

## Second Laureate Fundamental Research

**Project Title:** Multiferroic materials for solar energy harvesting

**Researcher:** Prof. Federico ROSEI

**Country:** Italy

**Field:** Nanotechnology

**Scientific Affiliation:** Centre for Energy, Materials and Telecommunications,  
INRS



### Abstract:

The bottom-up approach is considered a potential alternative for low cost manufacturing of nanostructured materials. It is based on the concept of self-organization of nanostructures on a substrate, and is emerging as an alternative paradigm for traditional top down fabrication used in the semiconductor industry. We demonstrate various strategies to control nanostructure assembly at the nanoscale, focusing on multifunctional materials, i.e. materials that exhibit two or more functionalities. In particular, we investigate the properties of multiferroic materials, namely systems that exhibit two ferroic properties, in this specific case ferroelectricity and magnetism. In this context, we demonstrate the use of multiferroic thin films for solar energy conversion and solar water splitting both for niche applications (e.g. self-powered sensors) and for integration with mature photovoltaic technologies like silicon.

### Biography:

Federico Rosei is Professor and Director of Institut National de la Recherche Scientifique, Énergie, Matériaux et Télécommunications, Varennes (QC) Canada. Since January 2014 he holds the UNESCO Chair in Materials and Technologies for Energy Conversion, Saving and Storage. He received MSc and PhD degrees from the University of Rome “La Sapienza” in 1996 and 2001.

He is Member of the European Academy of Sciences, Fellow of the Royal Society of Canada, of the American Physical Society, of the American Association for the Advancement of Science, of SPIE, of the Royal Society of Chemistry and of the Engineering Institute of Canada among others.

He has received several awards, including a Friedrich Wilhelm Bessel Award (Alexander von Humboldt Foundation), the Rutherford Medal in Chemistry (Royal Society of Canada), the Herzberg Medal (Canadian Association of Physics), the NSERC EWR Steacie Memorial Fellowship and the José Vasconcelos Award for Education (World Cultural Council).

