

## Third Laureate Fundamental Research



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**Project title:** Functionalizing carbon nanotubes, graphene, semiconductor nanowires and related nanostructures for next-generation energy, optoelectronic and sensing applications

**Abstract:** My group has built a strong program in synthesizing low-dimensional (LD) nanomaterials by both chemical and physical vapor depositions, in particular, those involving plasma or highly energized processes. A solid foundation in research and development of novel nano-systems for next-generation optoelectronic and energy applications has been established. Our core competence in LD nanomaterials includes carbon nanotubes (CNTs), graphene, GaN nanowires, Si nanotips (SiNTs) arrays, and related advanced nano-composites, wherein nanoparticles are incorporated in the LD nanomaterials. For these seemingly diversified materials and application areas, we focus mainly on the following key common objectives: (1) Studying the energetic and formation kinetics of these nanostructures and their composites; (2) Functionalizing the surface of C, GaN, Si, and related nanostructures as well as tailoring their interface properties; (3) Analyzing the interface/surface structure and physical/chemical property in nanoscale; and (4) Designing “smart” micro-devices with specific attributes such as size- and surface/interface-controlled properties. In addition, on-chip approaches to integrate all these nanostructures into functional micro-devices for potential energy, optoelectronic and bio-/molecule-sensing applications have been demonstrated.

**Biography:** Prof. Li-Chyong Chen is a Distinguished Research Fellow in the Center for Condensed Matter Sciences (CCMS) at National Taiwan University (NTU). She received her Ph.D. in Applied Physics from Harvard University, USA (1989), and an honorary doctoral degree from Linköping University, Sweden (2007). Prof. Chen has worked at General Electric Corporate Research and Development, Schenectady, NY, USA (1989-1994) as a technical staff member. She then returned to Taiwan in 1994 assuming a faculty position at NTU. Prof. Chen owns 8 patents and has written 6 book chapters and published over 208 papers (with H-index=29 and total citations=3,319) in internationally referred journals, including Nature Material and Nature Nanotechnology. Her work on nanopeapod published in Nature Material 2006 has been selected as a Fast Breaking Paper and a few other papers have also been listed as highly-cited papers by ISI. Prof. Chen has organized quite a number of professional meetings and served on the Editorial Advisory Board of a few journals, including the Critical Reviews in Solid State and Materials Sciences, Taylor and Francis since 2004. She was also an Associate Editor of the Journal of Vacuum Science and Technology B-Microelectronics and Nanostructures (2004-2006).