

## **Probing nanostructures in action: how do they transform during reactions?**

Fabiano Bernardi

*Physics of Nanostructures Lab, Institute of Physics, UFRGS, Brazil*

The energy crisis and climate change are major issues affecting our lives nowadays. Despite the wide number of proposals to reach a sustainable world, we are still far away from the desired solution. This is partially because most of the complex atomic events occurring in real applications are unknown and this fundamental knowledge is crucial for designing new smart nanostructures for these applications. The elucidation of these atomic events is only possible with the use of state-of-the-art techniques combined with theoretical calculations. The deeper understanding on the physical and chemical processes behind a catalytic reaction is certainly the best way for us to be prepared for any challenge facing us. In this talk, recent advances about this topic developed in our group will be discussed focusing on catalytic reactions related to the global warming issue, hydrogen storage, and artificial photosynthesis reaction.