

**Institute of Energy Technology – Professorship of Renewable Energy Carriers*****Invitation to a Seminar***

**Date:** Thursday, December 20, 2012  
**Time:** 16:00-17:00  
**Place:** Maschinenlaboratorium ETH Zürich, ML-J25/26

**Speaker:** **Prof. Goran Jovanovic**  
School of Chemical Biological and Environmental Engineering  
Oregon State University

**Title:** **Sweet Spot of Microtechnology**

**Abstract** – Since the advent of microtechnology, scientist and engineers have been making brave advances in all areas of chemical reaction engineering. Heterogeneous catalytic processes occupy the most prominent place in this effort. Development is undoubtedly fueled by the most fundamental advantages of microreactors: extremely high surface-to-volume ratio, and exceptionally high and controllable heat and mass transfer. In addition, microstructures and microdevices create new opportunities to employ non-conventional fields and forces when enhancing (bio)chemical process rates. Thus, microreactors create an extraordinary opportunity for novel deployment of catalysts and improvement of catalytic processes.

In this presentation we will introduce an innovative approach in the design of microchannel based catalytic reactors. This approach will reflect principal advantages of microtechnology, as they pertain to the development of microscale chemical reactor architecture. The integration of catalysts into these microdevices has dramatically departed from existing paradigms in conventional chemical reactors. Furthermore, in line with the development of newly designed features of chemical microreactors, and using fundamental principles, we will propose criteria and reasons why catalyst design in microreactor applications has to take a different approach. At the end, we will discuss new developments that illustrate applications of catalytic microreactor processes in energy, environmental and bioengineering fields. Some of these processes are currently under development, while others are awaiting creative solutions that will fulfill the microtechnology promise for enhanced performance of (bio)chemical processes.

**Biosketch** – Dr. Jovanovic is Full Professor at the School of Chemical, Biological and Environmental Engineering of Oregon State University (OSU), and Associate-Director of Micro-products Breakthrough Institute (MBI). His research interest is focused in several areas of microtechnology. His interest in microscale technologies started in mid 1980s when, as part of a research team at Belgrade University, he developed the first semi-artificial pancreas based on microscale cell immobilization and encapsulation. Currently, Prof. Jovanovic is developing a new class of high volume processing microreactors and microfluidics-based devices for production of biofuels, desulphurization of fossil fuels, water desalination, separation processes, and biomedical devices. He serves as Chief Technology Officer in MTEK Energy Inc. In addition to being a Fulbright Scholar, Prof. Jovanovic is the recipient of the Alumni Distinguished Professor Award (OSU 2012); Life Long Achievement Award, (NM State University 2008); OSU Alumni Award (OSU2006); OSU College of Engineering Research Award (OSU 2005); Elizabeth Ritchie OSU Distinguished Professor Award (OSU 2001); Outstanding Faculty Advisor Award (WERC Consortium & Los Alamos National Laboratory 1999), Austin Paul Engineering Faculty Award (OSU 1997).

