



National scientific trans-GDR day

April 11, 2012, Besançon, FRANCE

« **Micromanipulation for Micro and Nano Systems** »

**ABSTRACT**

Micro and nano systems constitute an excellent example of the evolution of the products towards a miniaturization, personalization and integration of a growing number of functionalities. This evolution goes with those of microtechnologies and packaging and requires more and more often micro-assembly operations. Indeed, micro-assembly enables to integrate in the plane or out of the plane at the chip level of dies/microcomponents that are issued from different and incompatible microfabrication processes. Progresses recently made in robotics now makes assembly of components smaller than the millimeter (being able to go until some  $\mu\text{m}$ ) with positioning accuracy better than the micron possible. That opens very interesting prospects in terms of design for new microsystems obtained by vertical integration of microcomponents (Fig 1) but also in terms of design and control of microrobots since the performances to be reached (precision, speed, reproducibility) lead us to the limit of the state of the art.

The purpose of this day will be to discuss of the content and outlooks of this new alternative which relies at the French national level at the interface between two GDR (Research group of the CNRS) names “[Robotics](#)” and “[Micro-Nano Systems](#)”.

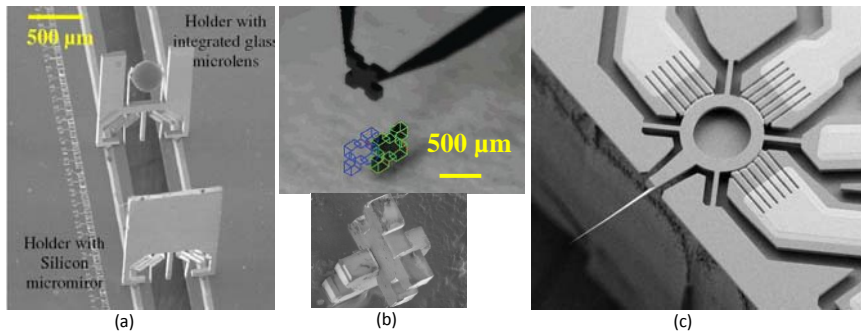


Fig 1: Example of realizations (a) Micro-optical bench with vertical integration of a micromirror and micro-optical lens (FEMTO-ST) (b) Assembly of 2 Silicon component (FEMTO-ST) (c) MEMS resonators used as AFM probe (IEMN)

**Keywords:** Microsystems, integration, miniaturization, micro-assembly, micromanipulation, micropositioning, MEMS, MOEMS

**SPEAKERS**

- Hans ZAPPE** – IMTEK, University of Freiburg –  
*Optical Microsystems : Technologies and Applications*
- Frédéric ZAMKOTSIAN** – Laboratoire d’astrophysique Marseille –  
*Des MOEMS dans les instruments astronomiques du futur*
- Jean-Louis LECLERCQ** – Université de Lyon, Institut des Nanotechnologies de Lyon (INL) –  
*Micro-Nano Systèmes Optiques III-V*
- Stéphane RÉGNIER** – Pierre and Marie Curie University Paris –  
*Development of a Flexible Robotic System for Micro/Nano Manipulation and Haptic Teleoperation*
- Lionel BUCHAILLOT** – IEMN Villeneuve d’Ascq –  
*Apport des microsystemes pour la microscopie à force atomique*
- Alain BOSSEBOEUF** – IEF, Université Paris Sud-11 –  
*Procédés de transferts de motifs et de dispositifs*
- Massimo MASTRANGELI** – EPFL, Lausanne –  
*Failure Modes in Capillary Self-Assembly*
- Sylwester BARGIEL** – FEMTO-ST, Besançon –  
*MOEMS-based optical instrumentation on-chip*
- Philippe LUTZ** – FEMTO-ST, Besançon –  
*Out of plane MEMS/MOEMS robotic assembly methods*

**PROGRAM**

8h00 - 8h45	Welcoming - coffee
8h45 - 10h30	Scientific session n°1 – Presentations (3)
10h30 – 10h45	Coffee break
10h45 - 12h15	Scientific session n°2 – Presentations (3)
12h15 – 14h	Lunch – Poster session
14h - 15h30	Scientific session n°3 – Presentations (3)
15h30 – 16h30	Demonstrations, Experimental labs and conclusions

**CONTACTS - REGISTRATION**

<p><b>More infos on:</b> <a href="http://www.femto-st.fr/Journée_GDR">http://www.femto-st.fr/Journée_GDR</a></p> <p><b>Contact :</b> Cédric CLEVY FEMTO-ST Institute, AS2M Department <a href="mailto:clevy@femto-st.fr">clevy@femto-st.fr</a></p>	<p><b>Registration is free but required before April 4, 2012:</b> Send an email to Isabelle GABET specifying your name, institution, participation in demonstrations? and poster title</p> <p><a href="mailto:Isabelle.Gabet@ens2m.fr">Isabelle.Gabet@ens2m.fr</a></p>
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