

Seminar On

**2.5D Technology based on Vertically Aligned Carbon Nanotubes
for Millimeter Air-Filled Waveguide
Professor Dominique Baillargeat**

**Scientific Executive Director
CNRS@CREATE Ltd**

&

**Regional Director
CNRS Representative Office in ASEAN**

Date : 15 February 2024 (Thursday)
Time : 11:00 am – 12:00 nn
**Venue : Room 15-202, 15/F, State Key Laboratory of Terahertz and Millimeter Waves,
Lau Ming Wai Academic Building, City University of Hong Kong**

Abstract

An original 2.5 technology based on vertically aligned Carbon Nanotubes (VACNTs) to develop millimeter-waves Air-Filled WaveGuide (AFWG) structures is described in this talk. The design of AFWG is based on bundle of VACNTs acting as WG's metallic lateral walls. A CMOS compatible CNTs process is developed and optimized to fabricate the WG. Such AFWG are relevant for nanopackaging applications and systems 3D heterogeneous integration (for future interposers for instance).

Raman spectroscopy and molecular dynamics are applied to study the effects of the CNTs compression during the fabrication process. Examples of the realizations of millimeter AFWG are presented together with S-parameters measurements which validate the concept of VACNTs-based AFWG. In addition, the experimental attenuation constant is estimated at 0.5 dB/mm between 81-86 GHz.

Biography



Professor Dominique Baillargeat is IEEE Fellow. He is Professor at the University of Limoges (France), Classe Exceptionnelle. He was Chair of the RF Nanotechnology Technical Committee of IEEE Microwave Theory & Technique Society (2020-2022) and Chair of the Nanomaterials Technical Committee of IEEE Nanotechnology Council (2019-2021), and IEEE Nanotechnology Council Distinguished Lecturer (2018-2019).

Since September 2019, he is appointed as Scientific Executive Director of the CNRS@CREATE Ltd, in the framework of the Campus for Research And Technological Enterprise (CREATE) of the National Research Foundation (NRF) of

Singapore. CNRS@CREATE Ltd which is the first CNRS' overseas subsidiary, works with Singapore's universities, research institutions, and CREATE's international partners to conduct research and application of technologies in areas that are relevant to Singapore's social and economic needs. From September 2013 to August 2019, he was the Director of XLIM a joint research institute of 460 members of CNRS and University of Limoges, dedicated to High frequency electronic, photonic, mathematics and computer science. He was also the Director of the Lab of Excellence SIGMA_LIM, a 8 years project, on innovative materials, technologies and software architectures dedicated to the future smart and highly integrated communication systems.

From September 2009 to August 2013, he was the Director of the research laboratory CINTRA in Singapore, a joint lab. between the CNRS, NTU and Thales. The vision of this framework is to develop nanotechnologies for electronics.

Professor Baillargeat has done lot of research activities on the design of passive RF devices and on innovative packaging solutions for 3D heterogeneous integration. His research work is in the following areas: (1) EM modelling and design of RF components and modules, (2) 2D/3D additive manufacturing processes (3) nano-modelling and nano-characterization techniques for assisting the development of carbon-based devices (solutions for RF nanopackaging (interconnect), RF components, sensors, etc.).

He have been involved in many projects (past and present) either as XLIM scientific responsible or collaborator through fundings from the French Research Agency, European Community, ESA, CNES or with industrial partners (Thales, EADS etc..). He has been the advisor of 33 graduated PhD students. He co-authored more than 80 articles in international journals and books, and 200 communications in international conferences.

***** ALL ARE WELCOME *****

Enquiries:

Professor Chi Hou Chan, State Key Laboratory of Terahertz and Millimeter Waves
Tel.: (852) 3442 9360 Fax: (852) 3442 0353 Email: eechic@cityu.edu.hk