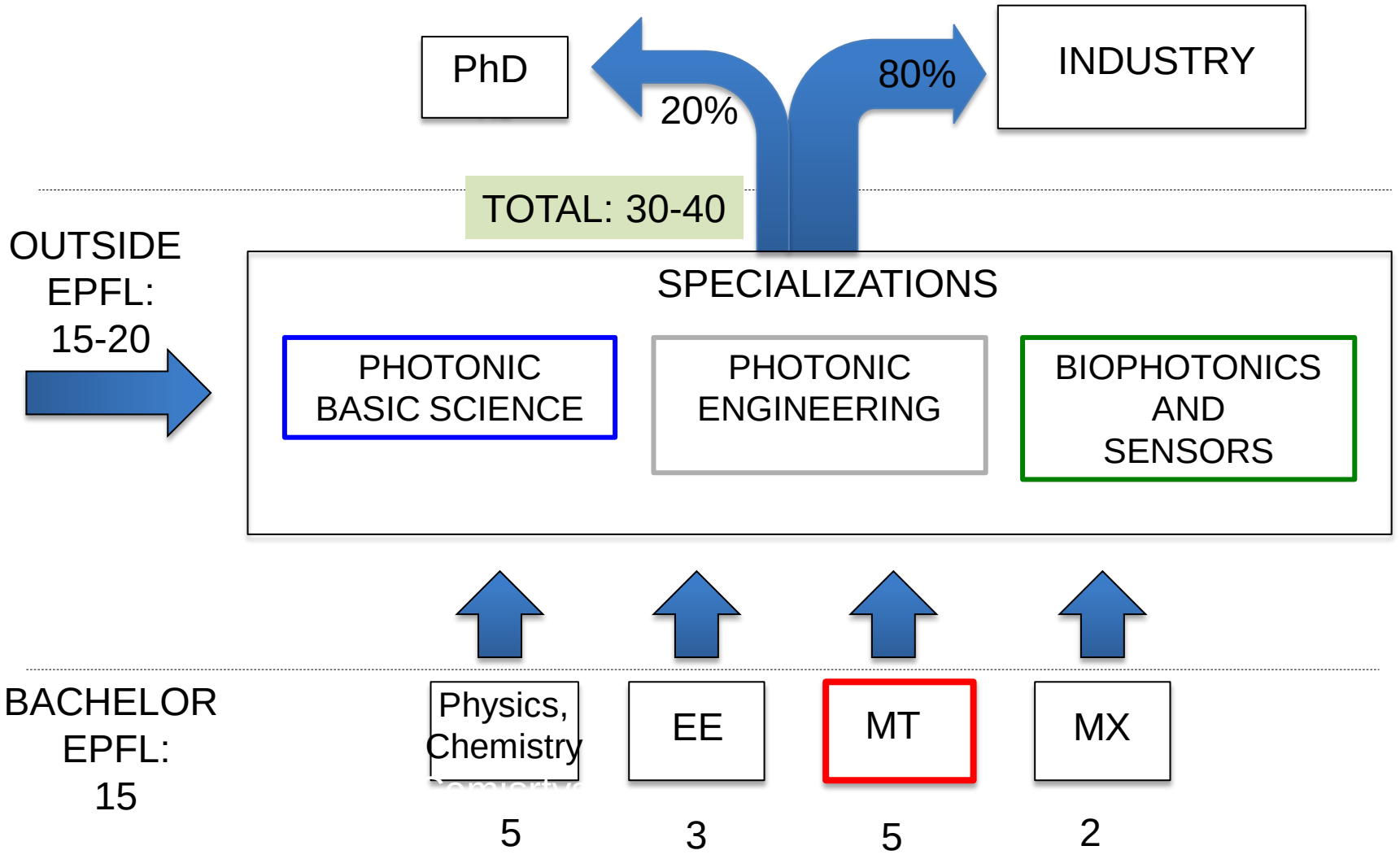
MASTER THESIS

PROJECTS

15 ECTS

40 ECTS
(20 in each
specialization)

Master proposal – target start: 2015



Required Classes (15 ECTS)

	Class		lecturer	Section/cycle	ECTS
optical biosensors)		rophores,	Aleksandra Radenovic		

Specialization: photonic engineering

Class	lecturer	Section/cycle	ECTS
System concepts, elements and system design, applications,from micro- to nano)	H-P Herzig	Master	3

- **Fellowships** for master @ EPFL, Uni Bern and UAS Buchs:

  8 fellowships per Year, each CHF 10K.
  Merit basis: selected by master committee
  Need to define a metric to attribute the number of fellowships to the 3 institutions.

- **Winter school** in optics (incl. SSOM sponsor): CHF 40K.

  5 days – mountain location. English

  Open to master students at EPFL, UNI-Bern, UAS Buchs (limit to 30)

  2 ECTS (~35 hours)

  Focused on **optical design, micro-optics** (imaging, lighting) – modeling / ray tracing software

  Courses by Academics and experienced people in industry (e.g. Fisba, Swissoptics,)

- Photonics education at the master level can only be implemented sustainably if there is a need from industry.