Welcome to the 17th edition of the CMi MicroNanoFabrication Annual Review Meeting
600 participants registered (with 30% from industry)
Many thanks for your participation
WELCOME ADDRESS

- Adrienne Corboud Fumagalli
- Vice-President for Innovation and Technology Transfer
OUTLINE

- Users
- Staff
- Cleanroom
- Tools
- Projects
# USERS IN 2015

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>STI-CMi</td>
<td>STI-IMT-LO</td>
<td>SB-IPHYS-LASPE</td>
<td>SV-BMI-LMNN</td>
<td>EXT-CERN EXT-Aleva</td>
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<td>STI-IMT-LOB</td>
<td>SB-IPHYS-LPMC</td>
<td>SV-GHI-UPKIN</td>
<td>EXT-CSEM EXT-Asulab</td>
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<td>STI-IMT-LPM</td>
<td>SB-IPHYS-LPMV</td>
<td>SV-IBI-LDCE</td>
<td>EXT-EMPA EXT-Bruker</td>
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<td>SB-IPHYS-LPN</td>
<td>SV-IBI-LLCB</td>
<td>EXT-UNIBS EXT-Debiotech</td>
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<td>STI-IMT-LSBI</td>
<td>SB-IPHYS-LPQM</td>
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<td>EXT-UNIBE EXT-EXALOS</td>
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<td>STI-IMT-NAM</td>
<td>SB-IPHYS-LUMES</td>
<td>SV-IBI-UPLUT</td>
<td>EXT-UNIFR EXT-Hamamatsu</td>
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<td>STI-IMT-ESLAB</td>
<td>SB-ISIC-LEPA</td>
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309 (46)  60 (11)  41 (10)  29 (9)  41(24)

- Total: 480 users (+8%) operating the CMi tools
- Total: 100 labs (+4%) or companies
USERS IN 2015

- The number of Users increased over the past 7 years at an average rate of 12% per year
- We have more than doubled the number of Users in 7 years
- Our prevision is to maintain the growth rate around 10% per year for the next 5 years (new labs)
- We will reach the number of 500 Users in 2016
- We observe some occupancy peaks with more than 50 Users simultaneously in the cleanroom

Nanofabrication plays an increasing role in modern science.
- The fees paid by the users show a regular progression
  - Monthly cap per user is applied
  - Master students operate almost free of charge
- Discussions about the invoicing rules
  - Eligibility rules from SNSF & Horizon 2020
THE STAFF

- 19 FTE staff members
- + Student assistants
- + Apprentices
We have a total cleanroom surface of 1300m² on two levels connected by an elevator.

The cleanroom is almost full.

New space is required for installing new tools.
TOOLS INSTALLED/PURCHASED IN 2015

- Electronics Upgrade of the 10 existing furnaces
- Installation of a TEOS furnace

- Coater Developer
  - SUSS ACS200 Gen 3

- Mask Aligner
  - SUSS MA6 Gen3
ALD tool for coating high aspect ratio materials
  + Prof. Jeremy Luterbacher
  + Coating of particles [& magnetic materials (Ni$_{80}$Fe$_{20}$)]
  + Deadline for public tender: 02.05.2016

RIE for etching dielectrics with ultra low roughness
  + Prof. Tobias Kippenberg
  + Etching of Dielectrics with ultra low roughness
  + Deadline for public tender: 02.05.2016
WHISH LIST FOR THE FUTURE?

- Maskless Aligner?
  + Direct exposure of photoresist
  + In beta-site in CMi

- New EBEAM writer?
  + Better performances
  + Speed, Image placement, Field size, Edge fracturing
  + Stability & Uniformity

- PVD Cluster Tool?
  + Thin film deposition of dielectric materials
  + Multilayers & Bragg reflectors
  + Co-sputtering of metals, nitrides & oxides
REQUESTS DIRECTLY FROM LABS?

- Plasma enhanced Chemical Vapor Deposition system?
- Pulsed Laser Deposition system?
- Vapor HF etcher?
  - For the release of MEMS without stiction
Over the last 12 months, 6 papers were published in Nature & Science with devices produced in CMi.

1°
Science 10 Jul 2015:
Vol. 349, Issue 6244, pp. 165-168
DOI: 10.1126/science.aab2051
Mid-infrared plasmonic biosensing with graphene
Plasmonic graphene biosensors

2°
Nature 10 August 2015
Vol. 524, pp. 325–329
doi:10.1038/nature14672
Measurement-based control of a mechanical oscillator at its thermal decoherence rate
Mechanical oscillators

3°
Nature Nanotechnology 21 September 2015
Volume: 10, Pages:1070–1076
doi:10.1038/nnano.2015.219
Identification of single nucleotides in MoS2 nanopores
MoS2 nanopores biochips

4°
Nature Nanotechnology 23 Nov 2015
Volume: 11, Pages:147–151
doi:10.1038/nnano.2015.254
Harnessing the damping properties of materials for high-speed atomic force microscopy
AFM tips

5°
Science 22 Jan 2016:
Vol. 351, Issue 6271, pp. 357-360
DOI: 10.1126/science.aad4811
Photonic chip–based optical frequency comb using soliton Cherenkov radiation
Photonic chips

6°
Nature Communications 6 Apr 2016
Volume: 7, Article number: 11216
doi:10.1038/ncomms11216
Near optimal graphene terahertz non-reciprocal isolator
Teraherz graphene devices
 ERC GRANTS 2016

- 7 professors using the CMi have received an ERC Grants this year 😊
- 2 advanced + 2 consolidators + 2 starting + 1 Proof of concept
PICTURE OF THE MONTH - JANUARY

Micro-matchstick carpet
Mahdi Zamani, LMSC
PICTURE OF THE MONTH - FEBRUARY

Sunflower party
Benoît Desbiolles, LMIS4
Valentin Flauraud, LMIS1
Liana around antic columns
Dmitry Mikulik, LMSC
Jelena Vukajlovic, LMSC
ABSTRACTS IN 2016

- 217 posters collected in the brochure
Very exciting program

10 presentations

Spanning an exceptionally broad range

Try to be different every year different

Not always invite the heavy users

Emphasize on the new Professors @ EPFL

Sometime also some exotic users

One common point:

MicroNanoFabrication
ENJOY THE CONFERENCE
THANKS FOR YOUR ATTENTION