



EPFL MICRONANOFABRICATION ANNUAL REVIEW MEETING

2012 : TUESDAY MAY 8TH

WELCOME & THANKS

- ✘ Welcome to the 12th edition of the CMi MicroNanoFabrication Annual Review Meeting
- ✘ Welcome to the Inauguration Ceremony of the BM building transformations
 - + Including the CMi cleanroom extension
- ✘ Many thanks for your participation
- ✘ 410 participants (30% industry, 40% external)

EVOLUTION OF THE CMI

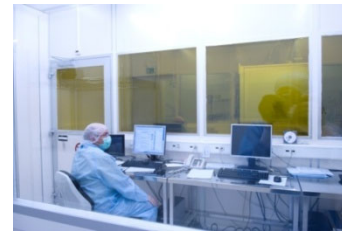
CMI tools ...



IC



MEMS



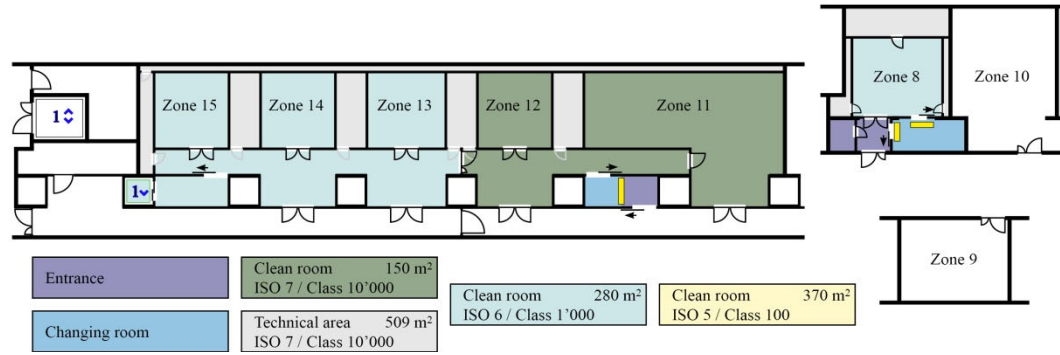
NanoFabrication

Non-conventional Processes for Integrated Microsystems

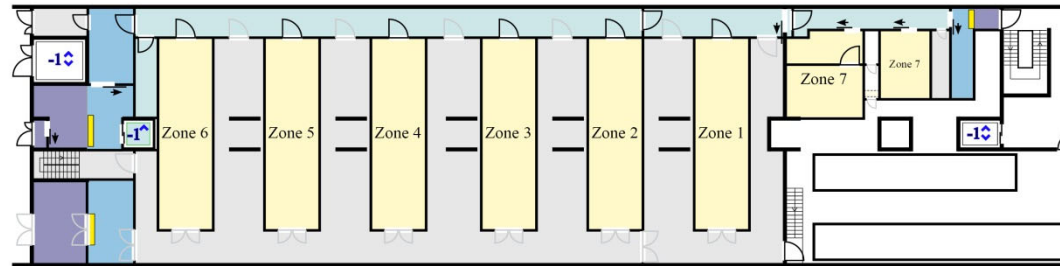


CLEANROOM EXTENSION

× CMi BM+1



× CMi BM-1



CMi BM+1 mainly dedicated to:

- × Metrology
- × Wet Chemistry
- × Photolithography
- × PDMS processing
- × Thin films
- × Backend activities
- × Exploratory processes

Total Surface	NEW surface
1300m ²	300m ²

- × CMi BM+1 will be widely used by the Researchers from the Life Sciences and the Basic Sciences

CLEANROOM EXTENSION



Many tools already in operation like:

- ✕ PDMS facility
- ✕ Versatile photolithography area
- ✕ Flexible wet chemistry lab

CLEANROOM EXTENSION



✘ Dressing rules in CMi BM+1



✘ Dressing rules in CMi BM-1

NEW CONCEPT

- ✘ Much more than a cleanroom extension ...
- ✘ Adaptation program of the CMi to fulfill the **new needs** for research and education
- ✘ Allow access to a **broader** technology base
- ✘ Increase **flexibility** of use, allow for **quick** and **easy** processing (open 24/7)
- ✘ Offer more **freedom** (but also less support)
- ✘ Further promote collaborations and **sharing** of know-how
- ✘ Adapt the cost structure to the **new needs**
- ✘ Offer extra space for **teaching** lab in nano & bio
- ✘ This is an add and not a degradation of the existing CMi

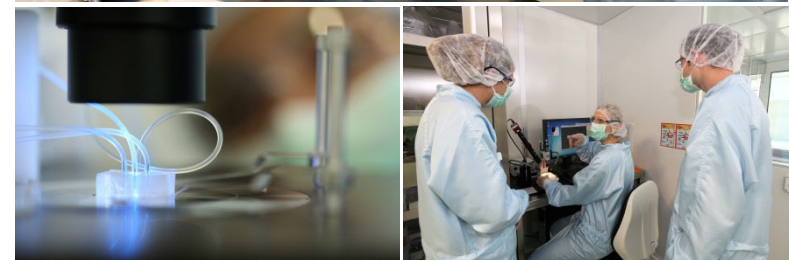
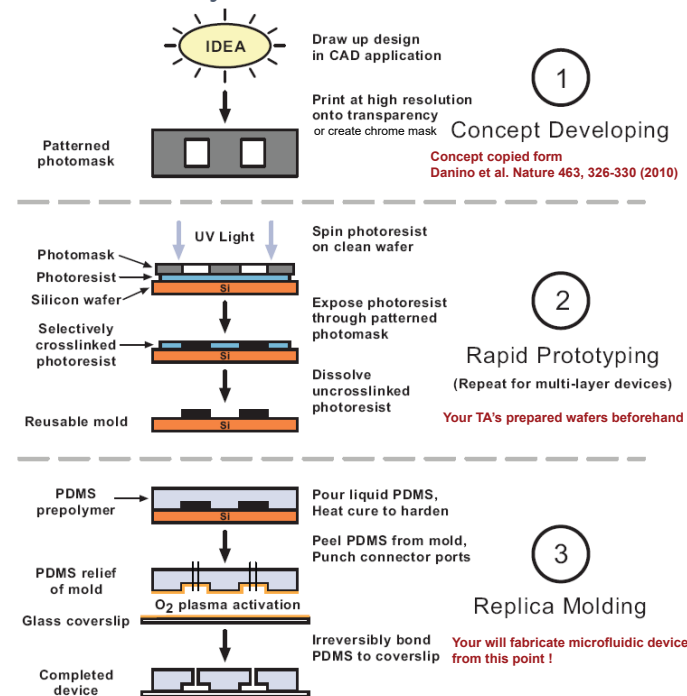
NEW TEACHING LAB

✘ Advanced BioEngineering Methods Laboratory (master in bioengineering, Prof. Radenovic)

Actually 4 teaching Labs in CMi:

- ✘ 1° Radenovic/Guiducci
- ✘ 2° Gijs/Brugger
- ✘ 3° Muralt
- ✘ 4° Renaud

Integration of Microfluidics and Microscopy for Cellular Analysis



NEW TOOLS

✕ ALD



Oxides:	Al ₂ O ₃
	TiO ₂
	HfO ₂
Nitride:	TiN
Metals:	Pt
	Ru

✕ Accepted on 18.02-2011

NEW TOOLS

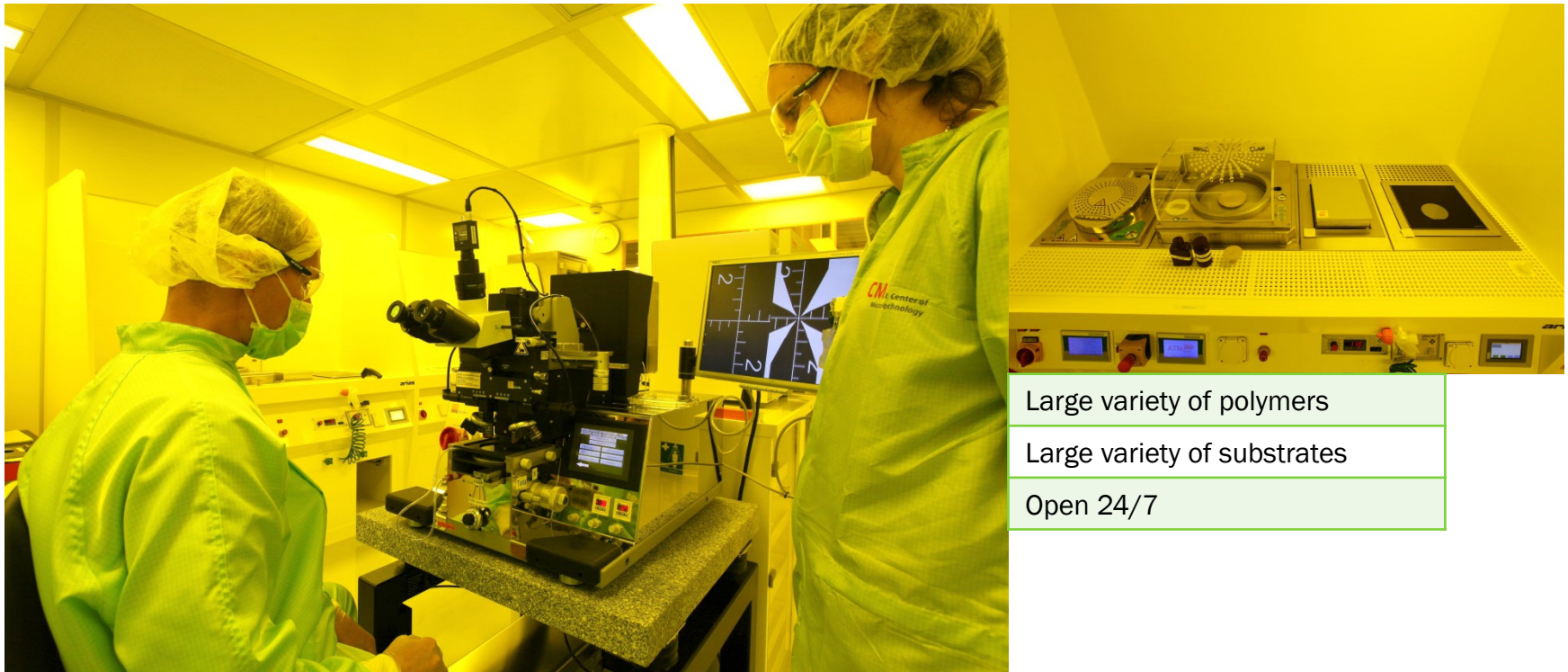
✖ Grinder



✖ Accepted on 06.05-2011

NEW TOOLS

✕ Versatile Photolithography area



- Large variety of polymers
- Large variety of substrates
- Open 24/7

✕ Accepted on 05.04-2011

NEW TOOLS

- ✘ PDMS processing line including a hole puncher
- ✘ Thermal & uv Imprinter
- ✘ Plotter cutter
- ✘ Circuit board prototyping tool
- ✘ Laminator
- ✘ Thermal evaporator
- ✘ Vacuum furnace
- ✘ ...

Total Inventory in 2011	
Scientific Equipment Level -1	22 MCHF
Scientific Equipment Level +1	1 MCHF
Total	23 MCHF

REQUESTED BUDGET FOR 2011

- ✗ SEM
- ✗ AFM
- ✗ Mechanical Profiler
- ✗ Sputtering tool for metals
- ✗ Elphy Multibeam FIB & SEM pattern generator
- ✗ EBEAM 10 position airlock
- ✗ RIE ICP*
- ✗ Sputtering tool for oxides* * = in collaboration with ICMP
- ✗ Nanomaterial Printing Platform** ** = in collaboration with LEPA
- ✗ ... please continue to tell us your needs

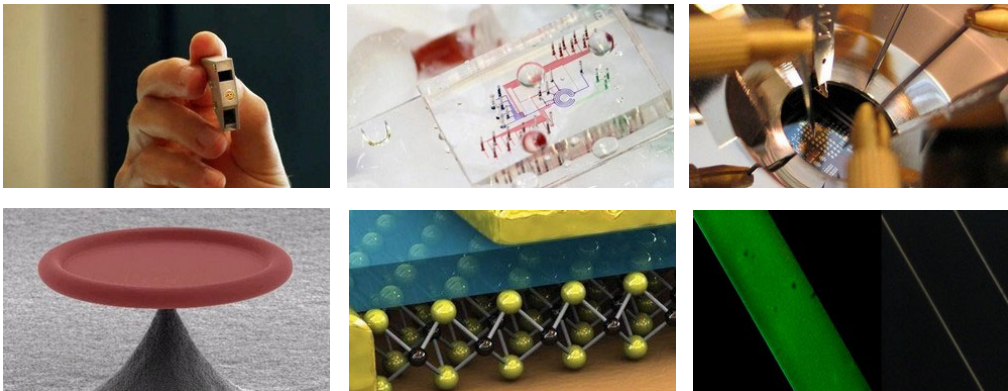
USERS IN 2010

STI	SB	SV & IC	EXT	COMPANIES					
STI-CMI	STI-IMT-LOA	SB-CIME	SV-GHI-UPKIN	EXT-CEA	EXT-Abionic	EXT-Sensimed			
STI-CBT-LBO	STI-IMT-LPM	SB-ICMP-LASPE	SV-IBI1-LMBM1	EXT-EMPA	EXT-Adv-Silicon	EXT-Sigatec			
STI-IBI2-CLSE1	STI-IMT-LSRO1	SB-ICMP-LOEQ	SV-IBI1-UPDEPLA	EXT-FEMTO	EXT-Ayanda	EXT-SilMach			
STI-IBI2-LBEN	STI-IMT-NAM	SB-ICMP-LPMC	SV-IBI1-UPLUT	EXT-HESVS	EXT-Biocartis				
STI-IBI2-LBNC	STI-IMT-OPT	SB-ICMP-LPN		EXT-HUG	EXT-Bruker				
STI-IEL-LANES	STI-IMT-SAMLAB	SB-ICMP-LPQM1		EXT-UNIGE	EXT-Colibrys				
STI-IEL-LSM	STI-IMX-LC	SB-IPEP-LPHE1			EXT-Debiotech				
STI-IEL-NANOLAB	STI-IMX-LMM	SB-IPSB-LCB			EXT-EXALOS				
STI-IMT-ESPLAB	STI-IMX-LMSC	SB-IPSB-LPMV			EXT-Flowdit				
STI-IMT-LMIS1	STI-IMX-LTC	SB-ISIC-LEPA			EXT-Icoflex				
STI-IMT-LMIS2		SB-ISIC-LPI			EXT-Intersema				
STI-IMT-LMIS3			IC-ISIM-LSI1	EXT-CSEM 12	EXT-Karmic				
STI-IMT-LMIS4					EXT-Leister				
STI-IMT-LMITS					EXT-Nanoworld				
STI-IMT-LO					EXT-Rolox				
187 (25)		35 (11)		20 (5)		20 (7)		23 (18)	

✘ Total: 285 users from 48 labs (and 18 companies)

ABSTRACTS

✕ 181 abstracts



Published on EPFL homepage

- ✕ 13.09.2010 The pocket projector is a reality!
- ✕ 01.10.2010 Engineering Life – a new generation of students emerges
- ✕ 28.10.2010 Energy saving devices (Steeper project)
- ✕ 12.11.2010 All optical transistor
- ✕ 30.01.2011 A material to revolutionize electronics
- ✕ 14.03.2011 EPFL reinvents the liquid crystal display



CONCLUSIONS

- ✘ Since its opening in 1999, CMi has constantly increased its volume of activity
- ✘ CMi is anticipating the needs for Research & Education
- ✘ Many success stories are built inside CMi
- ✘ CMi is well prepared for the future

PROGRAM



The highest value of the CMi is its Users ...

PROGRAM

- × 10h20-10h40 *B. Vigna* (Group VP & General Manager STMicroelectronics), From Motion Sensors to iNEMO™
- × 10h40-11h00 *S. Lacour* (<http://lsbi.epfl.ch/>), Micro-Nanofabrication on Elastomeric Substrates
- × 11h00-11h20 *Y. Leblebici* (<http://lsm.epfl.ch/>), Heterogeneous System Integration: Opportunities and Technologies for Platform Development
- × 11h20-11h45 Break
- × 11h45-12h00 *B. Vianay* (<http://lcb.epfl.ch/>), Adhesive Protein Micropatterning for Constraining Cell Spreading to Adopt Geometrical Features
- × 12h00-12h15 *V. Cadarso* (<http://lms1.epfl.ch/>), Non-Conventional Methods for Polymer Processing
- × 12h15-12h30 *L. Forro* (<http://lpmc.epfl.ch/>), From Carbon Nanotubes to Topological Insulators in Nanofabrication
- × 12h30-12h35 *Ph. Gillet* (Vice-President for Academic Affairs), Message from the Vice-President
- × 12h35-13h00 *D. Psaltis* (Dean of STI), Micro and Nanotechnology at the School of Engineering
- × 13h00-14h30 Opening Ceremony of BM Building Transformations with our President **Patrick Aebischer**
Lunch & **Technical Exhibition**
Place: in front of BM building (or in SG 294.22 if weather is bad)
- × 14h30-14h45 *R. Martinez-Duarte* (<http://lms4.epfl.ch/>), Microfabrication of Glass-like Carbon and Related Applications
- × 14h45-15h00 *R. Lockhart* (<http://www.csem.ch/>), Fully Programmable Micro Diffraction Gratings
- × 14h30-15h30 Break
- × 15h30-15h45 *W. Song* (<http://lo.epfl.ch/>), Optofluidics: From Micro to Nanoscale
- × 15h45-16h00 *J. Baborowski* (<http://www.csem.ch/>), Packaging of Silicon Resonators
- × 16h00-17h00 Cocktails & Poster Session

ENJOY THE CONFERENCE

✕ Enjoy the conference!

+ WiFi Access

✕ See last page of the Participants' List

✱ Username: x-cmi1

✱ Password: mimlob84

✱ Type d'accès: enclair (SSID public-epfl)