Erik DUJARDIN

NanoSciences Group
CEMES - CNRS UPR 8011
Toulouse - France

dujardin@cemes.fr

CEMES UPR 8011

Centre d'Elaboration des Matériaux et d'Etudes Structurales

- 70 chercheurs et enseignants-chercheurs
- 40 personnels techniques
- 50-80 étudiants, p-doctorants

- NanoSciences
- NanoMateriaux
- Matériaux Cristallins ss Contraintes

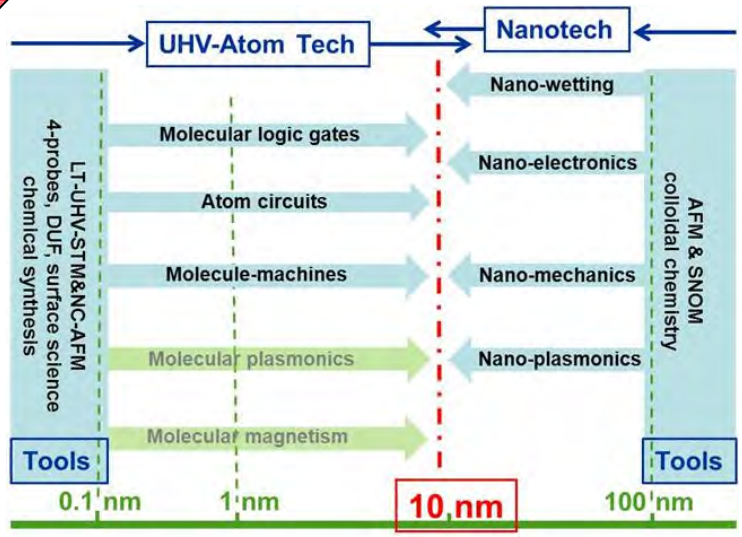
- UHV STM/AFM
- TEM / Implantation ions / RX
- Optique, fs, Raman
- Labos de Chimie

CEMES – Groupe NanoSciences

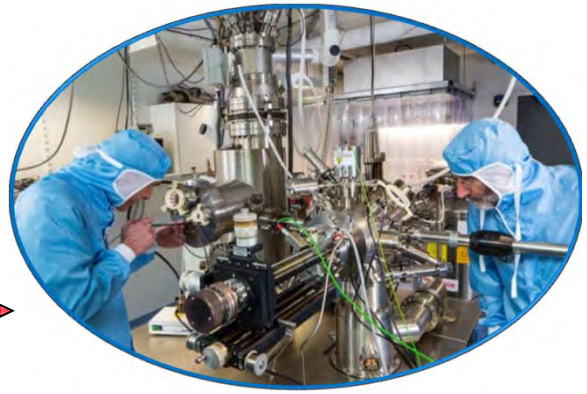
16 permanent staff:
- 4 chemists (2 CNRS)
- 3 theoreticians (3 CNRS)
- 9 physicists (6 CNRS)

Students & Pdocs
- 10 Post-docs
- 7 PhD students

Molecular design & synthesis



Theory & simulation



STM/AFM/NFOM, Surface science

Programme de recherche

Erik Dujardin

- **Graphene:**

a platform for fully integrated atom-scale opto-electronics

- **Crystalline and self-assembled nanoplasmonic architectures**

for optical quantum information processing

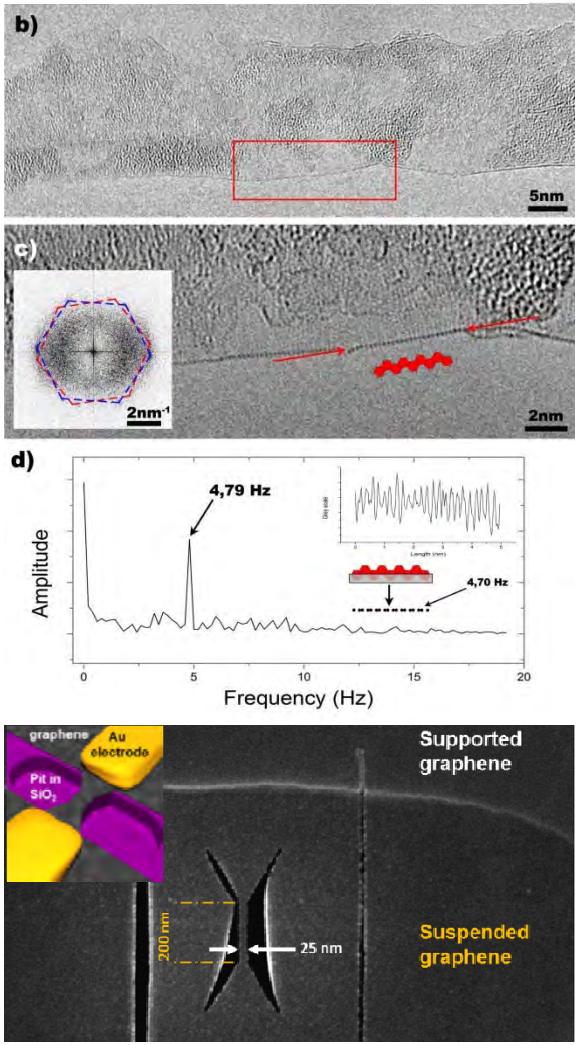
.

- **Bio-inspired nanomaterials chemistry**

Graphene NanoRibbon Devices

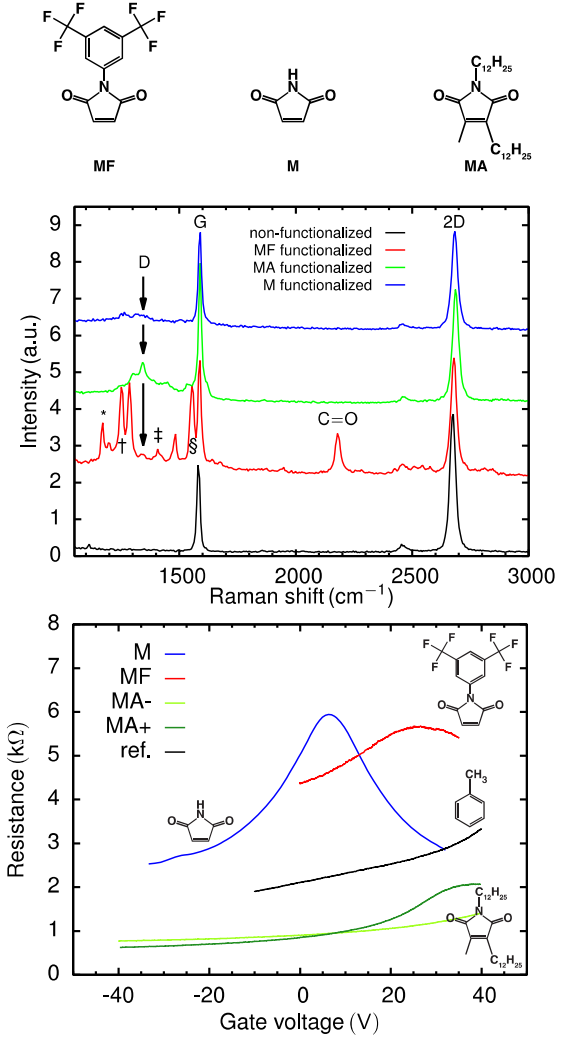
Towards atom technology in graphene in UHV

Atomically smooth GNR



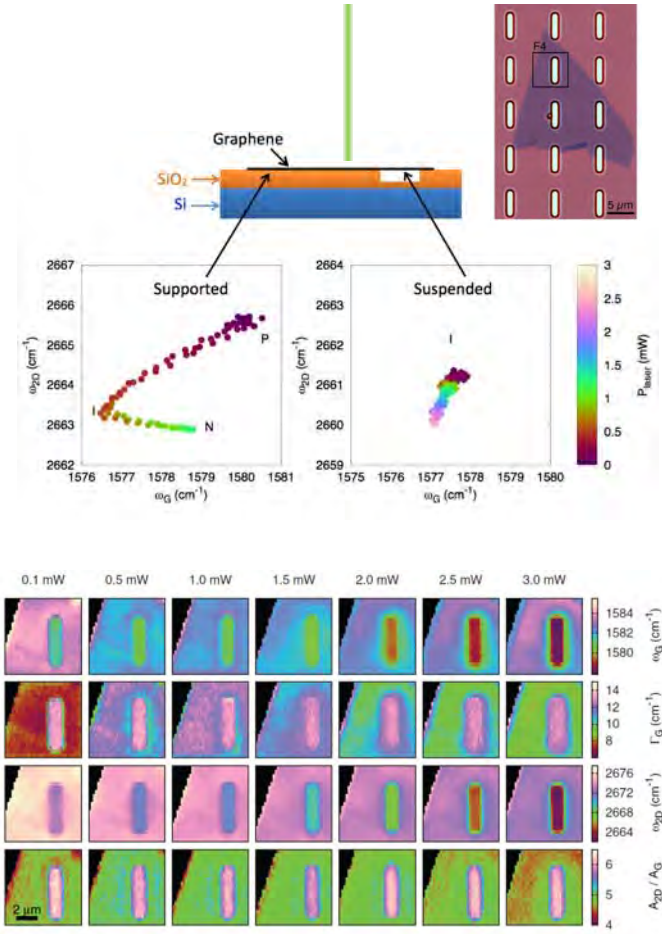
M. Nunez, S. Linas et al., ***2014***, in prep.

Reversible covalent grafting



M. Rubio-Roy, C. Mattioli et al., ***2014***, in prep.

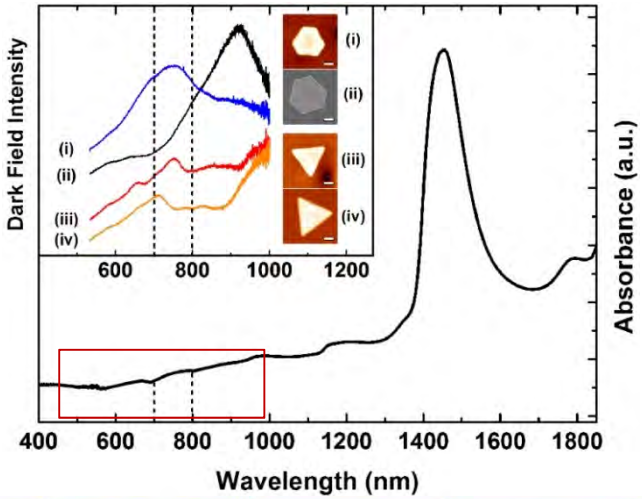
Reversible optical doping

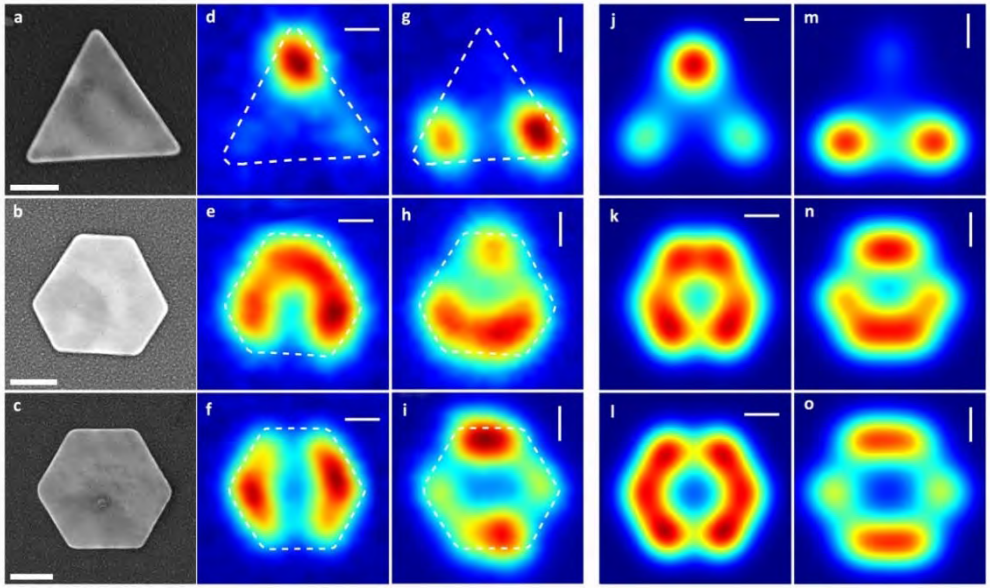


A. Tiberj, M. Rubio-Roy, et al., Sci. Rep., ***2013***, 3, 2355

Colloidal & Self-Assembled nanoplasmonics

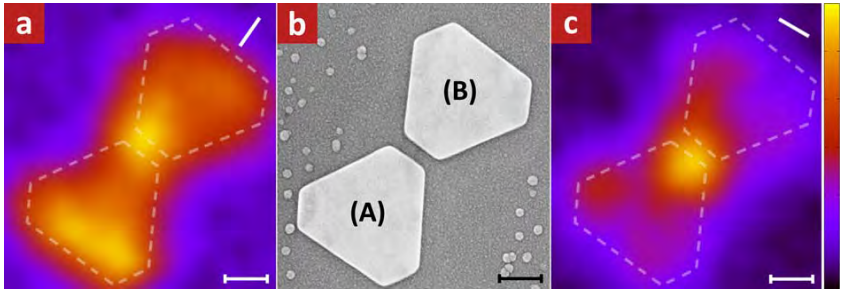
Engineering the 2D SP-LDOS

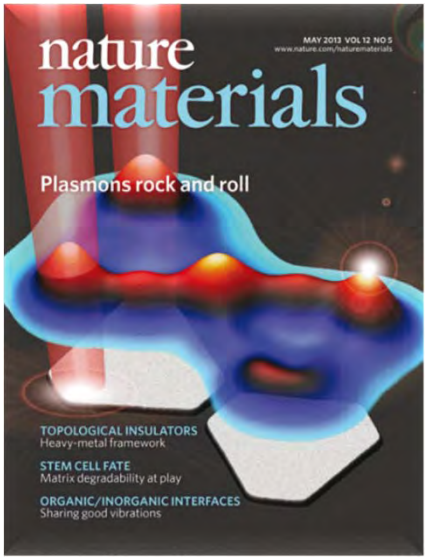




Scale bars: 200 nm

TPL experiments **TPL simulations**





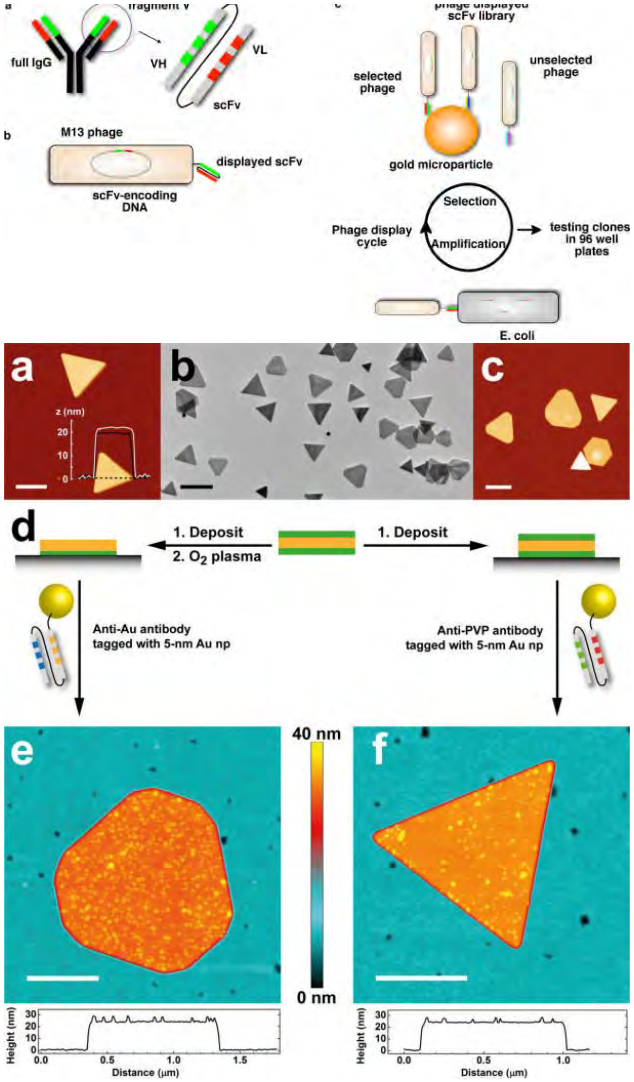
Nature Materials, **2013**, 12, 426-432 + Supp Info
Appl. Phys. Lett. **2013**, 103, 131112

Adv Mater **2005**, 17, 2553-59
Phys Rev Lett **2006**, 97, 100801
Phys Rev B **2010**, 81, 153412
Adv. Funct. Mater. **2011**, *21*, 851–859
ACS Nano **2012**, 6, 3434-40
J. Phys. Chem. C, **2013**, 117, 231262

Artificial proteins for Au morphosynthesis

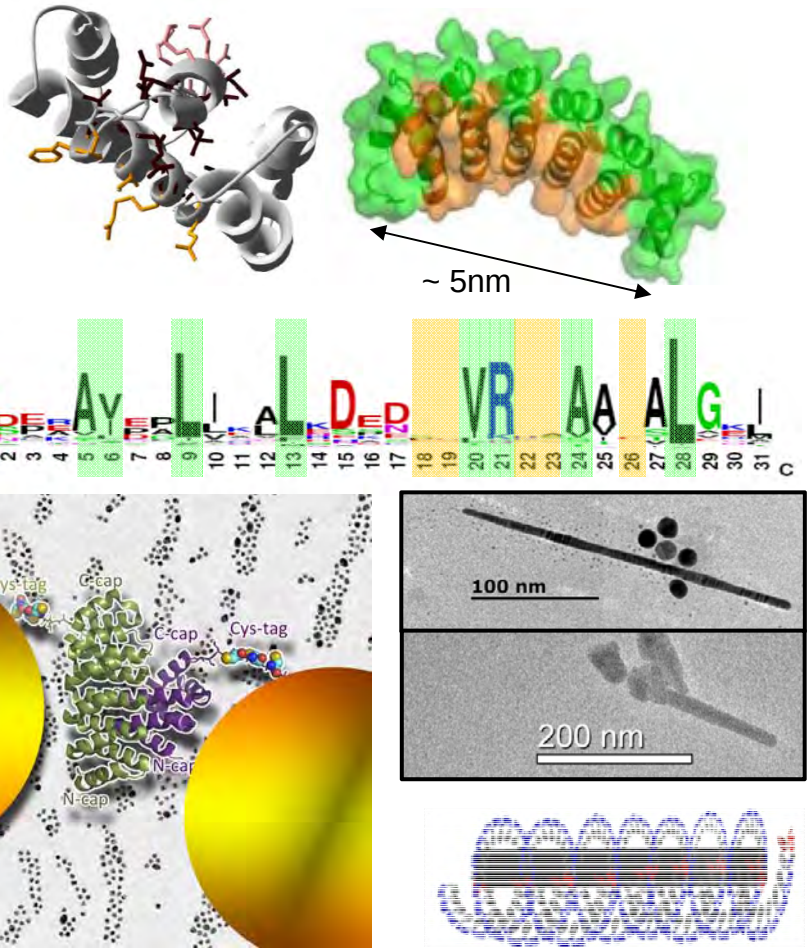
Engineering the metal NP shape and assembly

Anti-Gold Antibodies Engineering



P. Jarvi, E. Dujardin C. Nizak. Et al., *J. Phys Chem. C*, ***2014***, *118*, *14502*

Artificial protein design for plasmonics



K. Gurunatha, A. Urvoas, P. Minard, ED, ***2014****, in prep.*
K. Gurunatha, A. Fournier, A. Urvoas, P Minard, ED, ***2014****,* in prep.

CEMES

Technologies atomiques

Une vraie rupture dans les ICT du XXI^{ème} siècle

Comprendre et exploiter les comportements à l'échelle atomique

Technologies d'investigation et de parallélisation sont disponibles

Convergence interdisciplinaire de défis et de méthodes

Impact sociétal potentiellement important

Plateaux scientifiques
dont on doit se doter pour réussir

Centres de calcul massif et de compétence numérique

Centres de production de matériaux à haut potentiel (graphène, 2D)

Centre interdisciplinaire sur les phénomènes transductifs (Ex.: electron-photon) et dynamiques (fs, as)