

Nanotechnologies for Future Mobile Devices

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Learn how nanotechnologies, mobile communication, and the Internet are related to each other, and explore the potential for nanotechnologies to transform future mobile and Internet communications and the value networks of future electronics manufacturing. Based on a research collaboration between Nokia, Helsinki University of Technology, and the University of Cambridge, here leading researchers and business analysts review the current state-of-the-art and future prospects for:

- Structural materials in mobile devices, including novel multifunctional materials, dirt-repellent, self-healing surface materials, and lightweight structural materials capable of adapting their shape.
- Portable energy storage using supercapacitor-battery hybrids based on new materials including carbon nanohorns and porous electrodes, fuel cell technologies, energy harvesting and more efficient solar cells.
- Electronics and computing advances reaching beyond IC scaling limits, new computing approaches and architectures, embedded intelligence, and future memory technologies.
- Nanoscale transducers for mechanical, optical, and chemical sensing, nature's way of sensing and actuation, biomimetics in sensor signal processing, and nanoscale actuation.
- Nanoelectronics, for example based on graphene, to create ultrafast and adaptive electronics for future radio technologies, such as cognitive radio.
- Flat panel displays – how nanotechnologies can be used to achieve greater robustness, improved resolution, brightness and contrast, as well as mechanical flexibility.
- Open innovation in nanotechnology development, future manufacturing, and value networks.
- Commercialization of nanotechnologies.

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Olli Ikkala is Academy Professor of the Academy of Finland and Professor of Polymer Physics and Molecular Nanostructures at the Helsinki University of Technology. His current research interest is in developing concepts for functional nanomaterials based on macromolecules, synthetic polymers, and biomacromolecules.

Asta Kärkkäinen is Principal Scientist at Nokia Research Center, Helsinki, where she has worked since 1997. As a Research Manager of the Predictive Engineering Group, she has coordinated research on multidisciplinary design to enable optimal structural, thermal, acoustical, and chemical performance of future Nokia devices.