The CONNECT Consortium

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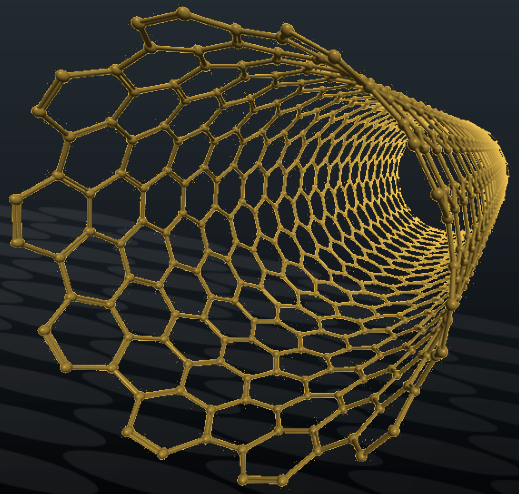
2. CEA, Grenoble, France
3. CNRS, Montpellier, France
4. IBM, Zurich, Switzerland
5. AIXTRON Cambridge, UK
6. GSS (now part of SYNOPSYS), UK
7. University of Glasgow, UK

Key Contacts



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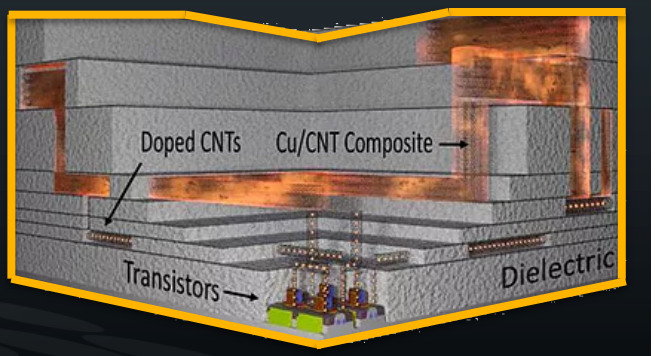
Wiki: https://en.wikipedia.org/wiki/Carbon_nanotubes_in_interconnects



Key Data

Project Start: 1st January 2016

Funding Period: 3 Years

EC Funding: €4 Million

CarbON Nanotube compositE InterconneCTs

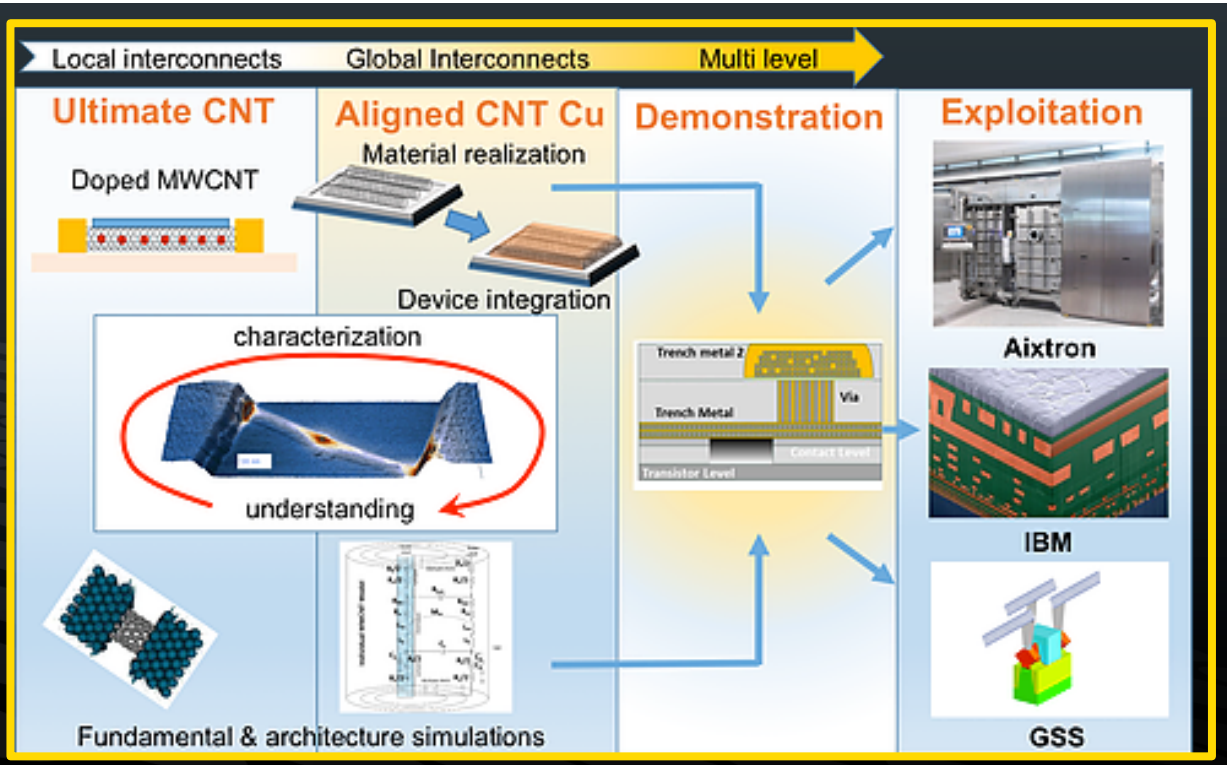
European Union Horizon 2020 Research and Innovation Program – Grant Agreement No. 688612

CONNECT

" The main objective of CONNECT is to develop interconnect technology enabling future CMOS scaling as well as highly integrated alternative computing architectures for energy efficiency. "

European Commission

HORIZON 2020



The Electronics Value-Chain

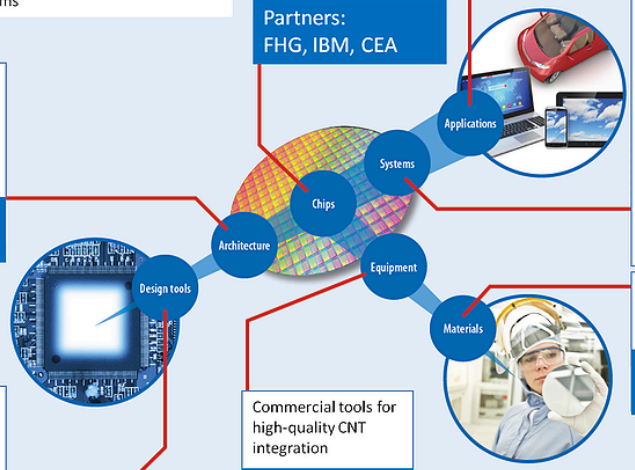
The Impact and the members of the CONNECT project overlaid onto the chart of the "European Industrial Strategic Roadmap for Micro- and Nano-Electronic Components and Systems"

• Demo: Integration in interconnect stack
• Prototyping and in-line inspection tools available.

Partners:
FHG, IBM, CEA

Tools and models for designing high-performance circuits and architecture for high power and 3D integration available.

Partners:
CNRS, IBM



Applications / Systems enabled by CONNECT:

• Scaled CMOS for high performance / low power computing

• Highly integrated alternative computing hardware (neuromorphic)

• High power electronics (automotive)

• Integrated sensor and logic devices in distributed devices (IoT, etc.)

High-quality CNT synthesis, doping and metallization

Partners:
AIX, CEA

Commercial software to simulate devices integrated using CNT interconnects

Partners:
GSS, UG

Commercial tools for high-quality CNT integration

Partner:
AIX

Our Targets in a Nutshell

(1) Demonstrate cutting-edge electrical resistivity on CNT lines with diameter below 10nm made of individual doped MWCNT.

(2) Develop process growth and impregnation methods for aligned CNT-Cu composite material that achieve trendsetting current carrying capability for solving electromigration issues with Cu interconnects.

(3) Demonstrate the electrical, thermal and electromigration properties of the CNT and aligned CNT-Cu composite interconnects on dedicated test structures. Integrate the aligned CNT-Cu composite with compatible CMOS back-end-of-line process and demonstrate on a two levels interconnect (via + lines) functional device with improved electromigration.

(4) Push advanced characterization methods to be able to relate dopant and morphology of single CNTs to their electronic and thermal transport behavior.

(5) Develop physical-driven models for CNTs and Cu-CNT composite materials to study their electrical, thermal properties for doped individual and bundle lines. The goal is to explore design methods for energy efficiency at circuit and architectural-level with novel CNT interconnects architectures featuring energies of few pJ per bit.

(6) Exploit the participation of academic partners from differing scientific backgrounds to employ, educate and train young and aspiring people to advanced technologies ranging from sophisticated numerical tools to scaled CMOS with CNT-based interconnect integration.

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http://www.connect-h2020.eu/