

# CINTRA: A France-Singapore Research Alliance

By Prof Dominique Baillargeat, Director, and Dr Dinh Xuan Quyen, Deputy Director, CINTRA

CNRS-International-NTU-THALES-Research -Alliance (CINTRA) is a tripartite research alliance formed by the National Centre of Scientific Research (Centre National de la Recherche Scientifique or CNRS), the largest governmental research organisation in France together with Nanyang Technological University (NTU), Singapore's leading Science and Technology University and Thales, a global technology leader in the aerospace, space, defense, security and transportation.

## HOW WAS CINTRA FORMED?

In October 2009, the Memorandum Of Understanding for the establishment of CINTRA was signed in Paris (France), witnessed by France's Minister of Higher Education and Research, Mrs Valérie Pécresse and Singapore's Minister of Education and Second Minister of Defense, Dr Ng Eng Hen. The signatories to the agreement are the General Director of the CNRS, Mr Arnold Migus, the NTU President, Dr Su Guaning and the Chief Technical Officer at Thales, Dr Marko Erman.

Located at the NTU's Research Techno Plaza, the CINTRA Laboratory had its inauguration ceremony on December 2009. His Excellency Mr Olivier Caron, the Am-

**BOTTOM LEFT**  
Inauguration with HE Mr Olivier Caron

**BOTTOM RIGHT**  
Characterisation Lab

**RIGHT PAGE**  
NTU's Research Techno Plaza

As part of this alliance, Thales will develop new skills and new technologies.

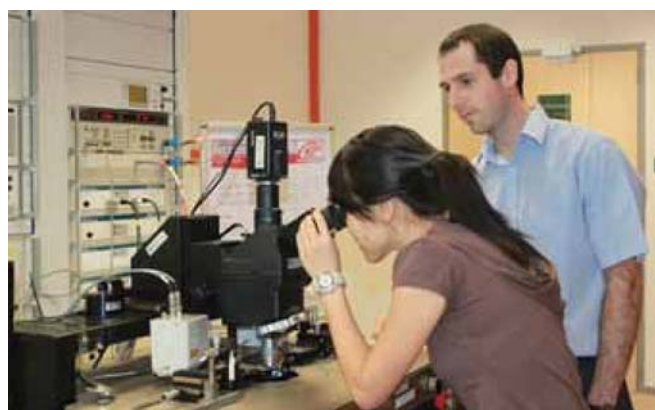
bassador of France to Singapore, was the Guest of Honour at the inauguration ceremony together with distinguished guests Dr Su Guaning, President of the NTU; Professor Bertil Andersson, Provost NTU; Mr Pierre Guillon, Director of the Institute for Engineering and Systems Science, CNRS; Mr Patrick Plante, Chief Executive Officer, Thales Technology Centre Singapore and faculty members of NTU.

The CINTRA Laboratory is managed by a Scientific Committee with representatives from the three partners. Prof Dominique Baillargeat of CNRS has been appointed as Director of the laboratory, with Professor Tjin Swee Chuan of NTU and Dr Dinh Xuan Quyen of Thales as Deputy Directors.

The lab's director, Prof Dominique Baillargeat, believes CINTRA to be a great

opportunity for researchers. "NTU sees CINTRA as an important research centre. They believe in it," he said. "It is a showcase for NTU and Singapore but it's also important for CNRS's international recognition as well as Thales' expertise development."

There are approximately 30 researchers currently based at CINTRA, not all full-time. That number could rise to 40 by September 2010 with the arrival of NTU and CNRS senior researchers and PhD and post-doctorate recruits. The research focuses on nanocomponents and new circuit architectures needed to overcome current limitations. One example of such application-driven challenges is the development of innovative technologies for co-integrating electronics and photonics on a single chip to take advantage of their combined capabilities for next-generation



computing, sensing, and communication applications.

### CINTRA OBJECTIVES

- To merge industrial and academic research expertise to study innovative solutions for critical photonics and electronics functions.
- To focus research on nanoscale and molecular scale photonic and electronic devices and architectures: next generation of advanced ICs.
- To develop innovative technologies for integrating electronics and photonics on a chip.

### RESEARCH ACTIVITIES

CINTRA will focus on the area of carbon based nanotechnologies, nanowire based nanotechnologies, 3D innovative materials and 3D integration. Research activities and substantial expertise in these areas exist within NTU's research laboratories and schools. CINTRA will provide a unique platform, where various disciplines such as modelling, design, fabrication and characterisation can network to explore new findings.

CINTRA has substantial expertises and strengths in the latest science and tech-

nology know-how to development innovations in nanotechnologies for future computing, sensing and communication applications. This tripartite collaboration will bring opportunities to deal with challenges faced by current technologies in both microelectronic and photonic industries. Such challenges will serve as a push factor to excel the boundary of today's technology to meet future commercial, defense and security needs.

Major facilities include a high frequency lab, two characterisation labs and a photonics lab (dark room facilities) housed inside the CINTRA laboratory. The Nanyang Nanofabrication Centre (N2FC) has two cleanrooms and one MOCVD room for nanofabrication facilities to provide support for nano-science and nanotechnology research.

### BENEFITS OF THIS COOPERATION

In October 2009, CNRS General Director Arnold Migus stated: "CNRS is very proud to contribute, through the creation of this joint laboratory with NTU and Thales, to the intensification of scientific relations between France and Singapore. This alliance brings together the prestigious NTU of Singapore, the major European multidisciplinary research organisation and a French

leading industrial group. This new Unité Mixte Internationale (joint international laboratory) is a structure of excellence which positions us at the cutting edge of Nanotechnologies. It will allow us to combine our respective strengths in scientific and technological research in this field."

NTU President, Dr Su Guanng commented: "The CINTRA laboratory will be an important conduit for the transfer of scientific and technological knowledge, breakthroughs and industrial innovations between Singapore and France. NTU is proud to be the university to represent Singapore in this partnership with CNRS and Thales. It is a testament to the University's global links, R&D capabilities and ability to innovate and develop technologies that make a difference to society."

Dr Marko Erman, SVP Research & Technology Thales declared: "Thales is proud to be part of this joint international research unit. As part of this alliance, Thales will develop new skills and new technologies to meet the most complex security requirements, especially the needs of future generations of electromagnetic sensors and processing functions, which will combine ultra-high performance with low power consumption." **F**

