

**Date and Time**: Wednesday, August 14th, 2019 (6:30PM)

**Location** : Skyworks (Conference Room), 649 Lawrence Drive,  
Newbury Park, CA 91320

**Agenda**: 6:30PM Reception & Networking;  
7PM Presentation

**The science behind NASA Radioisotope Thermoelectric Generators (RTGs)**

*Presenter* : Dr. Giacomo Cerretti

**NPP fellow (NASA Postdoctoral Program)**

**NASA/Caltech/JPL**

**Abstract:** Available and direct usable power is a fundamental requisite for spacecraft and planetary probes. Many NASA missions intend to investigate some of the harshest, darkest, and coldest locations of our solar system and beyond, and in such conditions the only reliable technology to power the mission is represented by RTGs. They provide electrical power through the direct conversion into electricity of the heat generated by the decay of a radioactive material. The absolute lack of moving parts and the already proven reliability (e.g. the space missions Voyager I and II are powered by RTGs that are still providing power after more than 40 years) make RTGs a very trustful technology. In this talk, Dr. Giacomo Cerretti will give an overview on the history of the radioisotope power systems in NASA missions, also analyzing the main components and the architecture of the RTGs. Since the development and engineering of more performing materials is a fundamental step to achieve high conversion efficiencies, he will focus on the theory of thermoelectricity and on the optimization strategies used to maximize the performances of SoA thermoelectric materials for aerospace applications.

**Author's bio:** Dr. Giacomo Cerretti is currently an NPP fellow (NASA Postdoctoral Program) working at the NASA Jet Propulsion Laboratory (JPL) in Pasadena, California. After receiving his BSc and MSc in mechanical engineering, he worked for two years at the European Laboratory for Non-linear Spectroscopy (LENS) in Florence (Italy) on the development of photosensitive liquid crystalline elastomers (LCEs) for nano-robotics applications. After that, he moved to Mainz (Germany) where he obtained a PhD in inorganic chemistry with a dissertation on metal oxides and ceramic materials for high temperature thermoelectrics. His current research at JPL focuses on the development of new and more performing thermoelectric materials to be used in the radioisotope thermoelectric generators (RTGs) for powering future deep space NASA missions.

