

*nano* SCIENCES  
FONDATION



# 2009 Thesis Prize Award Ceremony

Amphi M001 - Phelma MINATEC  
3 Parvis Louis Néel - 38000 Grenoble

**Thursday, November 19<sup>th</sup> 2009**

**5.00 pm - 7.30 pm**



# 2009 Thesis Prize Award Ceremony

Talks given by 3 scientists of the Foundation, recently awarded by the European Research Council:

→ 5.00 : Molecular spintronics using single-molecule magnets,  
by Wolfgang WERNSDORFER  
*Senior "ERC Advanced Grant"*

→ 5.15 : Spintronics phenomena and their implementation  
in functional devices,  
by Bernard DIENY  
*Senior "ERC Advanced Grant"*

→ 5.30 : Nanowires for multiphysics devices and circuits,  
by Thomas ERNST  
*"ERC Starting Grant"*

Introduction of the 2009 laureate : François VARCHON  
by Laurence MAGAUD

→ 5.50 : Electronic and structural properties of graphene  
on silicon carbide  
by François VARCHON

*"2009 Nanosciences Foundation Thesis Prize"*

→ 6.10 : Cocktail

# Wolfgang WERNSDORFER

*Senior "ERC Advanced Grant"*

## **Molecular spintronics using single-molecule magnets**



**W**olfgang Wernsdorfer,

a CNRS researcher since 1996, is a leader in the field of magnetism at the nanometre scale, and in the nanosciences generally.

He developed the ultrasensitive micro-squid magnetometer that enabled the first measurement of the magnetization reversal of a single 1000 atom cobalt nanoparticle.

He is presently doing pioneering work in molecular spintronics and most recently his team has detected a quantum phase transition at low temperature in a single C<sub>60</sub> molecule.

Wolfgang Wernsdorfer has been awarded a grant in the European Research Council's "Ideas" programme, a recent initiative to fund the most creative, top level researchers.

His research program will target the single magnetic molecule as a component in the new field of molecular spintronics.

Bernard DIENY

*Senior "ERC Advanced Grant"*

**Spintronics phenomena  
and their implementation in functional devices**



**S**pin-electronics is a very rapidly expanding area of research and development which merges magnetism and electronics.

Since the discovery of Giant Magnetoresistance in 1988 (Nobel Prize 2007), several breakthroughs have further boosted this field.

Spinelectronics has found applications in hard disk drives (1998) and more recently in non-volatile standalone memories (Magnetic Random Access Memory).

Besides MRAMs, hybrid CMOS/magnetic technology can yield totally new architectures of electronic systems which would intimately mix logic and memory functions.

The possibility to generate steady magnetic excitations due to spin-polarized current in magnetoresistive devices is also stimulating a strong interest for frequency tunable RF oscillators used in wireless communication.

# Thomas ERNST

## *"ERC Starting Grant"*

### **Nanowires for multiphysics devices and circuits**



**T**homas ERNST received in 2000 his Ph.D. degree from the National Polytechnics Institute of Grenoble, France.

From 1997 to 2000, he developed advanced SOI CMOS electrical characterization, simulation and modeling methods at IMEP laboratory in collaboration with STMicroelectronics.

He then joined CEA-LETI to develop novel strained-channel CMOS architectures for 32 nm technology. In particular, he was leading strained SOI, strained Germanium, and SiGeOI CMOS integration at Leti. Since 2005, he is leading the 3D multi-channels and nanowire CMOS devices developments for CMOS, memories and sensors.

His expertise is in the area of novel fabrication technologies, analytical modelling for electrical characterization.

# What is the Nanosciences Foundation Thesis Prize?

The Thesis Prize of the Nanosciences Foundation was created in 2009. It aims to acknowledge the best PhD thesis realised in the Nanosciences field prepared within one of the Grenoble laboratories.

The Prize is worth 1500€ and will be awarded every year to one PhD student, based on the Excellence of his work, to be recognised by the Foundation's Steering Committee.

**To attend the 2009 Thesis Prize Award Ceremony, register online by Friday, November 13th 2009 on:**

**<http://ceremonie2009.eventbrite.com/>**

# François VARCHON

*Laureate of the “2009 Thesis Prize”*

**Electronic and structural properties of graphene on silicon carbide.**



**G**raphene is one of the rising materials in condensed matter physics because of its outstanding electronic and transport properties.

The thesis work is focused on epitaxial graphene where the annealing of a SiC surface leads to the formation of few graphitic layers.

Eventhough the system consists in several C layer on a SiC substrate, transport measurements evidence properties expected for an isolated graphene sheet.

The question then is how the conducting graphene layer can be decoupled from its neighbourhood (substrate and other C layers). To address this issue, atomic and electronic structures of graphene on both surfaces of SiC (Si- and C-face, respectively) have been studied by ab initio calculations and compared to Scanning Tunneling Microscopy images (STM).



The Nanosciences Foundation has been created to support the Research focused on "**Nanosciences at the frontiers of nanoelectronics**" which is performed within the associated network of laboratories called the 'RTRA' (Réseau Thématique de Recherche Avancée).

This network includes **32 laboratories** and about **900 scientists** across the research institutions based in Grenoble.

The Foundation's main goals are to foster a world-class Nanosciences Research in the network's laboratories by **supporting collaborative and multidisciplinary** projects of Excellence, to strengthen the connections between research and education, sustain a coordinated development of **shared-use technological facilities** and therefore, to extend the **international visibility** of Grenoble in Nanosciences."