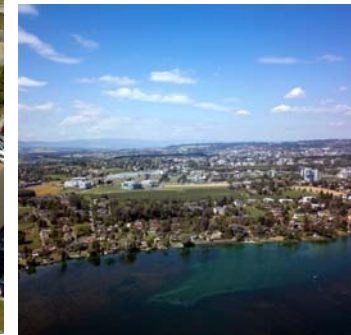


# MicroNanoFabrication Annual Review Meeting


*Welcome !*

- 8<sup>th</sup> MicroNanoFabrication Annual Review Meeting organized by the EPFL Center of MicroNanoTechnology (CMI)
- 9<sup>th</sup> will be organized by the CMI on May 20<sup>th</sup>, 2008



# Thank You !

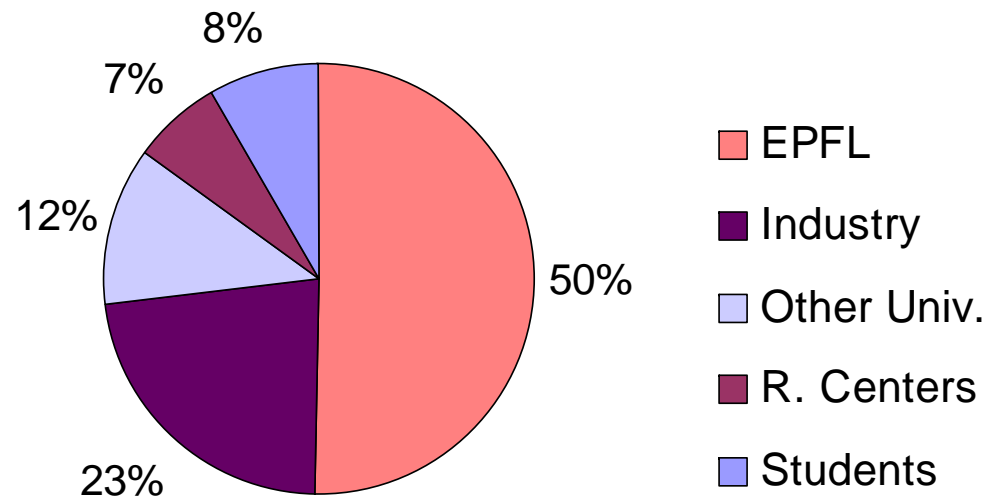
## *Many thanks:*

- Many thanks to the speakers of today
- Many thanks to the users of the CMI and the COMLAB for submitting 150 abstracts
- Many thanks to Claudia for the great job in organizing this meeting 
- Many thanks to the EPFL which is strongly supporting the CMI
- And last but not least thank you to all of you for being here today

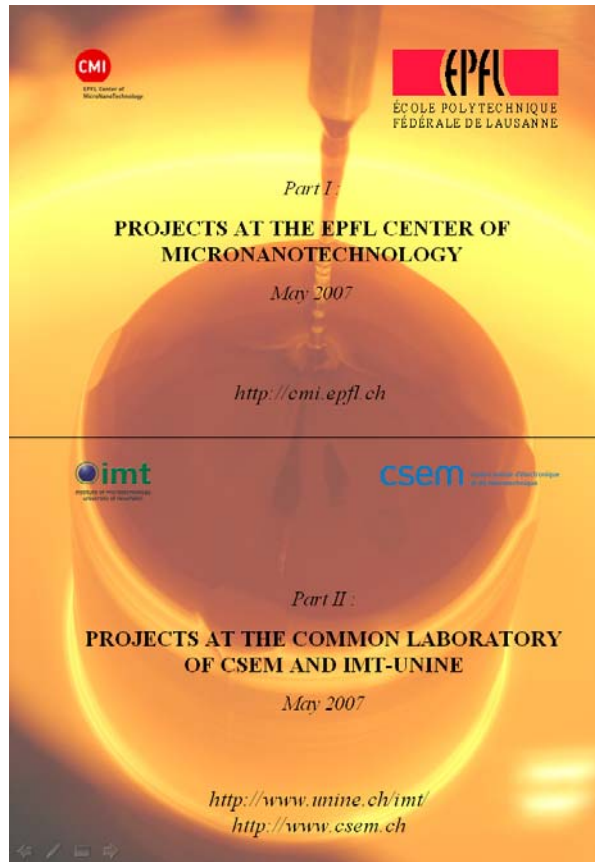


# Participants (as of May 7st, 2007)

Total : 266 people (+20%)



# Abstracts



STI-IMM-LEG-Ionescu	16	IMT-de Rooij	7
STI-IMM-LMIS-Brugger	10	IMT-Koudelka-Hep	2
STI-IMM-LMIS-Gijs	10	IMT-Staufur	2
STI-IMM-LMIS-Popovic	2	IMT-Shea	2
STI-IMM-LMIS-Renaud	16	IMT-Herzig	2
STI-IMX-LC-Muralt	9	IMT-Stoekli-Evans	1
STI-CMI	3	CSEM	2
STI-IPR-LSRO1-Bleuler	1	<b>Total</b>	<b>18</b>
STI-IPR-LSRO2-Clavel	2		
STI-ITOP-NAM-Martin	2		
STI-ITOP-LEMA-MOSIG	1		
SB-IPMC-LCB-Meister	1		
STI-IMM-LSM-Leblebici	4		
STI-IMM-LSI-DeMicheli	1		
STI-IOA-LOA-Salathé	1		
STI-IOA-LOA-Hoffmann	2		
SB-ISIC-LEPA-Girault	3		
SB-ISIC-LPI-Grätzel	1		
SB-CIME-Buffat	3		
STI-IMM-LMTS-Shea	1		
External laboratories	7		
CSEM	9		
Private companies	22		
Training of students	4		
<b>Total</b>	<b>131</b>		

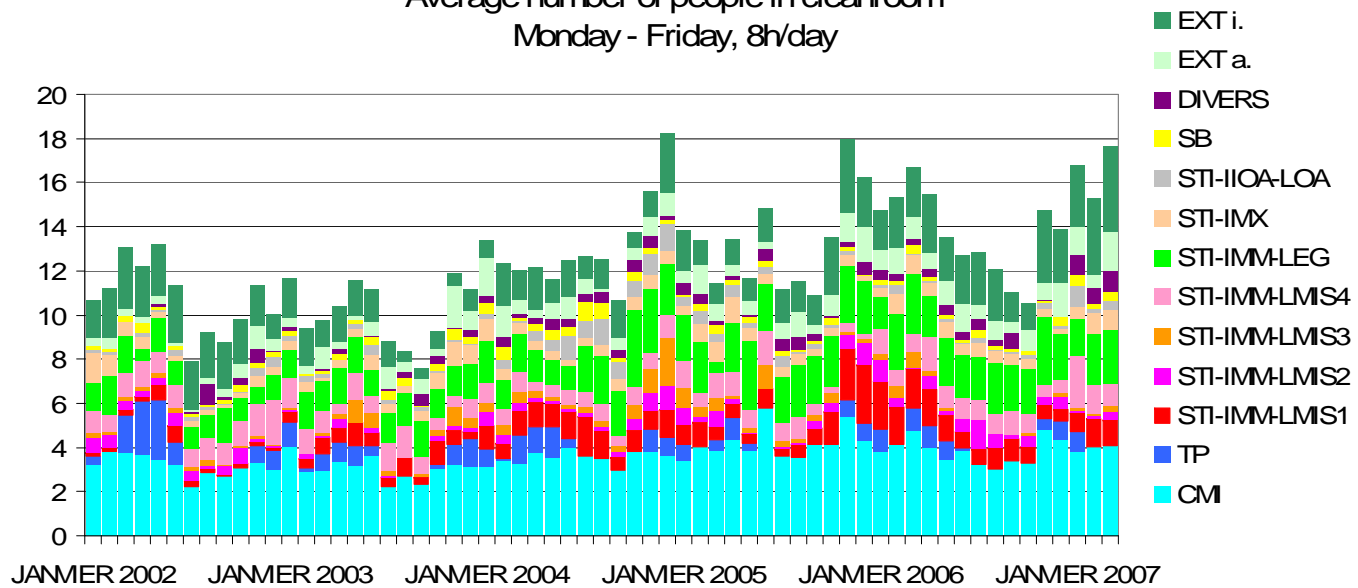
The projects at CMI are driven by :

- 20 laboratories of EPFL (STI, SB)
- 8 external laboratories
- 16 privates companies

+ 6% in 2007 compared to 2006

# CMI Cleanroom Average Occupancy

Average number of people in cleanroom  
Monday - Friday, 8h/day

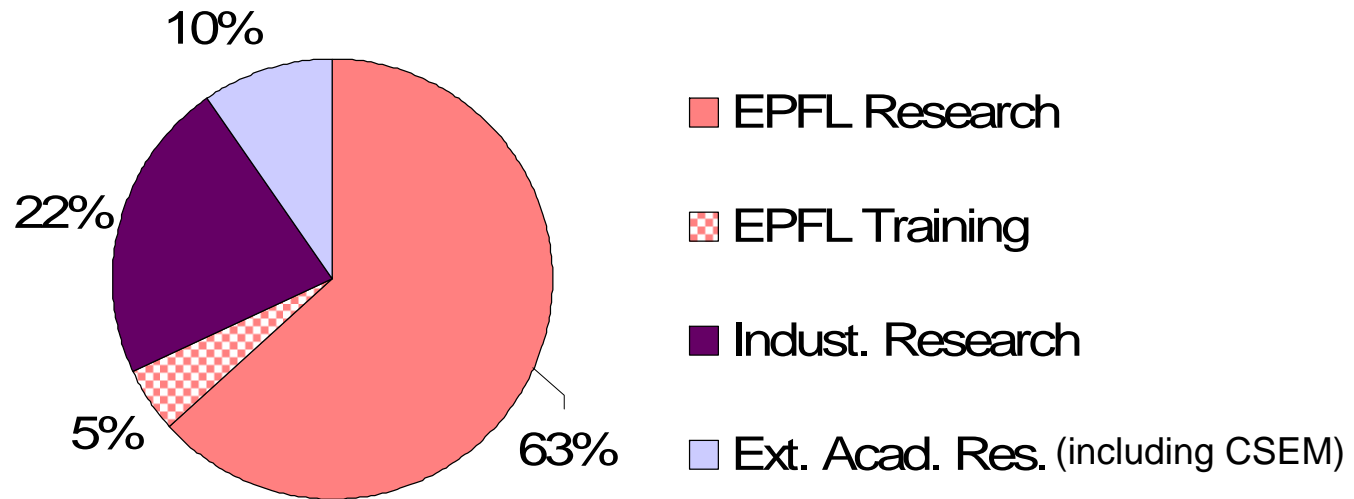


2005 : 13.3 people 8h/day  
2006 : 13.6 people 8h/day

+ 2.37% in 2006 compared to 2005

# CMI Cleanroom Activity (Staff Excepted)

Year 2006



# CMI Finances

- CMI running costs in year 2006 (kCHF)**

<b>Infrastructure</b> : energy, N2, water, maintenance (covered by EPFL budget)	751
<b>Processing</b> : consumables, maintenance of processing equipments	1'341
<b>TOTAL</b>	<b>2'092</b>

+9% in 2006 compared to 2005

Due to the need to have more staff !

- CMI resources in year 2006 (kCHF)**

<b>CMI User's Fees</b> (consumables) and CMI Services Revenues	1'365
<b>TOTAL</b>	<b>1'365</b>

- 2% in 2005 compared to 2004

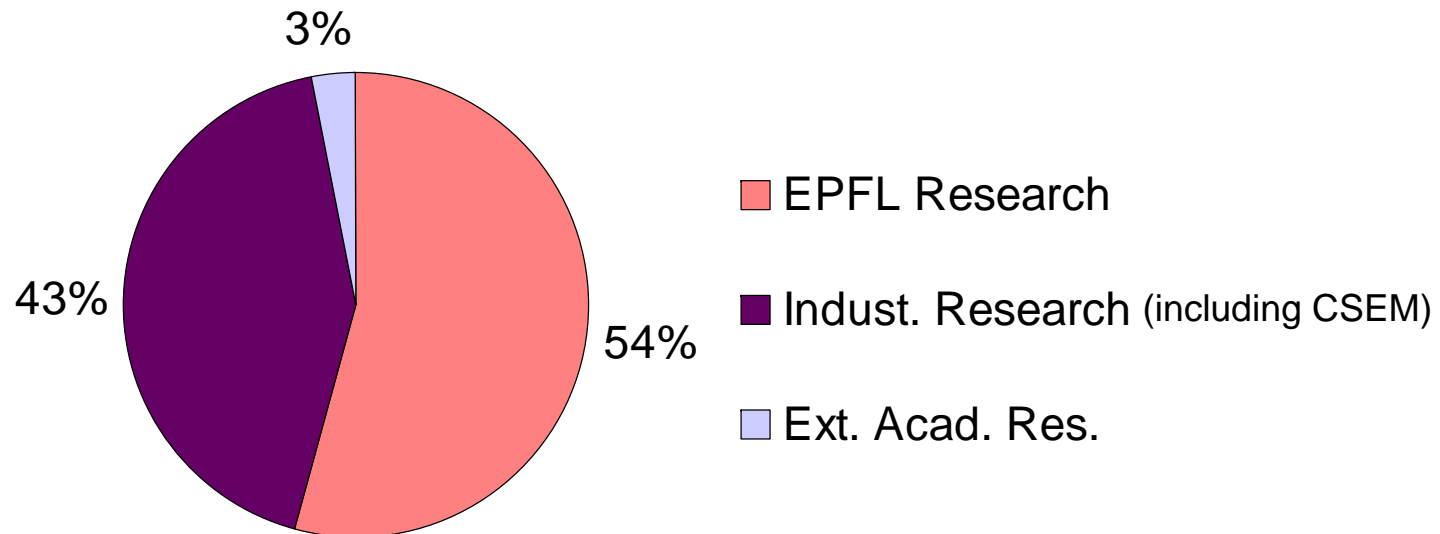
Not included in this table are:

- the salaries of the permanent staff
- the costs of the amortization and of the new investments

Global annual budget would be around 5 to 6MCHF

# CMI revenues from the users

Year 2006





# CMI Staff

- Staff**

Permanent positions		10.6
<b>Non-permanent positions</b>	Some are very critical for the efficiency of the CMI → <b>Solution to keep the key people on board</b>	3.8
	<b>TOTAL</b>	<b>14.4</b>



# CMI Inventory

- Inventory 2007 in kCHF**

Infrastructure	13'000
Scientific Equipment	21'000
<b>TOTAL</b>	<b>34'000</b>



More than 70 pieces of equipment up-and-running with very high uptime.  
Zero maintenance contract but a very professional staff.

# New: EBEAM lithography

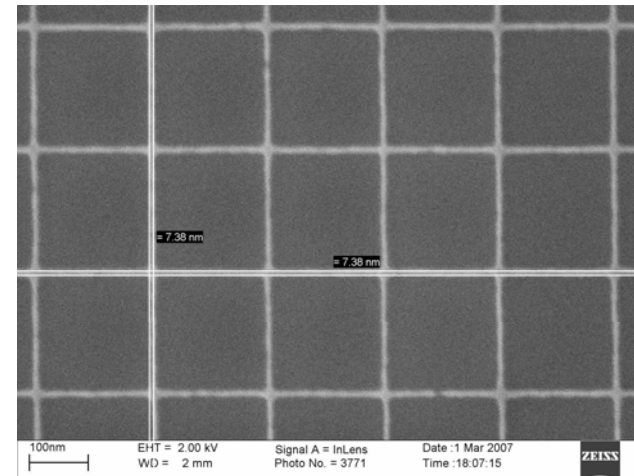
## *EBEAM lithography system:*

- Vistec EBPG5000plusES was accepted at CMI on April 26<sup>th</sup>, 2007
- Sub-10nm lithography, 100keV, 100nA, 50MHz



May 8th, 2007

Ph. Flückiger

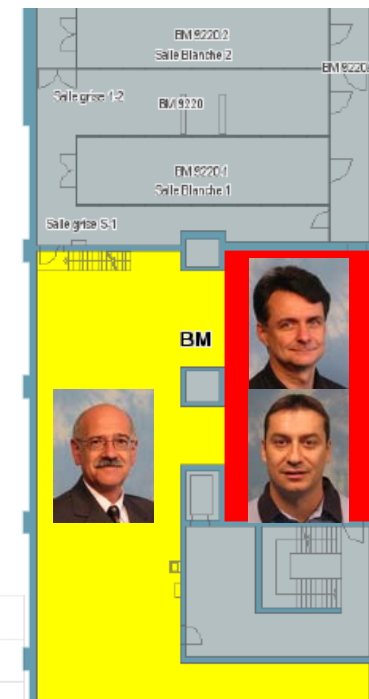


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# New: EBEAM cleanroom

## *EBEAM cleanroom:*

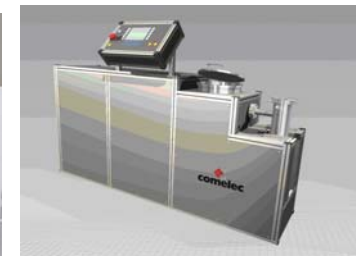
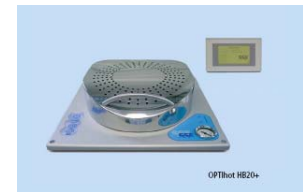
- Temperature drift:  $< 0.1\text{K/h}$
- Relocate and stack up the existing air conditioning units
- Major facilities modifications without disturbing the activity in the main cleanroom



# Funding request for 2007

*Funding request submitted for the following acquisitions :*

1. Spectroscopic ellipsometer
2. Upgrade on STS etcher: anisotropic & selective RIE with HBr
3. EBEAM resist coater
4. Stress measurement system
5. Atomic force microscope
6. Furnace for SiO<sub>2</sub> deposition based on TEOS
7. Parylene deposition system



# Conclusions

- The research activity at CMI is increasing years after years
- 28 laboratories and 16 private companies are currently using the CMI cleanroom
- Excellent balance between teaching activities, academic research and industrial research
- Enough permanent staff is a must for the efficiency of the CMI
- A powerful Electron Beam Lithography system is now available at CMI
- Hopefully the CMI will continue to develop with new technologies & equipment

## About the conference ...

- 10h15-10h45 **L. Lee (ETHZ)**, Biologic ASICs & Quantum Nanoplasmonics for Systems Biology
- 10h45-11h15 **M. Puech (Alcatel)**, Fabrication of 3D Packaging Through-Silicon Via using DRIE
- 11h15-11h30 Break
- 11h30-11h45 **A. Mercanzini (EPFL)**, Micro and Nanotechnologies for Implantable Neural Electrodes
- 11h45-12h00 **S. Buzzi (ETHZ)**, Silver Direct Nanoimprinting for Photonics
- 12h00-12h15 **J. Thome (EPFL)**, High Heat Flux Micro-Evaporators for Cooling of Microprocessors
- 12h15-12h30 **O. Frey (IMT)**, Brain Implantable Biosensors Integrated on Silicon Microprobe Arrays
- 12h30-14h00 Lunch & Poster Session
- 14h00-14h15 **H. Lorenz (Mimotec SA)**, Mechanical Microparts in LIGA and Silicon
- 14h15-14h30 **K. Moselund (EPFL)**, Fabrication and Transport Properties of Gate-All-Around Si Nanowires
- 14h30-14h45 **Ch. Edouard (Flowdit)**, Micro Vannes Dédiées au Contrôle d'Écoulement Aérodynamique
- 14h45-15h00 Break
- 15h00-15h15 **S. Rey-Mermet (EPFL)**, Microfabricated Solid Oxide Fuel Cells
- 15h15-15h30 **Ph. Niedermann (CSEM)**, Comlab as a Tool for Industrial MEMS Development
- 15h30-15h45 **K. Lister (EPFL)**, Ebeam Lithography at CMI
- 15h45-16h00 **D. Rosenfeld (Swiss MNT Network)**, Swiss MNT: a Step toward the Industry
- 16h00-16h30 Cocktails & Poster Session

**5 invited talks    6 talks involving CMI    2 talks involving COMLAB**



EPFL Center of  
MicroNanoTechnology



ÉCOLE POLYTECHNIQUE  
FÉDÉRALE DE LAUSANNE

*Enjoy your conference !*

- Thank you for your attention and enjoy your conference