

**EPFL
CMi**

**EPFL
CMi** - Center of
MicroNanoTechnology

Philippe Flückiger

3 May 2022

■ École
polytechnique
fédérale
de Lausanne

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CMi**

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3 May 2022



EPFL

MicroNanoFabrication

Annual Review

Meeting

Philippe Flückiger, EPFL, May 3rd, 2022

Next editions :

02.05.2023 - 22nd edition

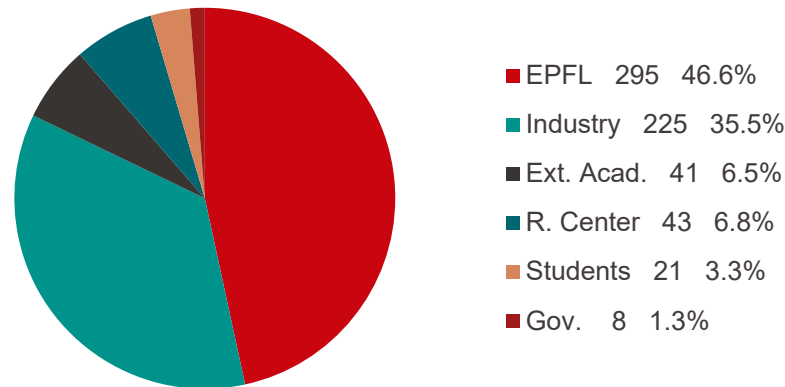
14.05.2024 - 23rd edition

12.05.2025 - 24th edition

Welcome & thanks

- Welcome to the 21st edition of the CMi MicroNanoFabrication Annual Review Meeting
- 700 participants registered (with 1/3 from industry, more than 50% from outside EPFL)
- Many thanks for your participation

- Global companies
- Local industry
- Startups
- Suppliers
- Government Agencies
- Researchers
- Faculty members
- Students
- Colleagues from other academic cleanrooms



- -> Traveling from 11 different countries
- -> Networking

The list of participants is available on : <https://cmi.epfl.ch>



CMi at glance

Users

Finances

Governance

Staff

Tools

Cleanroom

Projects

Users in 2021

Engineering Sc.		Basic Sc.	Life Sc.	Ext. Acad.		Companies	
STI-IBI-BIOS	STI-IEM-NAM	SB-IPHYS-GR-GA	SV-GHI-UPKIN	AMI_FR_BioPhysics	Fiotec_Brasil	ActLight	Lumiphase
STI-IBI-CLSE	STI-IEM-NANOLAB	SB-IPHYS-HQC	SV-GHI-UPPERSAT	CERN_2	Fundep_Brasil	Adept_Neuro	Lunaphore
STI-IBI-LBEN	STI-IEM-POWERLAB	SB-IPHYS-LASPE	SV-IBI-UPDEPLA	CERN_EP_dept	INRS_Varennes_CA	Advanced_Fiber_Re	Mackinac
STI-IBI-LBMM	STI-IEM-PV-LAB	SB-IPHYS-LBEM	SV-IBI-UPLUT	CHUV	Niels_Bohr_Inst_D	Aleva	MCH-processing
STI-IBI-LBNC	STI-IGM-EMSI	SB-IPHYS-LEB	SV-IBI-UPSUTER	CSEM_E1	UCLouvain	Alpes_Lasers	Mistic
STI-IBI-LBNI	STI-IGM-LNET	SB-IPHYS-LMSC2	SV-ISREC-UPGON	CSEM_T1	UNI-SUSSEX-PH-IQT	AMS_Intl_AG	Morphotonix
STI-IBI-LHTC	STI-IGM-LRESE	SB-IPHYS-LPBS		CSEM-Muttenz		Annaida	Nanoga
STI-IBI-LNE	STI-IGM-MICROBS	SB-IPHYS-LPQM1		EMPA_Dubendorf		Asulab	Nanoworld
STI-IEM-AQUA	STI-IGM-NEMS	SB-IPHYS-LQM		ETHZ_D-ITET_IEF		Axetris	Neraxis
STI-IEM-GALATEA	STI-IMX-FIMAP	SB-IPHYS-LQP		ETHZ_D-ITET_Neuro		Bloesch	Novagan
STI-IEM-GR-QUA	STI-IMX-INE	SB-IPHYS-LUMES	ENAC-IIC-LESO-PB	ETHZ_D-PHYS_IPA		Bruker	Oxford_Ionics
STI-IEM-GR-SCI	STI-IMX-LMGN	SB-ISIC-LAS	ENAC-IIC-LMS	ETHZ_D-PHYS_LFKP		Colibrys	Pi_Imaging
STI-IEM-ICLAB	STI-IMX-LMM	SB-ISIC-LPDC	ENAC-IIE-LTE	FCBG		Creal	Piematics
STI-IEM-LAFT	STI-IMX-LMOM	SB-ISIC-LPI		HES-SO-FR_ChemTec		EXALOS	Pierhor_Gasser
STI-IEM-LAI	STI-IMX-LMSC	SB-SCI-RH		HES-SO-GE_inSTI		FEMTOprint	Preciflex
STI-IEM-LANES	STI-IMX-LP	SB-SPC-BPP		HES-SO-GE_inSTI_2		H_Glass	Richemont
STI-IEM-LAPD	STI-IMX-LPAC			HES-SO-VS		Hexisense	Rolex
STI-IEM-LMIS1	STI-IMX-QMAT		IC-IINFCOM-LCAV	Metas		ID_Quantique	SEED
STI-IEM-LMIS2	STI-IMX-SMAL			PSI_PSD-LMN		Imec	Sigatec
STI-IEM-LMIS4	STI-SCI-CD			UNIBAS		Innoview	Silicon_Austria_7
STI-IEM-LMTS	STI-SCI-DD			UNIFR_Chemistry		KEP_Innov	Spryns
STI-IEM-LO	STI_SEL (TP nanoelec)			UNIGE_Biochem		Ligentec	Sunbioscience
STI-IEM-LPMAT	STI_SMT (TP micro 332)		AVP-CP_ECAL	UNIGE_GAP		Lionix_Intl	TrueDyne_Sensors
STI-IEM-LSBI	STI_SMT (TP micro 501)			UNIGE_Physique		LSPR	Xsensio
48 (369)		16 (79)	11 (26)	30 (41)		48 (95)	

↑
of laboratories

↑
of users

- Total: 153 labs & companies (employing 560 users)

Users in 2021

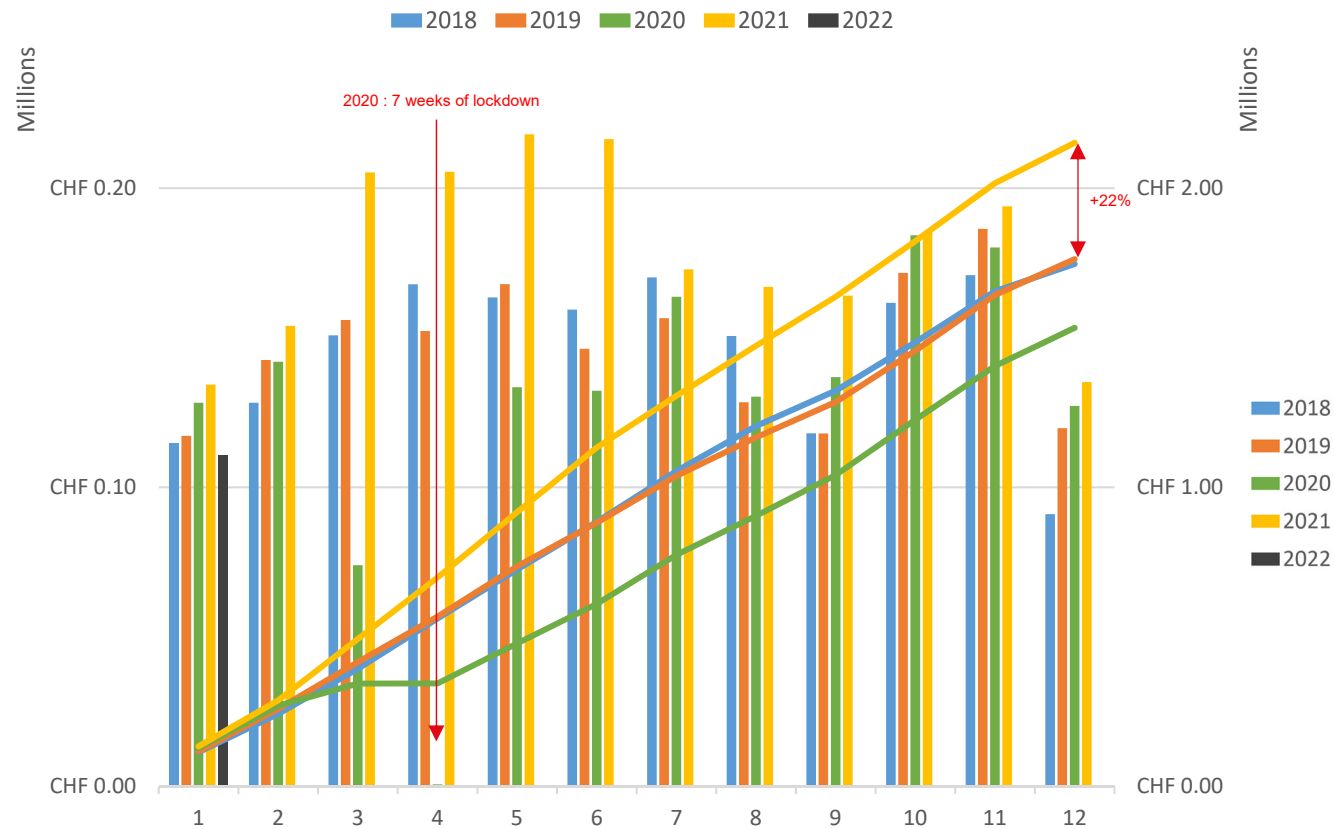
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STI-HI-LBEM	STI-IEM-POWERLAB	SB-IPHYS-LASPE	Global health	CERN_EP_dept	INRS_Varennes_CA	Advanced_Fiber_Re	Mackinac
Bio Engineering	STI-IEM-PV-LAB			CHUV	Niels_Bohr_Inst_D		MCH-processing
	STI-IGM-EMSI	Physics		CSEM_E1	UCLouvain	Startups SMEs Big companies	Mistic
	STI-IGM-LNET			CSEM_T1	UNI-SUSSEX-PH-IQT		Morphotonix
	STI-IGM-LNET			CSEM-Muttenz			Nanoga
	STI-IGM-LNET		Swiss Inst. for experimental cancer research	EMPA			Nanoworld
	STI-IEM-AQUA	SB-IPHYS-LQM		ETHZ	CERN CSEM EMPA ETHZ Universities	Axetris	Neraxis
Electrical and Micro Engineering	STI-IGM-LNET	SB-IPHYS-LQP		ETHZ		Bloesch	Novagan
	STI-IMX-LMGN	Chemical Sciences and Engineering		ETHZ		Bruker	Oxford Ionics
	STI-IMX-LMM			ETHZ		Colibrys	Pi Imaging
	STI-IMX-LMOM			FCBG		Creal	Piemacs
	STI-IMX-LMSC		Civil Engineering	HES-SO-FR_ChemTec		EXALOS	Pierhor Gasser
STI-IEM-LAI	STI-IMX-LMSC			HES-SO-GE_inSTI		FEMTOprint	Preciflex
STI-IEM-LANES	STI-IMX-LMSC	SB-SPC-BPP		HES-SO-GE_inSTI_2		H_Glass	Richemont
STI-IEM-LAPD	STI-IMX-LMSC			HES-SO-VS		Hexisense	Rolex
STI-IEM-LMIS1	STI-IMX-LMSC			Metas		ID Quantique	SEED
STI-IEM-LMIS2	STI-IMX-LMSC		Environmental engineering	PSI_PSD-LMN		Imec	Sigatec
STI-IEM-LMIS4	STI-IMX-LMSC			UNIBAS		Innoview	Silicon_Austria_7
STI-IEM-LMIS4	STI-SCI-DD			UNIFR_Chemistry		KEP Innov	Spryns
STI-IEM-LMIS4	STI-SCI-DD			UNIGE_Biochem		Ligentec	Sunbioscience
STI-IEM-LO	STI_SEL (TP nanoelec)			UNIGE_GAP		Lionix Intl	TrueDyne_Sensors
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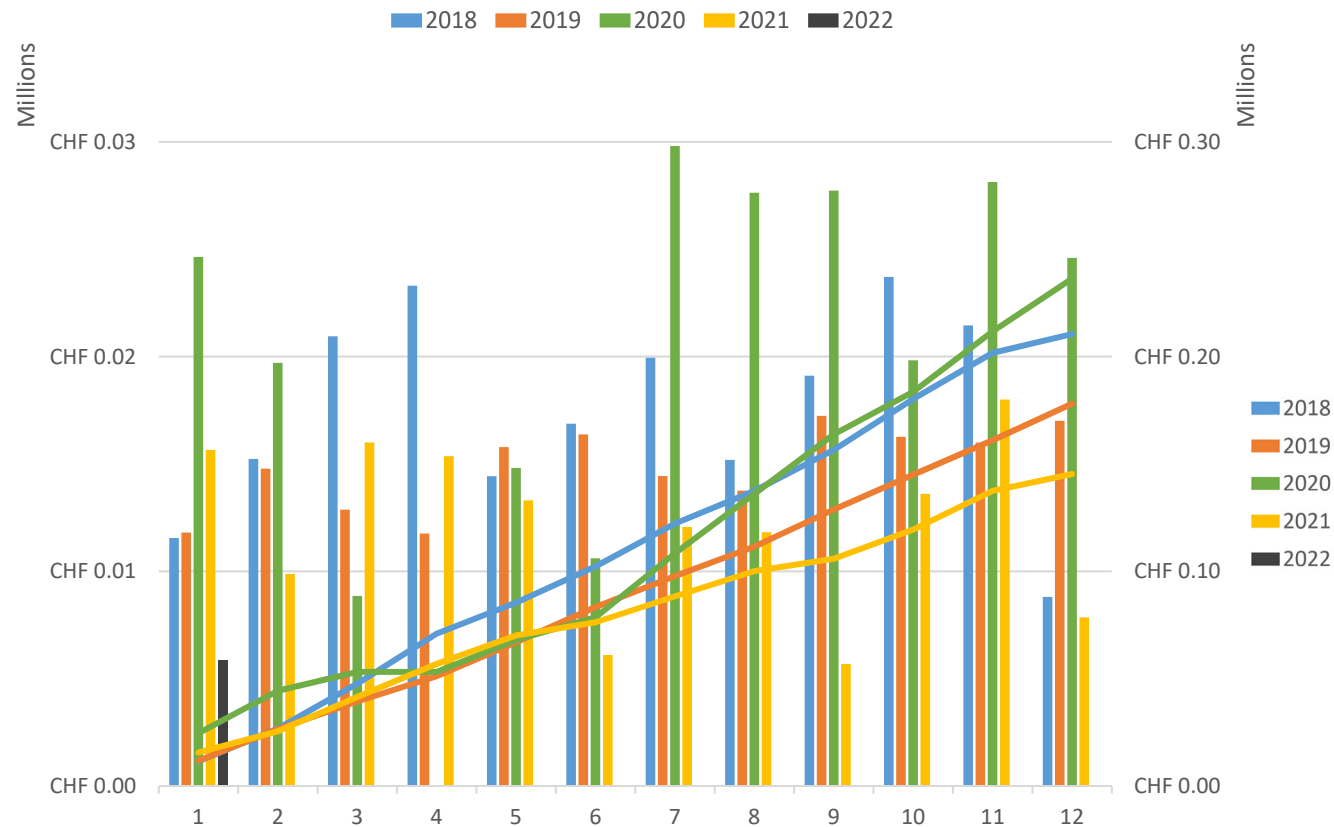
- Total: 153 labs & companies (employing 560 users)

Invoicing to internal EPFL Users



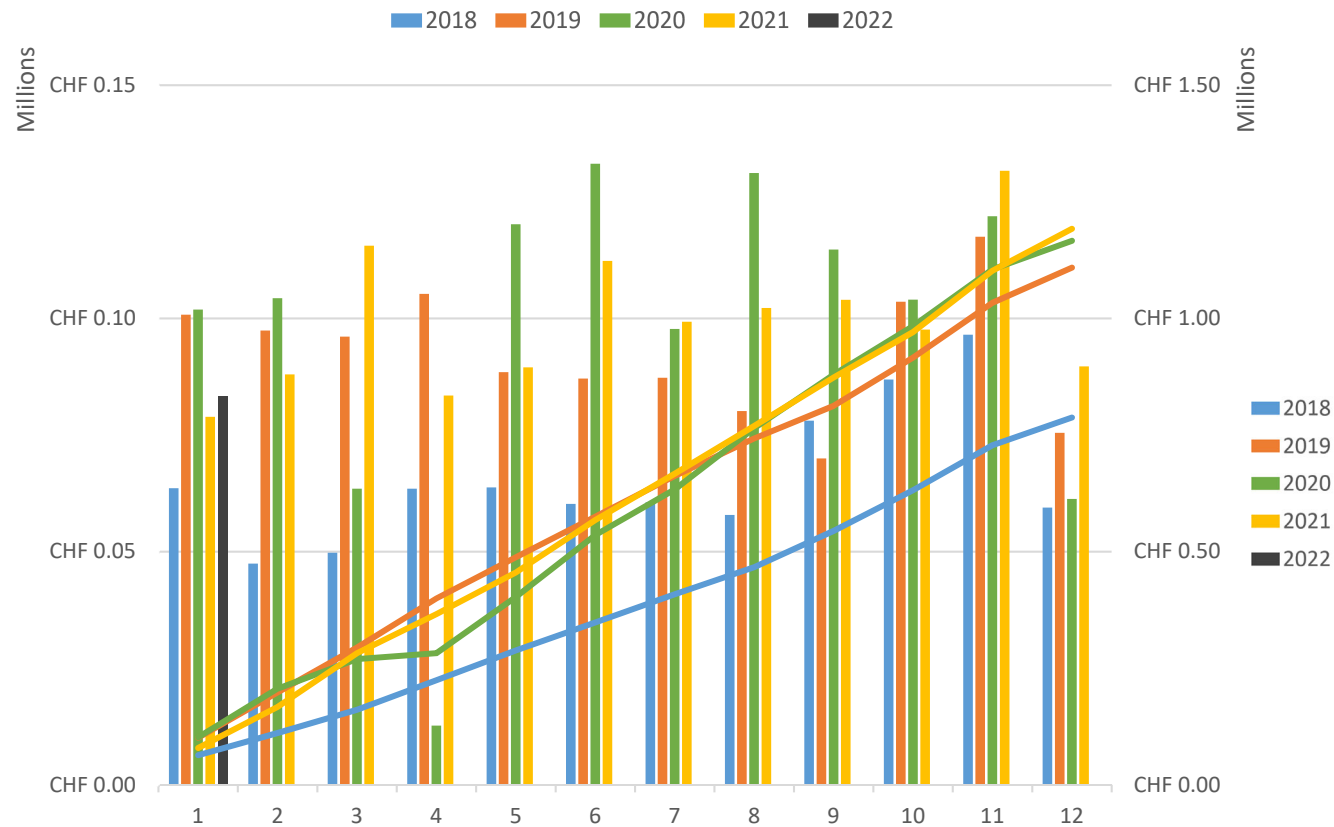
- 2.15MCHF invoiced in 2021 to our internal EPFL users (62% of the total)

Invoicing to external academic Users



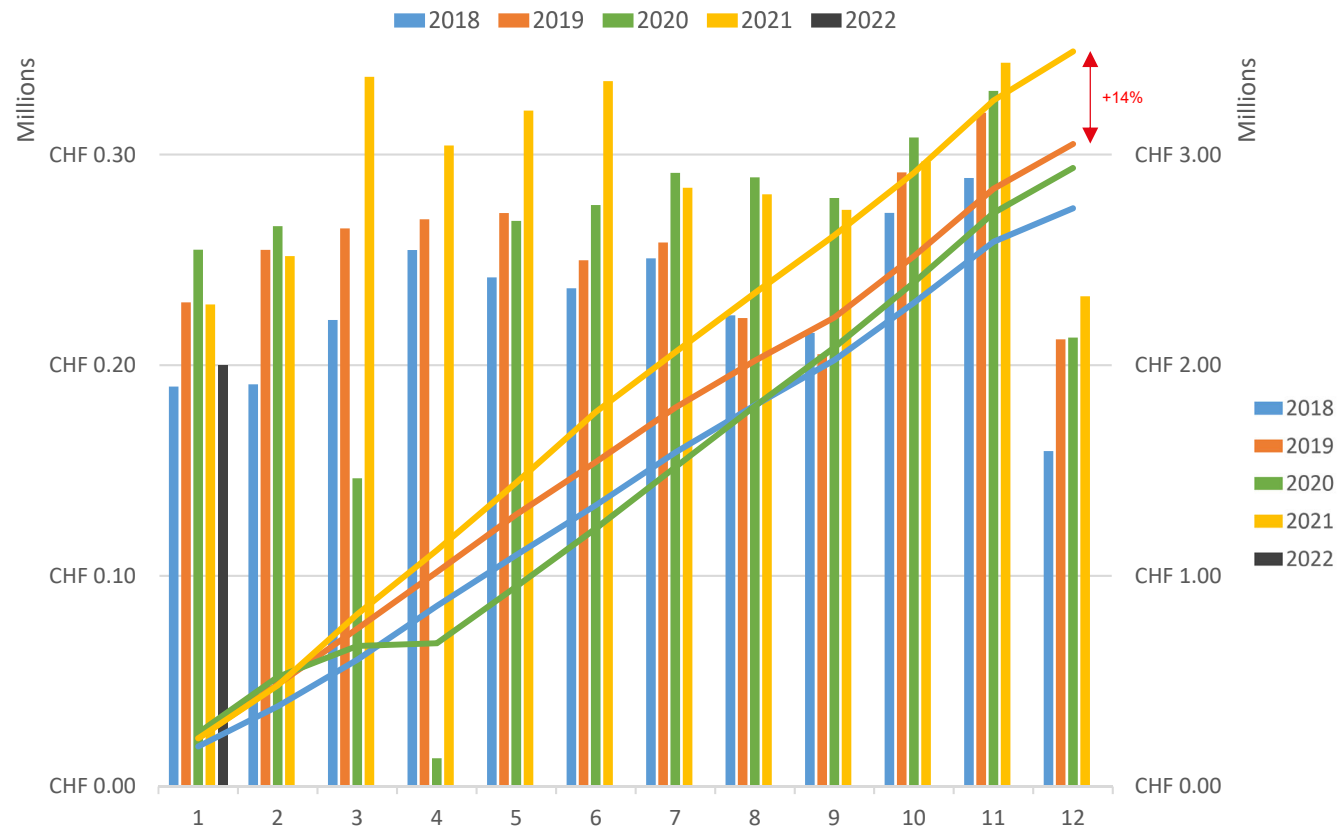
- 0.15MCHF invoiced in 2021 to our external academic users (4% of the total)

Invoicing to companies



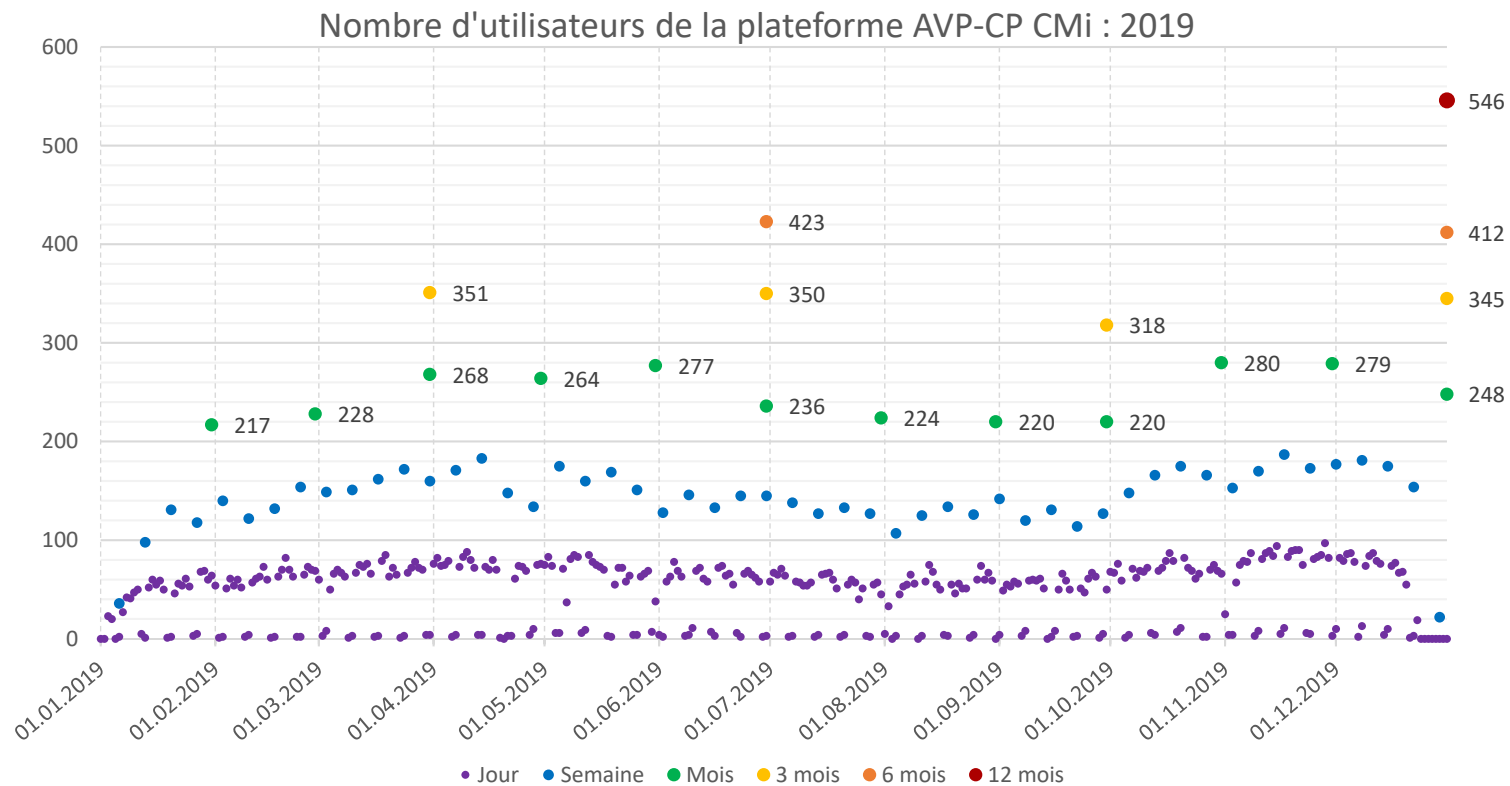
- 1.19MCHF invoiced in 2021 to our industrial users (34% of the total)

Total invoicing to all users



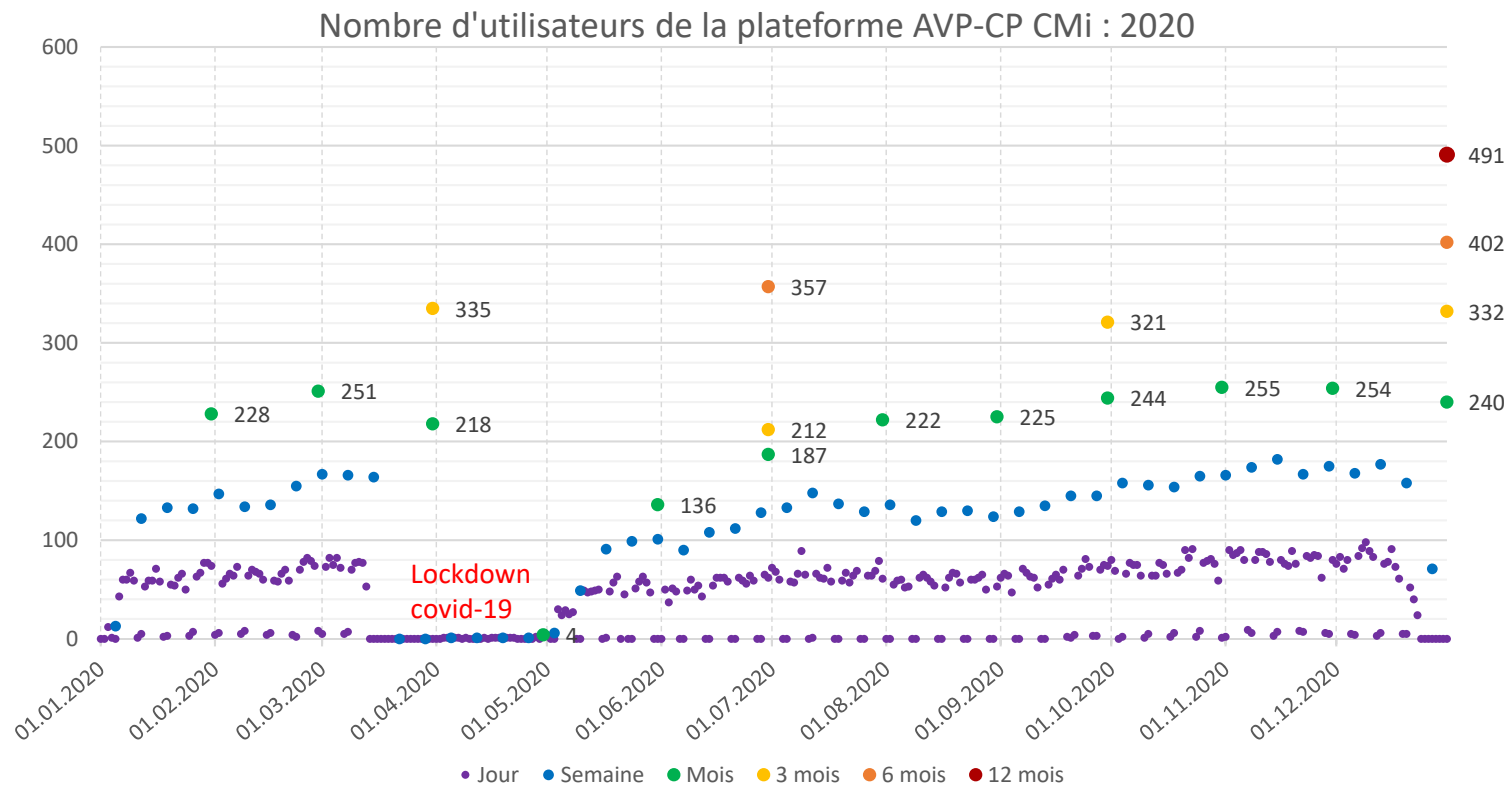
- 3.49MCHF invoiced in 2021 in total (+14% compared to 2019)

Users in 2019



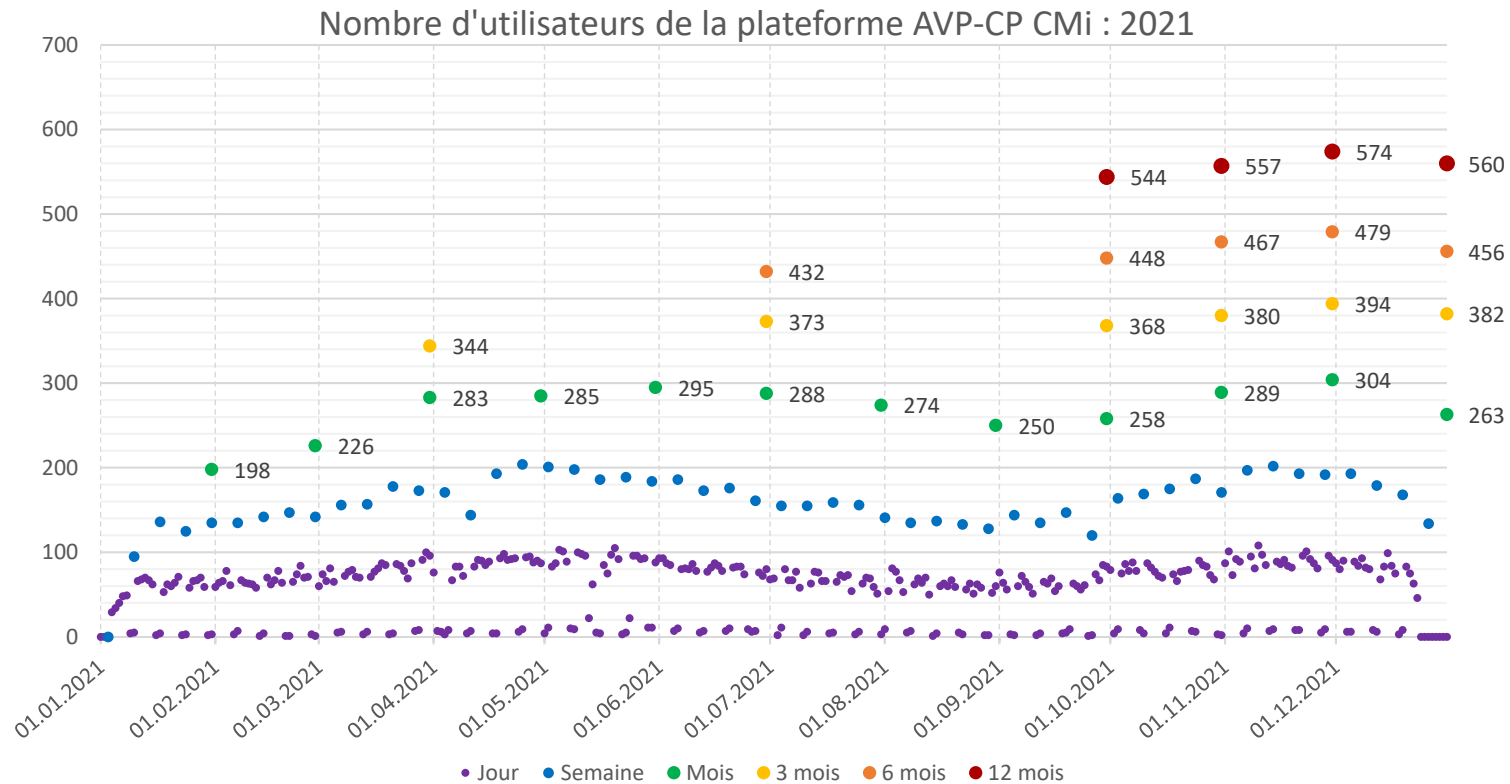
- Number of users per day/week/month/quarter/semester/year
- 546 users in 2019

Users in 2020



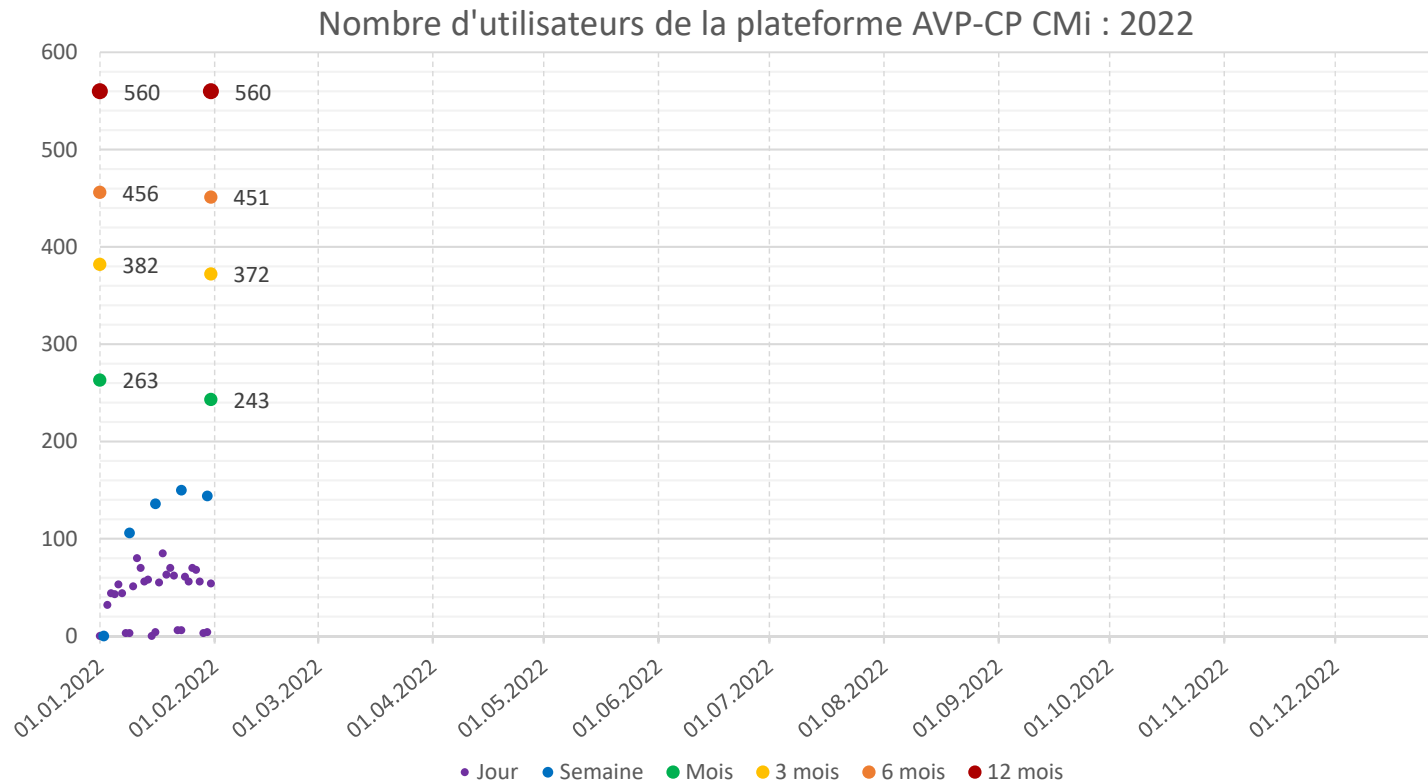
- 491 users in 2020 (-10% compared to 2019)
- Decrease explained by COVID-19 restrictions applied to the campus

Users in 2021



- 560 users in 2021 (+2.6% compared to 2019)
- Back to growth

Users in 2022



- Number of users recalculated each month

COVID-19 impact on dressing

EPFL CMI ENTRY procedure

IF YOU HAVE ANY SYMPTOMS OF FLU
DO NOT ENTER CLEANROOM !!!

1. Desinfect your hands !

2. Put on new clean white face mask.

3. Put on the gloves.

If you need to store smtg in the locker, wrap it in the plastic bag.

4. Put on blue shoe cover and pass the bench.



5. Put on hair net.

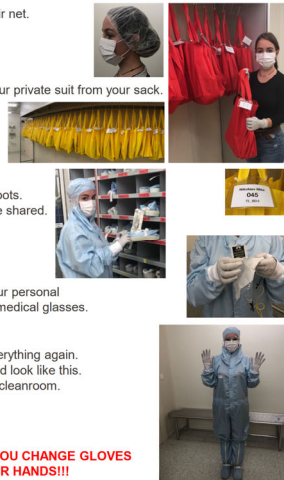
6. Put on your private suit from your sack.

7. Put on boots. Boots are shared.

8. Put on your personal safety or medical glasses.

9. Check everything again. You should look like this. Enter the cleanroom.

ANYTIME YOU CHANGE GLOVES
WASH YOUR HANDS!!!



<https://cmi.epfl.ch/organisation/covid19/>

COVID-19 impact

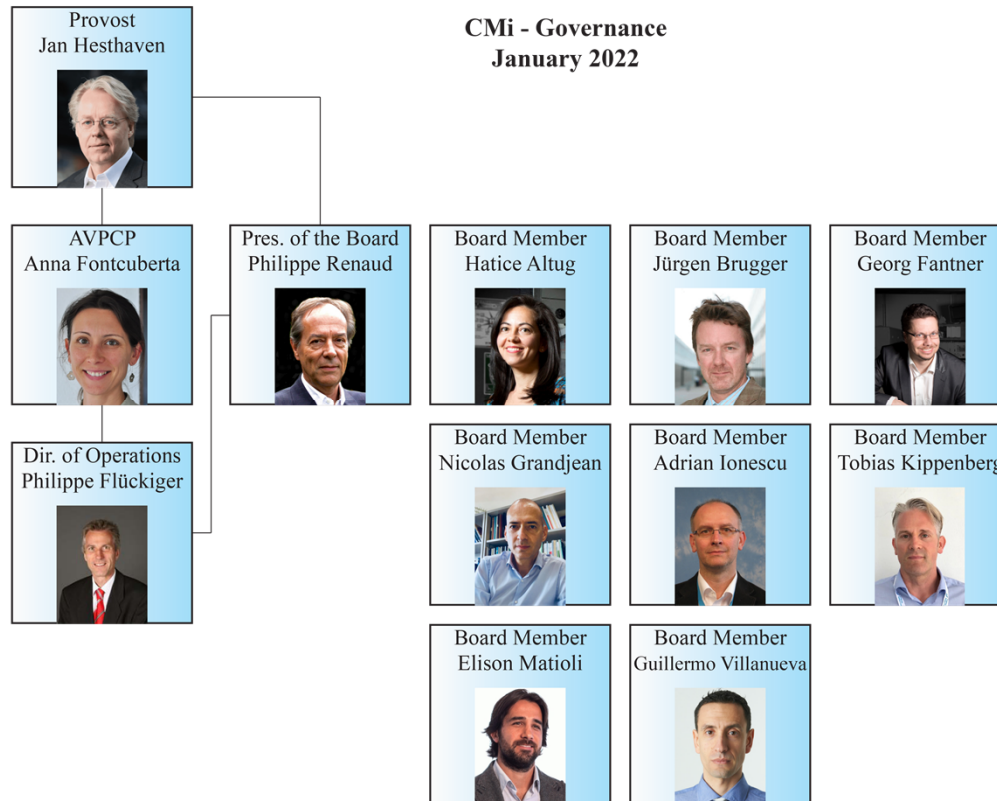
- The cleanroom garments are no longer shared among multiple users.
- Everyone has one designated cleanroom suit assigned for his/her personal use only.



Before the COVID-19

- The private suits are stored in private sacks since May 2020

Governance



Governance

- Since January 2021 the CMI reports to the Associate Vice President for Centers and Platforms and to the Vice-President for Academic Affairs.
- Our executive board is composed of 9 Professors including our president
- Members nominated for a period of 4 years from 01.11.2018 until 31.10.2022

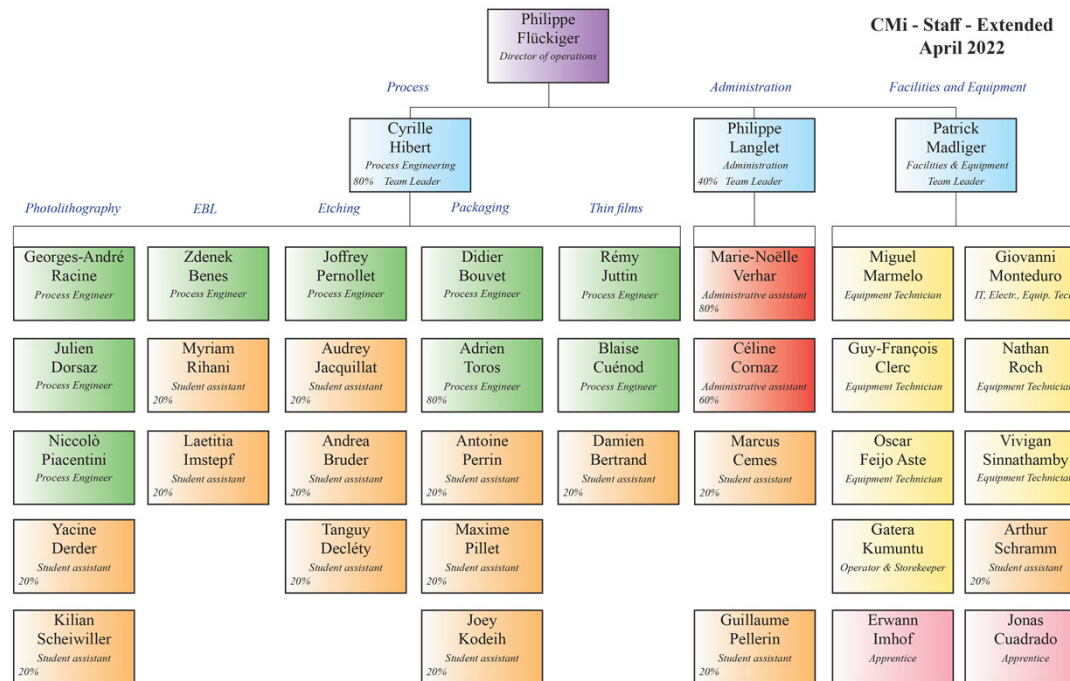
- New direction at EPFL since 01.01.2021



Staff

- Staff composed of 20.4 FTE employees
- We have plans to increase to 23.4 FTE employees by 2023
- 3 employees are currently still under non-permanent positions
- Employ 14 student assistants (part time)
- Train 2 apprentices

- Our staff is specialized in Process / Administration / Facilities and Equipment



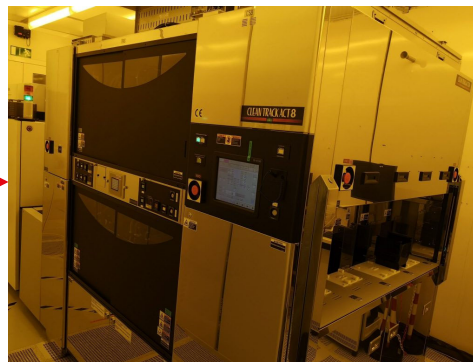
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- 3 employees are currently still under non-permanent positions
- Employ 14 student assistants (part time)
- Train 2 apprentices

- The 14 student assistants play an important role in the daily operations
- They provide services and they perform training for the new users

New Tools

Delivery	
1	2019 Spectro reflectometer Filmetrics
2	2019 Microscopes optiques Leica (7x)
3	2019 Upgrade IBE Veeco
4	2019 Système de mesure du champ EM et des vibrations
5	2019 DUV stepper ASML
6	2020 Post CMP cleaner GnP
7	2020 Critical Point dryer Tousimis
8	2021 Silicon etcher SPTS Rapier
9	2021 Profilomètre optique Contour-X 200 Bruker
10	2021 Coater/developper TEL ACT-8 cleantrack
11	2021 Système d'alignement Athena ASML
12	2021 Déménagement stepper ASML
13	2021 Prober MTI TS150
14	2021 Manual spin coater LSM150 Z13 Sawatec
15	2021 Rénovation SRD (4x) Peritest
16	2021 Polisseuse CMP2 Alpsitec
17	2021 UHV evaporator Plassys
18	2021 XeF2 Vapor etcher SPTS Xactix X4
19	2021 Automatic wire bonder F&S Bondtec
20	2022 Hottes solvants Herren
21	2022 Fours LPCVD Centrotherm
22	2022 Flash annealing system Rovak
23	2022 HMDS YES
24	2022 Spectro reflectometer Filmetrics
25	2022 Resistivity measurements Filmetrics
26	2022 ICP-PECVD Oxford
27	2022 PECVD
28	2022 PR stripper ESI
29	2022 PVD Cluster Alliance Concept
30	2022 Direct Writer MLA150
31	2022 Ellipsometer Woolam RC2
32	2022 Graveur metal
33	2022 Wafer Bonder EVG
34	2022 SEM Zeiss Merlin
35	2022 CVD diamant IPLAS
36	2022 FIB Zeiss Crossbeam
37	2023 EBL2
38	2023 Evaporateur Joule
39	2023 SIMS IBE
40	2023 Profilomètre mécanique
41	2023 Coucheuse manuelle
42	2023 Evaporateur Lift-off
43	2023 Coucheuse automatique
44	2023 Dielectric etcher



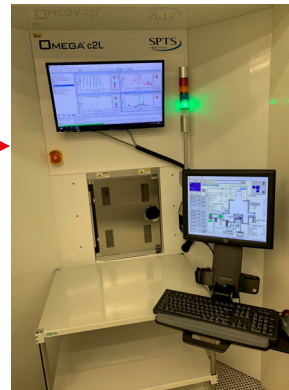
DUV stepper lithography

- ASML PAS 5500/350C
- 248nm
- TEL ACT-8
- Stepper connected to the coater
- Resolution 150nm
- Overlay accuracy <30nm
- 100mm wafers (150&200)
- 100 wafers per hour

- During these 5 years we are installing 44 new pieces of equipment !

New Tools

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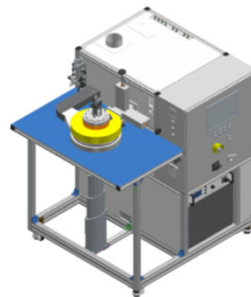
Dry etching of silicon

- SPTS Rapier deep silicon plasma etcher in fluorine chemistry
- SPTS Xactix X4 XeF2 Vapor gas etcher

- Dry etching of silicon

New Tools

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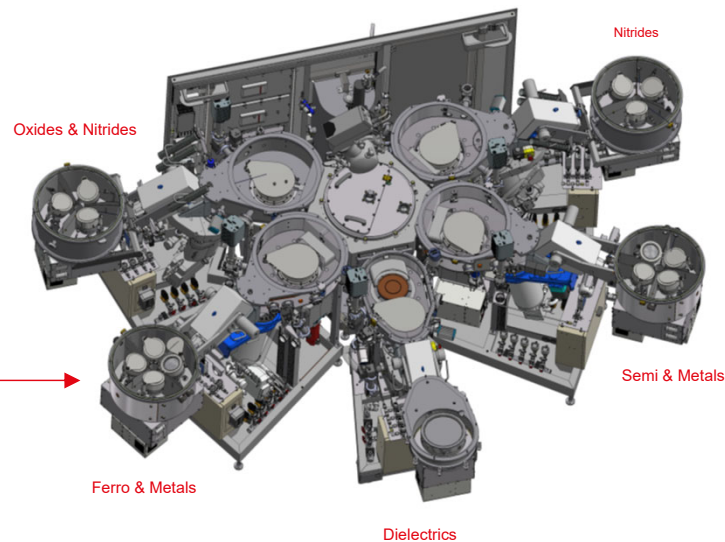


CVD thin films deposition

- 4x Centrotherm furnaces including 2 LPCVD for ultrapure SiO₂ and nitride.
- Oxford ICP PECVD for ultrapure SiO₂ and nitride.
- IPLAS CVD diamond system (June 2022)

- CVD thin films deposition

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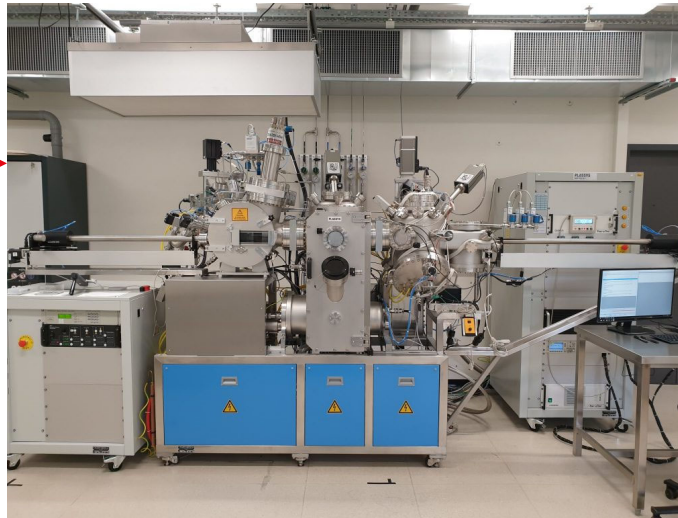


PVD Cluster Tool

- Alliance Concept CT-200
- 5 chambers
- Oxides & nitrides (3x100mm)
- Ferro & metals (4x100mm)
- Dielectrics (1x250mm)
- Nitrides (3x100mm)
- Semi & metals (4x100mm)

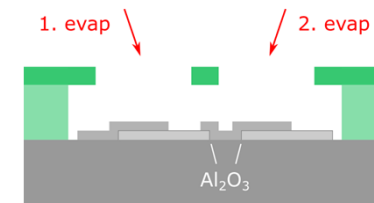
- A new PVD Cluster Tool with 5 chambers will be delivered soon

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41	2023 Coucheuse manuelle
42	2023 Evaporateur Lift-off
43	2023 Coucheuse automatique
44	2023 Dielectric etcher



UHV Evaporator

- Plassys MEB550SL3
- 1x load lock
- 1x evaporation chamber (UHV)
- 1x oxidation chamber (UHV)



Principle of the two-angle evaporation: the bridge is exposed so that only the bottom layer of resist is fully developed.

- UHV Evaporator for the fabrication of SIS Josephson Junctions

New Tools

Delivery	
1	2019 Spectro reflectometer Filmetrics
2	2019 Microscopes optiques Leica (7x)
3	2019 Upgrade IBE Veeco
4	2019 Système de mesure du champ EM et des vibrations
5	2019 DUV stepper ASML
6	2020 Post CMP cleaner GnP
7	2020 Critical Point dryer Tousimis
8	2021 Silicon etcher SPTS Rapier
9	2021 Profilomètre optique Contour-X 200 Bruker
10	2021 Coater/developper TEL ACT-8 cleantrack
11	2021 Système d'alignement Athena ASML
12	2021 Déménagement stepper ASML
13	2021 Prober MTI TS150
14	2021 Manual spin coater LSM150 Z13 Sawatec
15	2021 Rénovation SRD (4x) Peritest
16	2021 Polisseuse CMP2 Alpsitec
17	2021 UHV evaporator Plassys
18	2021 XeF2 Vapor etcher SPTS Xactix X4
19	2021 Automatic wire bonder F&S Bondtec
20	2022 Hottes solvants Herren
21	2022 Fours LPCVD Centrotherm
22	2022 Flash annealing system Rovak
23	2022 HMDS YES
24	2022 Spectro reflectometer Filmetrics
25	2022 Resistivity measurements Filmetrics
26	2022 ICP-PECVD Oxford
27	2022 PECVD
28	2022 PR stripper ESI
29	2022 PVD Cluster Alliance Concept
30	2022 Direct Writer MLA150
31	2022 Ellipsometer Woollam RC2
32	2022 Graveur metal
33	2022 Wafer Bonder EVG
34	2022 SEM Zeiss Merlin
35	2022 CVD diamant IPLAS
36	2022 FIB Zeiss Crossbeam
37	2023 EBL2
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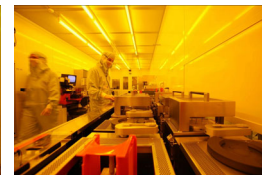
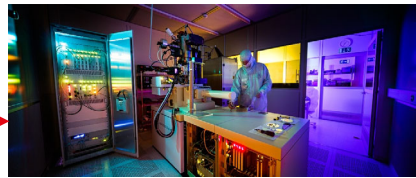
Wafer Bonder

- EVG 810/301/610/510
- 1x plasma activation
- 1x single wafer cleaning
- 1x optical alignment
- 1x bonding

- EVG wafer bonding line to be delivered in 2023

New Tools

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New projects

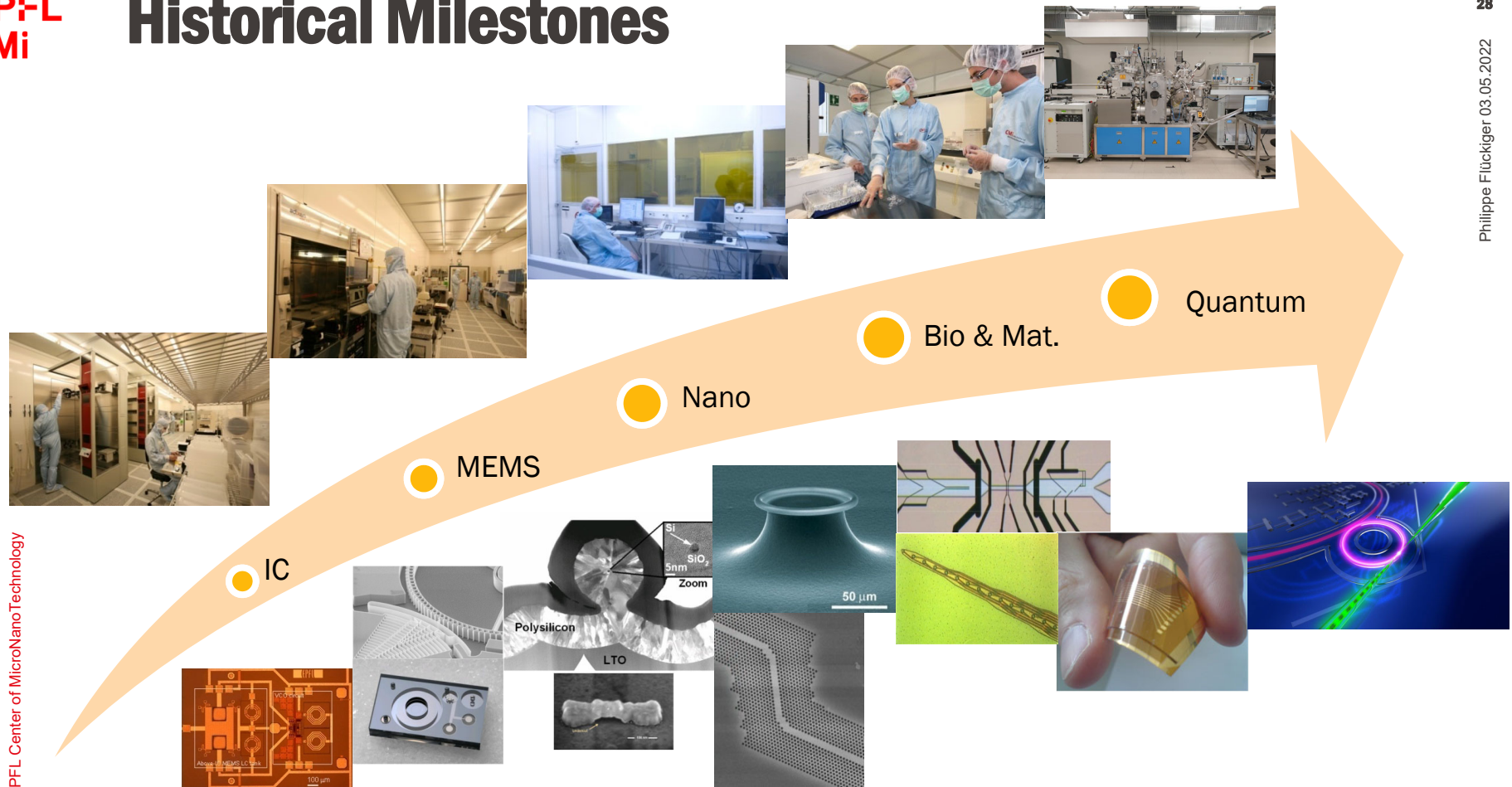
- An electron beam lithography system (2005)
- A lift-off evaporation system dedicated to oxides (2004)
- An automatic photolithography coater & developer for the replacement of 2 aging tools RT & EVG (1998 & 2004)
- A plasma etcher for dielectric etching (2012) dedicated to high purity samples without metal contaminations

- The direction of the school has decided to initiate new projects in 2022.

Historical Milestones

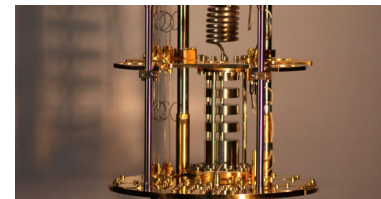
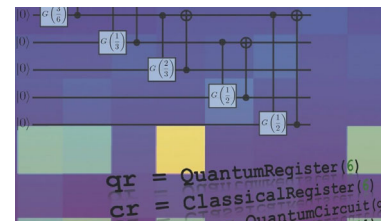
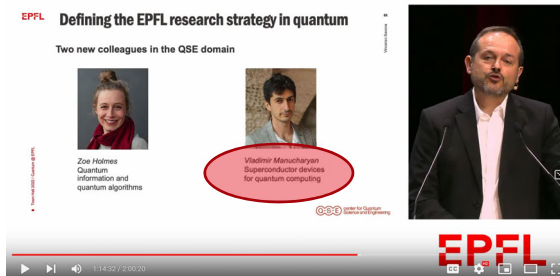
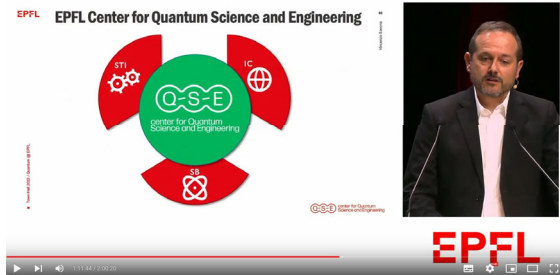
Microelectronics & MEMS 1998	• CMi created in 1998 & Cleanroom opened in March 1999 • Basic Microelectronics processes • MEMS processes like Deep silicon etching, SU-8
Nano 2005	• Electron Beam Lithography ordered in december in 2005 • Focused Ion Beam ordered in september 2003 • Atomic Layer Deposition in 2011
Cleanroom extension 24/7 2010	• Cleanroom extension opened in 2010 for more flexibility and cheaper access • Operated now in 24/7 mode since 2012 • PDMS, SU-8, Chemistry, Metrology, Non-conventional processes
Materials Diversity 2013	• Ion Beam Etching, PVD, ALD, PLD, Dry Etching • Chemistry • Photolithography: Mask Fabrication, Coater & Developer, Mask Aligner
DUV Stepper lithography 2019	• DUV stepper • Renewal of aging tools & Adding new capabilities • Envision the acquisition of a second EBEAM at the horizon of 2022
<u>Renewal & Broadening</u> 2019-2022	• Deep Si etcher - XeF2 etcher - CMP - Post CMP Cleaner - Super Critical Dryer - Metal etcher • PVD Cluster - LPCVD furnaces - PECVD - Flash Lamp Annealing - Direct Writer • Wafer bonding - CVD diamond - Optical Profiler - SEM - Ellipsometer
Quantum Science & Engineering 2022	• UHV evaporator for Josephson Junctions - HD PECVD • Second electron beam lithography system

Historical Milestones



- Broadening the CMi offer and the CMi users base along the time by incorporating

Historical Milestones

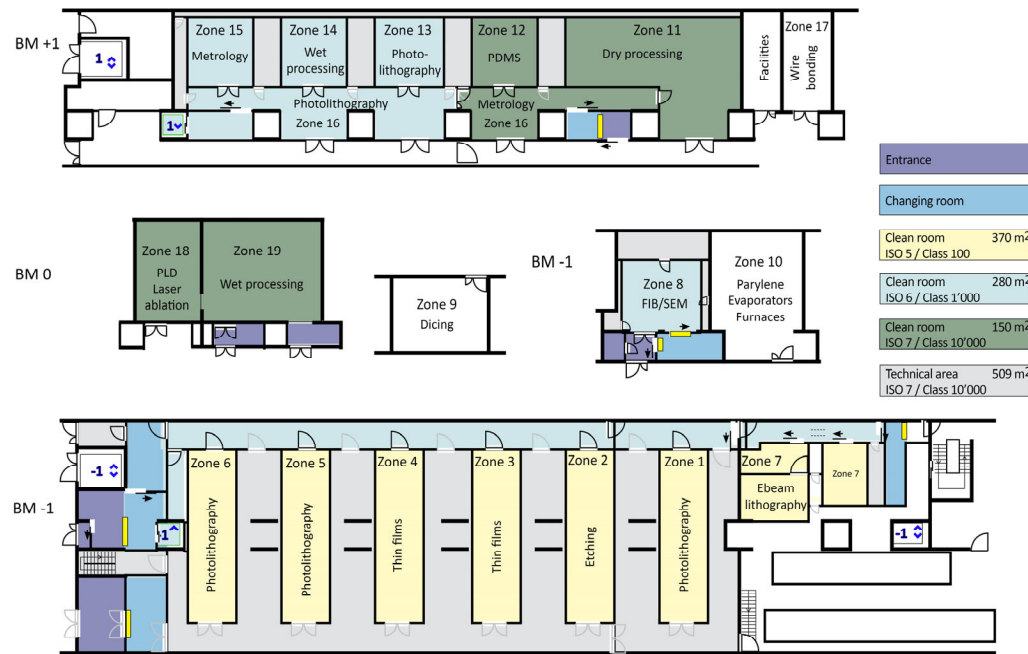


QSE at EPFL

- Created in 2022
- Two research pillars :
 - Research Pillar I: Applied quantum algorithms and data science
 - Research Pillar II: Quantum hardware materials and systems
- Pillar 2 will be leveraging the advanced nanofabrication facilities present on campus

- EPFL Center for quantum Science and Engineering

Cleanroom



Initial surface BM-1 (1998)	1000m ²
Extension BM+1 (2010)	300m ²
Extension BM0 (2017)	100m ²
Extension BM0 (2022)	350m ²
Total Surface	1750m²

- 2022: Transform the space received from the STI at level BM0 into a grey area

Capital Investment

- Processing Equipment

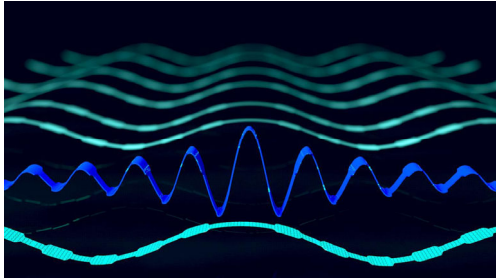
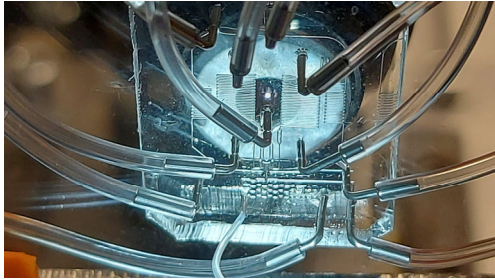
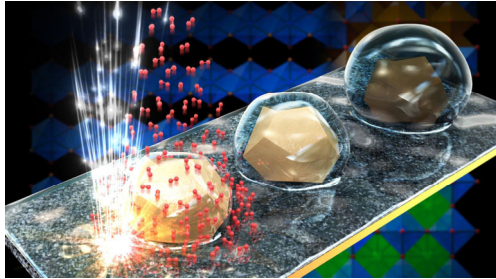
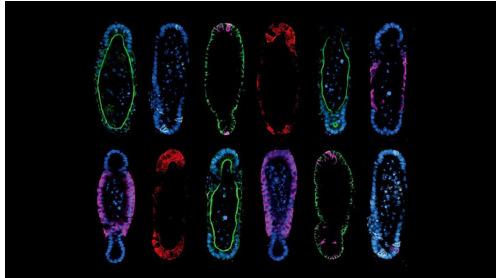
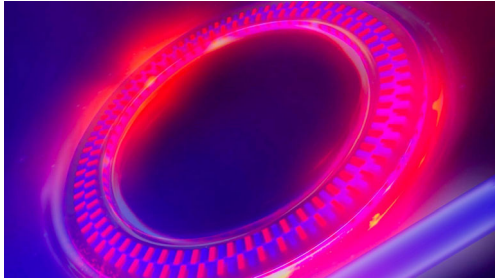
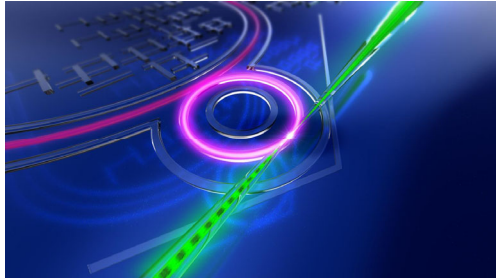
Scientific Equipment Levels -1 / 0 / +1	40 MCHF
Total	40 MCHF

- Cleanroom Infrastructures

Cleanroom Infrastructures Level -1	12 MCHF
Cleanroom Infrastructures Level +1	7 MCHF
Greyroom level 0	2 MCHF
Total	21 MCHF

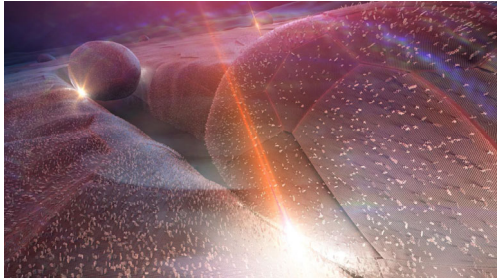
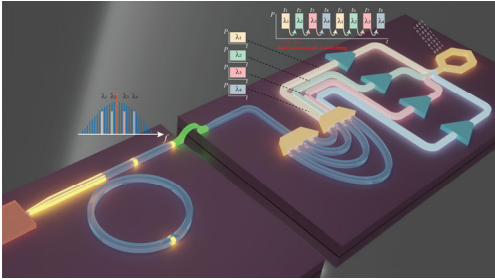
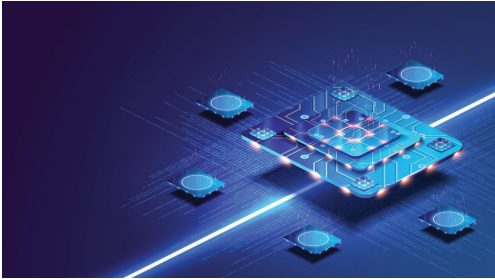
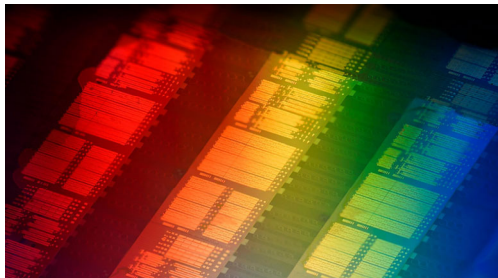
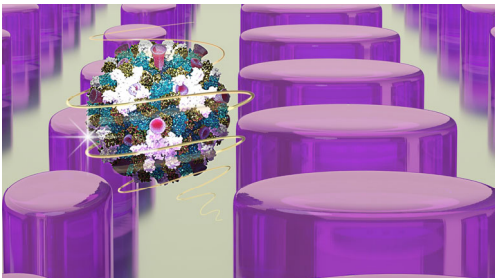
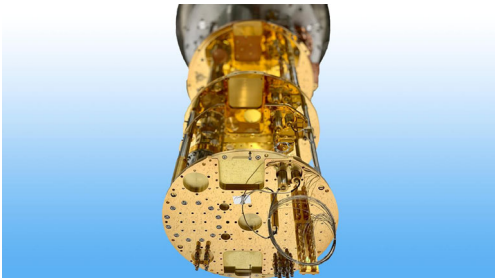
- Total 61MCHF



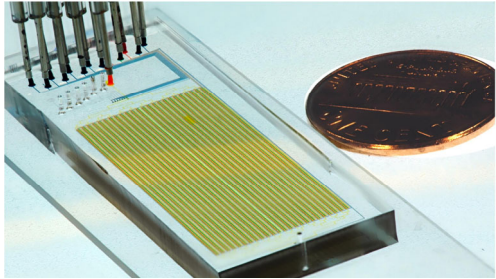
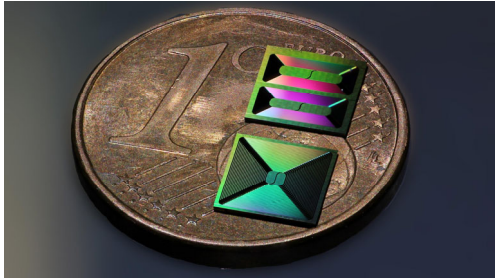
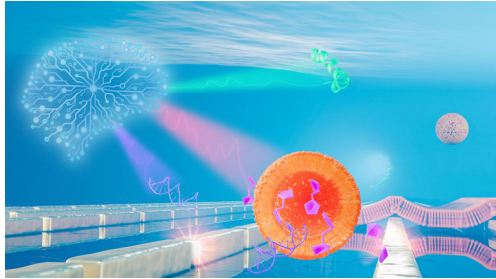
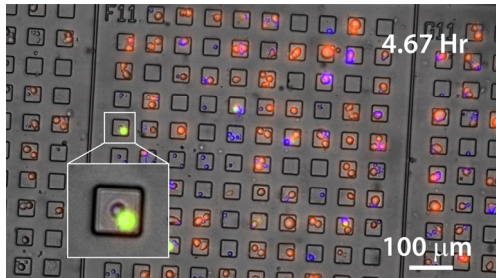
Kippenberg (RESONATORS) Nature Physics https://doi.org/10.1038/s41567-021-01498-4 March 2022 	Deplancke (RNA SEQUENCING) Nature Methods https://doi.org/10.1038/s41592-021-01391-1 February 2022 	Tileli (NANOMATERIALS CHARACTERIZATION BY TEM) Nature Catalysis https://doi.org/10.1038/s41929-021-00723-w January 2022 
Lütolf (STEM CELL DERIVED ORGANOIDS) Science https://doi.org/10.1126/science.aaw9021 January 2022 	Brès (RESONATORS) Nature Photonics https://doi.org/10.1038/s41566-021-00925-5 January 2022 	Kippenberg (INTEGRATED PHOTONICS) Nature https://doi.org/10.1038/s41586-021-04197-5 December 2021 

- A selection of publications which attracted special interest (last 12 months)
- Relayed onto the EPFL home page

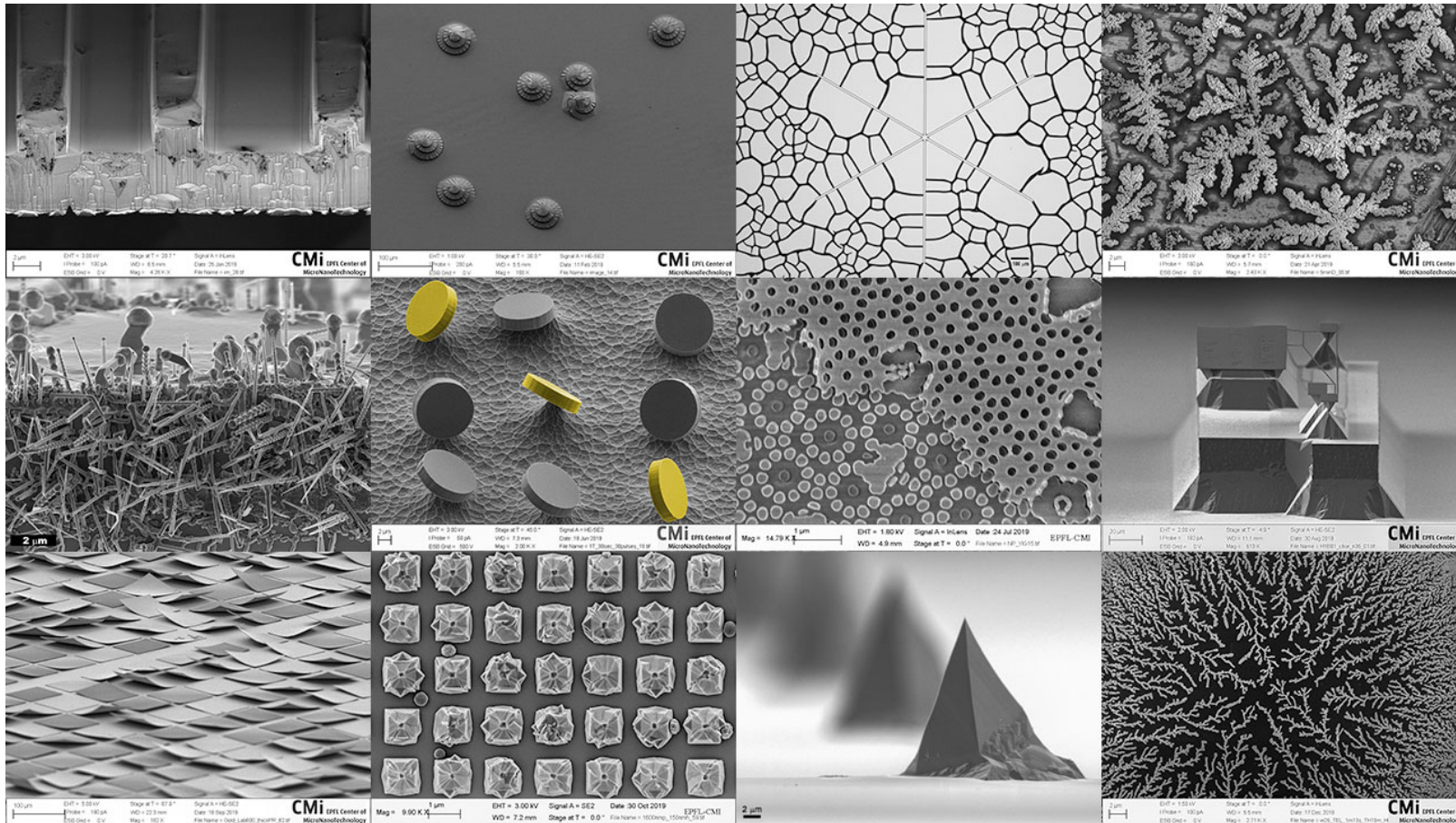
CMi inside

Galland (OPTOMECHANICS) Science https://doi.org/10.1126/science.abk3106 December 2021 	Kippenberg (OPTICAL CIRCUITS) Nature Communications https://doi.org/10.1038/s41467-021-25841-8 October 2021 	Savona (QUANTUM SCIENCE) EPFL https://actu.epfl.ch/news/epfl-launches-new-center-for-quantum-science-and-2/ August 2021 
Kippenberg (SILICON PHOTONICS) Science https://doi.org/10.1126/science.abh2076 July 2021 	Altug (OPTOFLUIDIC BIOSENSORS) Nature Communications https://doi.org/10.1038/s41467-021-23257-y June 2021 	Kippenberg (CRYOGENIC INTERCONNECT) Nature Electronics https://doi.org/10.1038/s41928-021-00570-4 May 2021 

CMi inside

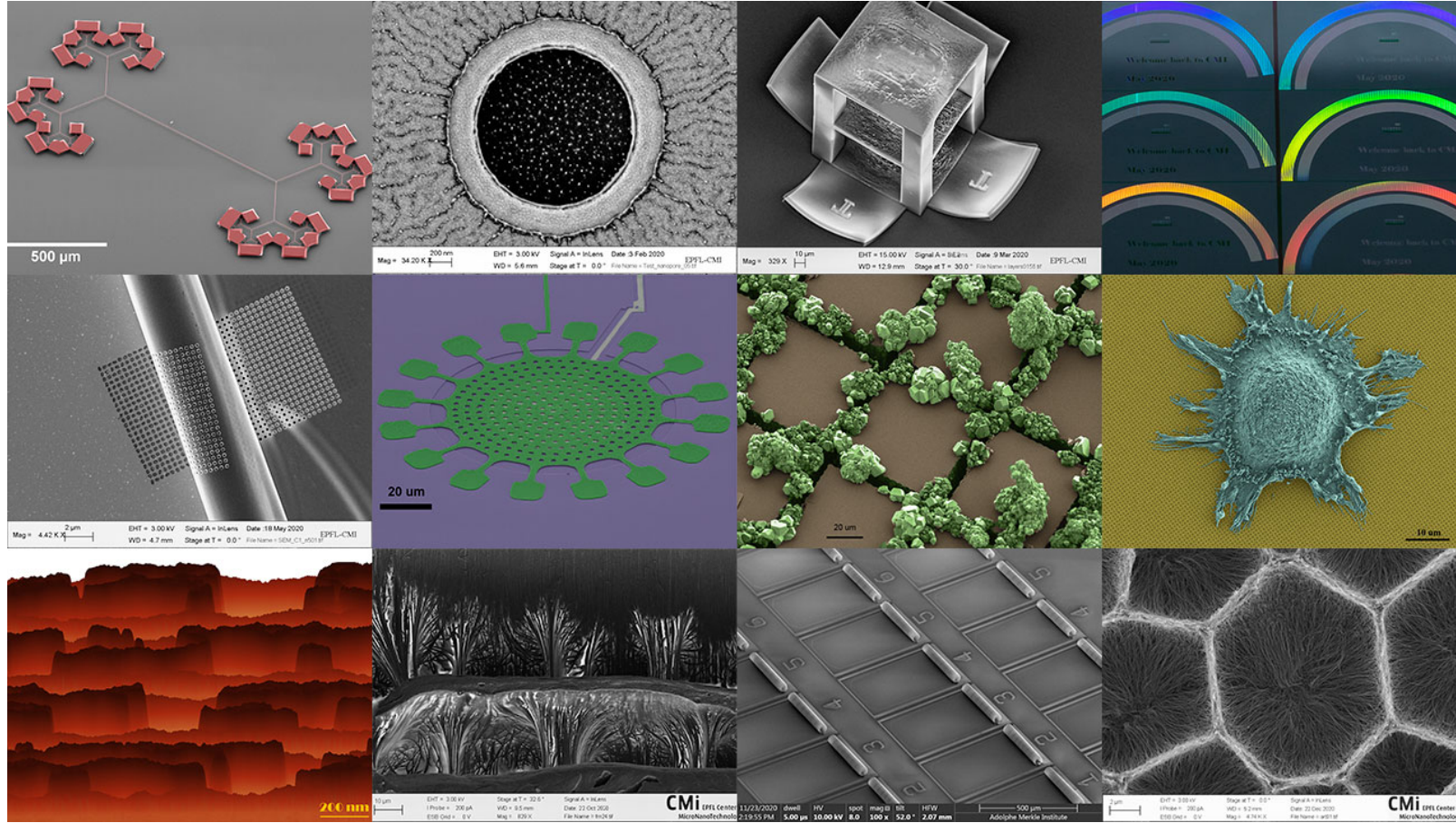
Maerkl (MICROFLUIDIC) PNAS https://doi.org/10.1073/pnas.2025289118 May 2021 	Kippenberg (PHOTONIC CIRCUITS) Nature Communications https://doi.org/10.1038/s41467-021-21973-z April 2021 	Altug (PLASMONIC BIOSENSORS) Advanced Materials https://doi.org/10.1002/adma.202006054 April 2021 
Ghezzi (RETINAL PROSTHESIS) Communications Materials https://doi.org/10.1038/s43246-021-00133-2 March 2021 	Xanadu Ligentec (QUANTUM CIRCUITS) Nature https://doi.org/10.1038/s41586-021-03202-1 March 2021 	Altug (HIGH-THROUGHPUT NANOBIOSCHIP) Science Advances https://doi.org/10.1126/sciadv.abe3348 March 2021 

Picture of the month 2019

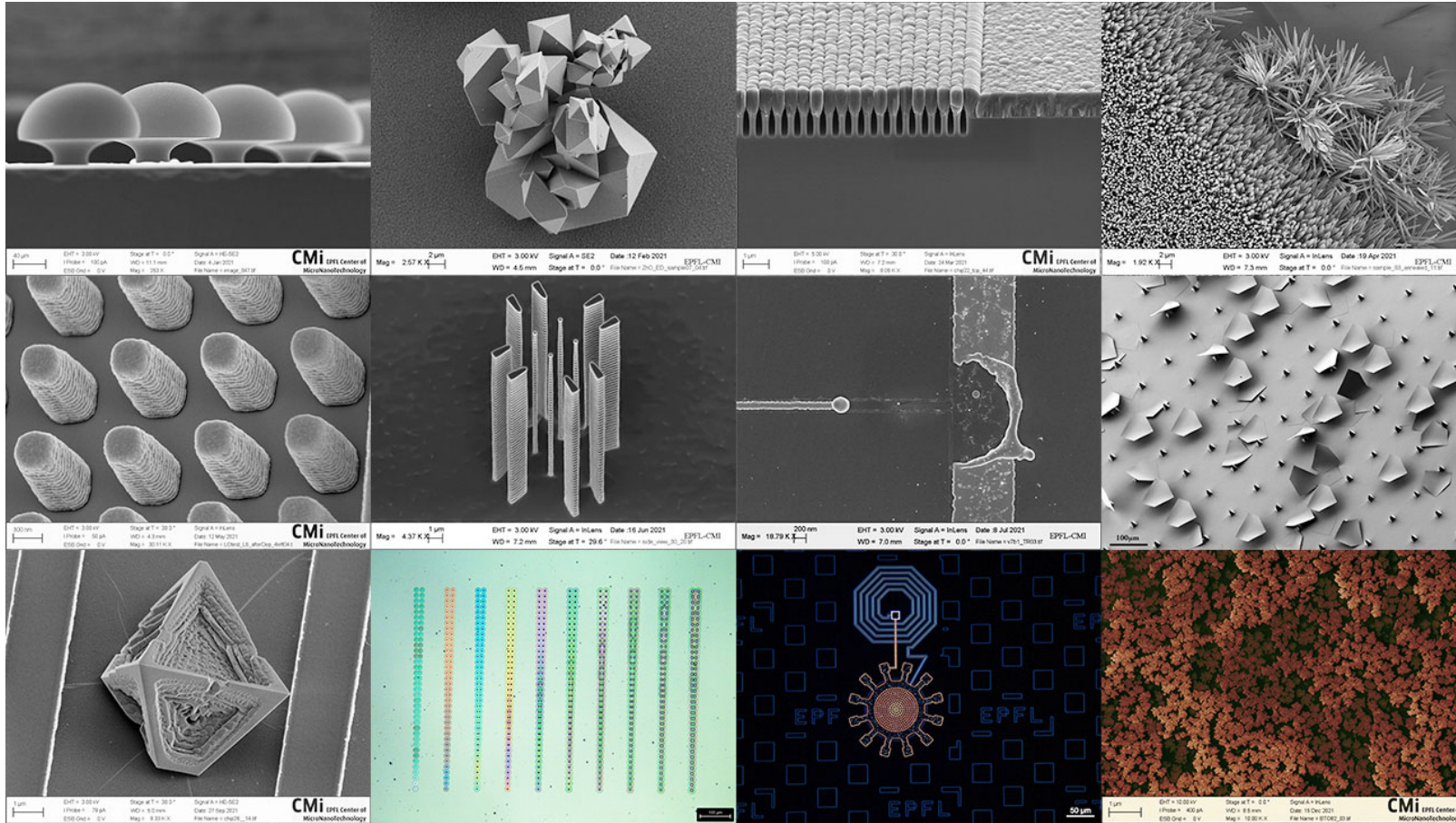


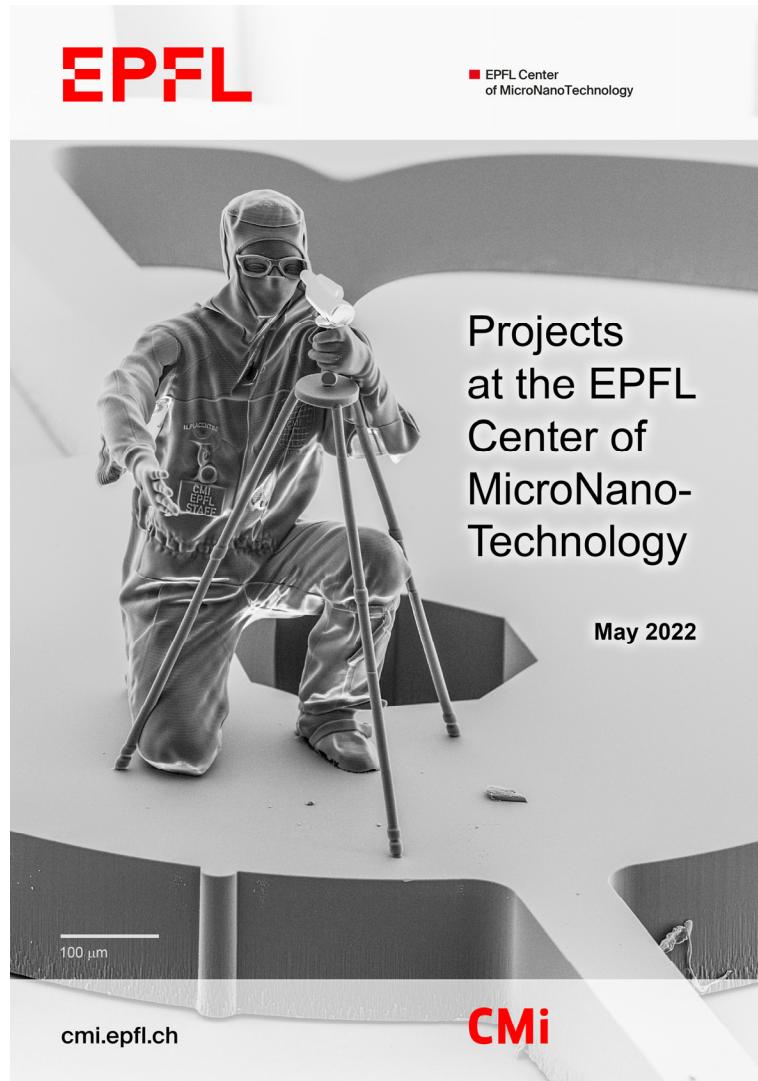
For the pleasure of the eyes : the official winners of the monthly picture contest

Picture of the month 2020



Picture of the month 2021





List of posters

- The 185 posters presented today are available online
- Password is available on request
- A few paper brochures are available

<https://cmiaccess.epfl.ch/projects/>

Front page: SEM image of our microns size colleague written with Nanoscribe

Program

	09h30-10h00	Coffees and Croissants, Distribution of Badges and Proceedings
	10h00-10h15	Philippe Renaud & Philippe Flückiger https://cmi.epfl.ch/ , Introduction
	10h15-10h30	Pasquale Scarlino , https://www.epfl.ch/labs/hqc/ , Superconducting-semiconducting hybrid quantum technology
	10h30-10h45	Christoph Merten , https://www.epfl.ch/labs/lbmm/ , Droplet microfluidics in antibody discovery, immune repertoire sequencing and personalized cancer therapy
	10h45-11h00	Giulia Tagliabue , https://www.epfl.ch/labs/net/ , Nanoantennas for energy and optical devices
	11h00-11h30	Break
	11h30-11h45	Mitali Banerjee , https://www.epfl.ch/labs/lqp/ , Twisted graphene devices to explore many-body physics
	11h45-12h00	Edoardo Charbon , https://www.epfl.ch/labs/aqua/ , Superconducting devices for quantum computing & sensing
	12h00-12h15	Herbert Shea , https://www.epfl.ch/labs/lmts/ , Soft actuators for wearable haptics
	12h15-14h30	Lunch & Poster Session
	14h30-14h45	Fabrizio Carbone , https://www.epfl.ch/labs/lumes/ , Nano-engineering the wavefunction of fundamental particles
	14h45-15h00	John Martin Kolinski , https://www.epfl.ch/labs/emi/ , Control of interface mechanics through engineered micro-structure
	15h00-15h30	Break
	15h30-15h45	Christophe Galland , https://www.epfl.ch/labs/lqno/ , Molecules in plasmonic nanocavities for optomechanical transduction
	15h45-16h00	Andras Kis , https://www.epfl.ch/labs/lanes/ , In-memory computing based on a 2D semiconductor
	16h00-17h00	Cocktails & Poster Session



Program

- Very exciting program
- 10 presentations
- Spanning an exceptionally broad range
- Try to be different every year
- Not always invite our heavy users
- Emphasize on the new Professors @ EPFL
- Sometimes also some exotic users
- One common point:
- MicroNanoFabrication

Program



Exhibitors

- 34 companies
- Thank you to all of them

- Thank you to all our exhibitors

EPFL
CMi

■ École
polytechnique
fédérale
de Lausanne



Thank you to the
CMi staff

**EPFL
CMi**

Merci

Enjoy the conference
Thank you for your attention

Philippe Flückiger

**EPFL
CMi**



Merci

Enjoy the conference
Thank you for your attention

Philippe Flückiger



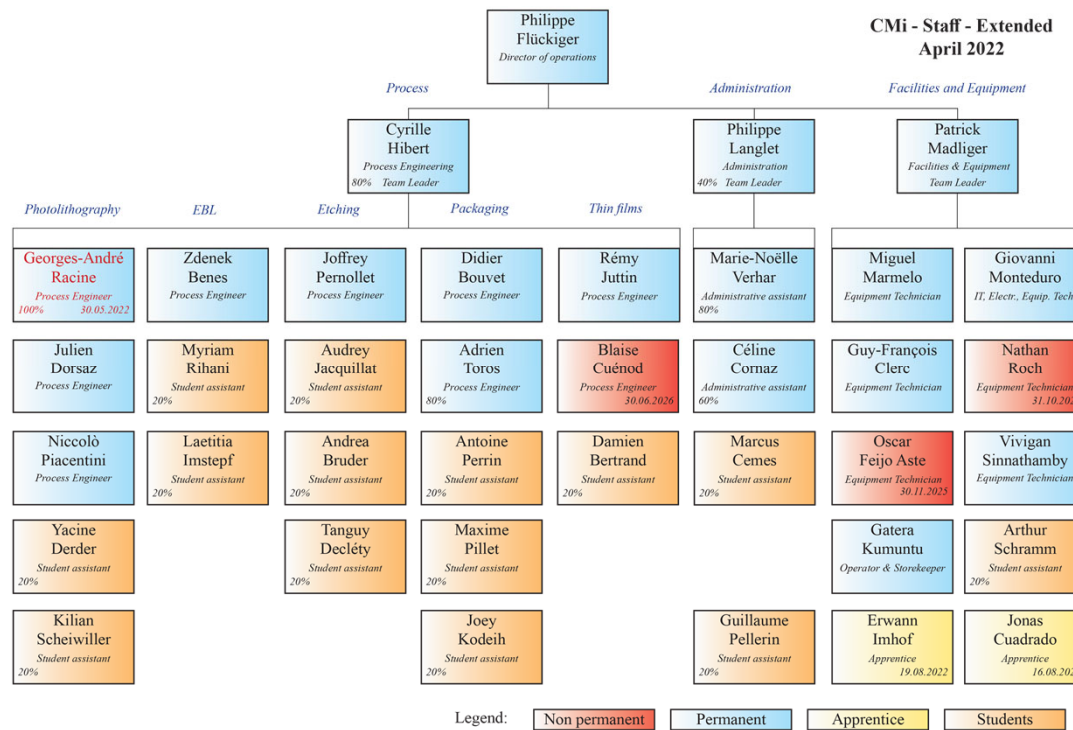
EPFL today

Campus

- 11,449 students, of whom 2,199 PhD students
- 344 faculty
- 6,134 staff (incl. PhD)

Structure

- 5 Schools (13 study prog. leading to an MSc)
- 2 Colleges
- 20 Institutes
- 44 research centers
- 371 laboratories



Staff

- Staff composed of 20.4 FTE employees
- 3 staff members are currently still under non-permanent positions
- Employ 11 student assistants (part time)
- Train 2 apprentices

- Staff April 2022



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