

## Science and Technology Prize

### Arthur J.Nozik

U.S. Department of Energy's National  
Renewable Energy Laboratory – USA

***“High Efficiency and Low Cost Solar Cells for Solar Electricity and Solar Fuels Production Based on Multiple Exciton Generation in Semiconductor Quantum Dots”***

Arthur J.Nozik is working at the U.S. Department of Energy's National Renewable Laboratory (NREL) of Golden (CO). He has developed fundamental researches aimed to improve the use of solar power in photovoltaic processes, by taking advantage of the potential utilization of the unique property of semiconductor Quantum Dot nanostructures to control the relaxation of photo-generated carriers. The approach is based on the production of enhanced photocurrent through electron-hole pair multiplication. The result has been achieved through a deep and detailed analysis of the dynamics of photoelectron and hole relaxation, of charge transfer and interfacial charge transfer processes. Such fundamental dynamics have been investigated in various bulk and nanoscale semiconductors by means of sophisticated transient spectroscopic techniques, with femtosecond to nanosecond resolution.

The obtained results open the door to the potential exploitation of multiple excitation generation for significantly enhance the conversion efficiency of solar cell.