

## About Vanguard

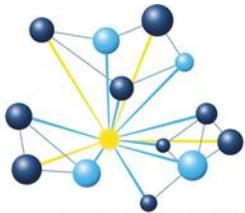
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The demo-case on Nanowires is part of the New Nano-Enabled Products pilot of the Vanguard Initiative

The Vanguard Initiative is an association of 30 EU-regions stimulating Industrial Modernisation through a more effective deployment of new technologies. More in particular, the Initiative aims at providing industrial companies easier access to (networked) facilities for demonstration, to lower technology uncertainty and speed up market uptake of new technologies, more advanced industrial production and new value chain.

### Read more at the Vanguard Website:

<http://www.s3vanguardinitiative.eu/cooperations/vanguard-initiative-pilot-project-new-nano-enabled-products>



**VANGUARD INITIATIVE**  
New growth through smart specialisation

## Contact

### Michael Salter

Project Manager at RISE Acreo  
[michael.salter@ri.se](mailto:michael.salter@ri.se)

### Ana Paula do Nascimento

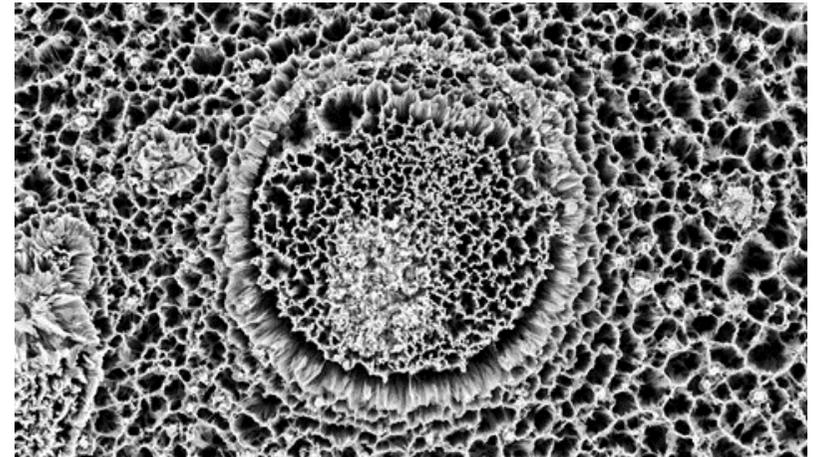
Senior EU Policy Coordinator,  
Regional Government of Skåne, Sweden  
[ana.nascimento@skane.eu](mailto:ana.nascimento@skane.eu)



# Nanowires

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A demonstration case  
within the Vanguard Initiative on  
New Nano-enabled Products Pilot



## Scope & Organisation

The Nanowires demonstration case aims to identify opportunities to commercialise the nanowire technology.

Nanowires can be made from semiconducting and metallic materials and are currently being commercialized in several industry sectors. In each sector, specific nanowire properties are leveraged to provide application benefits that are difficult to attain with conventional materials. In sensors, their large surface-to-volume ratio provides excellent sensitivity, in solar cells nanowires act as optical antennas enhancing the absorption efficiency, in LEDs the nanowire geometry allows for more efficient light generation and in power electronics nanowires enable high quality substrates, to name a few examples.

There are many opportunities, but nanowire technology also has both business and technology challenges that need to be overcome. Reliable high yield production of nanowires on application-compatible substrates in different materials, as well as integration of nanowires components to existing systems and injection into existing value chains are key aspects that still need to be addressed.

## Fields of interest

The following application areas are clear and centrally applicable markets of interest:

### Photovoltaics.

Nanowires with carefully designed geometry have been shown to act as optical antennas, enabling an increase of the solar cell efficiency while reducing the amount of material. New production technologies enable nanowires for photovoltaics to be mass produced in a cost-effective manner.

### Power and RF electronics.

Nanowire-based technology promises to reshape part of the power electronics market by enabling cost effective high-quality substrates. This is enabled by the potential of nanowires to provide dislocation-free substrates enabling vertical power devices in GaN.

### Lighting

Nanowires offers new ways to improve the efficiency and tunability of light emitting diodes (LEDs) previously inaccessible in conventional LED production technology. For example, new crystal directions and material compositions enabled by nanowire technology promises to solve the “green gap”, the inability to produce high efficiency green LEDs, by using the unique properties of nanowires.

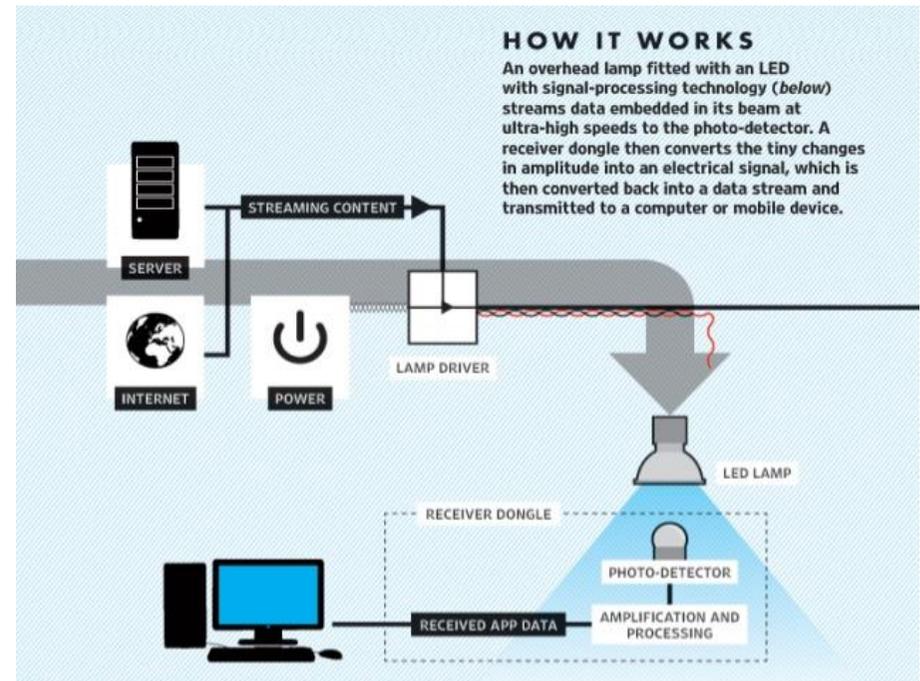


Figure: GaN/InGaN high speed LEDs for optical data transmission (LiFi) Source: RI.SE

## Proposed action for the platform

A cross-regional platform on nanowires will require active participation and validation from RTOs and industrial players in order to accelerate the commercialisation of nanowires. The objective is to showcase the potential of companies working with nanowire-focused products, and to facilitate engagement of international partners in joint efforts, creating new inter-regional value chains spanning throughout Europe.