Wrap-up report for session 1 Nanoelectronics for the next decade (1)

- Trends:
  - Power, rather than scaling, will be *the* issue in nanoelectronics
  - New device technologies, replacing CMOS, will be needed ~2015
  - New functional devices should be capable of heterogeneous integration with CMOS
- Goals for 2020:
  - Fabrication: Achieve 3D near-atomic level control
  - Devices: Discover new memory/logic devices, operating with greatly reduced energy dissipation
  - Architectures: More focus on emerging, non-IT applications, e.g. healthcare, mobility, energy management. All of these will require sensor networks
- International perspective:
  - EU: Emphasis on More-than-Moore & basic research
  - South-east Asia: MtM, but also novel state variables, quantum computing, molecular electronics
- Impact on society:
  - Nanoelectronics plays a major role in addressing most of society's major needs
  - Nanoelectronics takes over role of microelectronics as *the* global economic driver

NANO-TEC

Rapporteur: Mart Graef, Delft University of Technology

Wrap-up report for session 1 Nanoelectronics for the next decade (2)

- Discussion
  - What will be the next paradigm?
    - There is not a lack of ideas (spin-torque based structures, carbon-based devices, quantum effects, out-of-equilibrium principles), but heterogeneous integration capability will determine success.
    Major directions:
      - Device nanoscale functionality
      - New architectures, alternative ways to do computation
      - Software & architecture will be increasingly important
      - Merge of memory & logic
  - How are equipment companies involved?
    – As yet insufficiently, although materials-related questions (e.g. graphene, nanowires) provide a link.
  - Is there a perspective for US/European cooperation on R&D?
  - Why are quantum information systems high on the agenda of India and Western Pacific Rim?
    - Due to limited development in conventional areas, these countries want to do soemthing new.