

## **Catalyzing Innovation and Development through Targeted Capacity Building in Renewable Energies and Sustainable Food**

**Name:**

Federico Rosei and Louis Vervoort

**Affiliation:**

Institut National de la Recherche Scientifique (INRS)

**Brief Bio**

*Session Leader(s)*

**Dr. Rosei** is a Professor at INRS and holds the UNESCO Chair in Materials and Technologies for Energy Conversion, Saving and Storage, since 2014. He is a physicist with wide-ranging interests that bridge from fundamental studies of surfaces and interfaces to materials for third generation solar cells. He has published over 200 papers in refereed journals and delivered more than 210 invited talks at international conferences. Since 2011, he has been the Director of the Centre for Energy, Materials and Telecommunications of INRS.

**Louis Vervoort:** Originally a polytechnical engineer from the University of Ghent in Belgium, I did a PhD in physics at the University of Marseille, France, and a post-doc at the École Normale Supérieure in Paris. My original field of research is condensed matter physics (in particular semiconductor nanostructures). My PhD was devoted to the question: How can we make silicon optically active, i.e. photo luminescent ? During my post-doc at the ENS I worked on the theory of new quantum properties of multi-quantum-wells; experiences which I put to use in my present-day research. After having worked a few years as a project manager and consultant in innovation, mainly in the semiconductor industry, I was appointed Coordinator of the UNESCO Chair MATECSS (Materials and Technologies for Energy Conversion, Saving and Storage), hosted at INRS, Montreal, Canada, in spring 2015. My main motivations to join this unique adventure are twofold. First, it allows me to be at the heart of what disruptive innovation in renewable energies and new materials may be in the near future. Second, it allows me to actively contribute to an endeavor that has a real sense. I believe that the global climate change is maybe the essential challenge of our time; and research in materials and technologies for green energy will significantly contribute to tackling this challenge.

**Abstract**

*Short description, including alignment with conference themes and objectives*

Sustainable energy and sustainable food technologies rely heavily on the use of advanced materials and modern engineering approaches. These promising new technologies cannot be deployed in a developing country without ensuring that there is a sufficient “capacity,” i.e. enough engineers and scientists to ensure that technical know-how can be effectively implemented.

A promising approach to build capacity is through targeted programs that promote North-South and South-South exchanges and knowledge sharing at the University level. These programs can produce a small number (per unit time) of highly educated individuals (undergraduate and graduate students, professors) with advanced skills in science and engineering. Even few individuals with high-level training can catalyze change in their entourage by teaching, transferring their knowledge and implementing seed technologies that can be used to start local companies.

## Catalyzing Innovation and Development through Targeted Capacity Building in Renewable Energies and Sustainable Food

### Abstract (Cont.)

The aim of this session is to identify critical factors and best practices for maximizing the impact of this targeted approach towards technical capacity building in low and medium income countries (LMICs).

How can we identify relevant problems and challenges specifically related to energy and food in LMICs and consequently design suitable solutions for developing regions? How can a relatively small number of scientists and engineers trained in materials science, physics and chemistry have the highest impact?

### Description

*Proposed discussion focus*

Our leading question is: How can capacity building of young scientists from developing countries in renewable energy and sustainable food be leveraged to accelerate the deployment of technologies within these countries? A second, related question is: what are particularly promising and urgent fields of R&D to have impact within these countries?

As an example, targeted programs exist, like the one run through the UNESCO Chair in Materials and Technologies for Energy Conversion, Saving and Storage (MATECSS, start date: January 1st 2014), aiming to infuse targeted LMICs with small numbers of highly qualified personnel. MATECSS aims at hiring a minimum of 24 PhD students over its first four year term and to train them; and at fostering academic exchanges between participating institutions.

As an example, targeted programs exist, like the one run through the UNESCO Chair in Materials and Technologies for Energy Conversion, Saving and Storage (MATECSS, start date: January 1st 2014), aiming to infuse targeted LMICs with small numbers of highly qualified personnel. MATECSS aims at hiring a minimum of 24 PhD students over its first four year term and to train them; and at fostering academic exchanges between participating institutions.

The aim of this session is to discuss how highly trained individuals can be effectively used to expedite and support the development and deployment of essential technologies, with a specific focus on energy and food technologies. The discussion will also include ethical issues related to technological development. Other examples of problems to be addressed: is it feasible to identify particularly urgent and particularly high-impact R&D themes related to energy and food? How to retain within the LMICs highly trained individuals that may not be supported by a viable technology sector within these countries?

### Objectives

*Justification and expected impact during and after the conference*

The objective is to distill, through presentations and panel discussions, new insights and new answers to essential questions – insights and answers that should be endorsed by as many participants as possible. These questions are related to topics as:

- Priority themes and methods for science & technology managers in academia and industry
- Best practices for capacity building (always related to R&D in sustainable energy & food technologies for LMICs)

## **[SE12-ENE]**

# **Catalyzing Innovation and Development through Targeted Capacity Building in Renewable Energies and Sustainable Food**

### **Objectives (Cont.)**

- The relative benefits of targeting different parts of the value chain (capacity building in Professors versus capacity building in students)
- Mechanisms for promoting the retention of highly qualified personnel in LMICs.
- Strategies for capitalizing on a targeted infusion of highly trained individuals to catalyze the growth of the energy technology sector
- Promoting women in science and engineering in LMICs
- Evaluating the impact of new energy and food technologies in relation to education in LMICs
- Ethical issues related to technology development and deployment in developing regions

### **Target Audience**

The target audience is fairly large, and while it comprises in the first place people from academia, it is expected that also stakeholders from industry and government will be interested in our discussion themes. Thus our targeted public consists of graduate students and established researchers and teachers in science, engineering and social sciences; and potentially of decision makers in industry and government.