# Spectroscopy Society of Pittsburgh

**FEBRUARY MEETING**

Wednesday – February 20, 2008

Duquesne University
Mellon Hall of Science
(Laura Falk Hall)

**TECHNOLOGY FORUM - 5:30 PM**
Dr. Jorge Genovese, Research Professor in the Department of Surgery
University of Pittsburgh Medical Center

**"Healing Broken Hearts with Our Cells"**

The recent progress in cellular and molecular biology allows the development of new therapies for many serious diseases including heart failure and the conditions that originate it. One of the most innovative therapies consists in the transplantation of stem cells into the myocardium for heart muscle regeneration. Adult myocardium cannot effectively repair itself after infarction due to the limited number of stem cells. Thus, most of the injury is irreversible.

The goal of cell transplantation is to grow new muscle fibers (myogenesis) and/or to develop new blood vessels (angiogenesis) in the damaged myocardium. This may potentially contribute to improve ventricular function and to reverse the process that concludes in a condition that many times could be resolved by a heart transplant only.

Adult cultured autologous stem cells do not raise immunological, ethical, tumorogenesis or donor availability problems. The development of this therapeutic tool could change dramatically the evolution of many diseases and our mode of treatment. The use of stem cells represents a new paradigm of "cure by replacement": an etiological treatment, a real cure.

Tissue engineering by the combination of stem cells with different scaffolds may contribute to improving the efficiency of cellular therapy for organ regeneration opening the amazing possibility to generate "bio-artificial organs".

In this presentation an overview of the state of the art in stem cell research and clinical application will be done emphasizing the stem cell usefulness in cardiology.

**Bio**

Dr. Jorge Genovese received his M.D. in 1980 summa cum laude from the School of Medicine of Buenos Aires University, where he obtained his Ph.D. in 1987 after completing a thesis on TGF-Beta, which received an "outstanding" grade. Dr. Genovese has been Fellow of the Argentinean National Council of Scientific and Technological Investigations and of Buenos Aires University. He has also been an Assistant Researcher at the Veteran's Administration in his capacity of external fellow of Buenos Aires University, at the St. Louis University where was designated Faculty member of the Internal Medicine Dept. Dr. Genovese completed his second postdoctoral training at Rorer Biotechnology in Philadelphia under Prof. Joseph Schlessinger direction.

Dr. Genovese has been Vice President of the Tissue Engineering Society International and he is the Honorary President of the Tissue Engineering Committee at the National Academy of Medicine and Science of China.

During last years, Dr. Genovese's was devoted to different fields of tissue engineering: keratinocytes culture and different application ways, corneal epithelium and chondrocytes cultures and dermoepidermic devices generation. He has also cultured non-arrhytmogenic skeletal myoblasts successfully used for cell

therapy in humans. Dr. Genovese's research focuses on basic aspects of adult stem-cells differentiation and cell therapies in cardiology and he is the Director of the Cardiac and Molecular Biology laboratory at the Heart, Lung and Esophageal Surgery Institute (UPMC).

**TECHNICAL PROGRAM - 8:15PM**
Dr. Jurgen Popp,
University of Jena

**"Raman Spectroscopy - A Key Technology in Biophotonics Research"**

Raman spectroscopy has emerged in the last years as an extremely powerful method in almost all natural science disciplines. This renaissance of Raman spectroscopy was mainly triggered by the latest achievements in laser technology, by the design of very efficient filter to suppress the elastically scattered Rayleigh light, and by the development of extremely sensitive detectors. The advantages of Raman spectroscopy are its unprecedented high specificity and its versatility. Raman spectroscopy is a non destructive technique and does in general, require only minimal or no sample preparation. Solid, liquid, and gaseous samples can be measured as well as transparent or non transparent samples or samples with different surface textures i.e. Raman spectroscopy can be applied to any optical accessible sample, where a pre-treatment of the sample is not necessary.

In this presentation a report on a Raman spectroscopic characterization of a broad variety of biological probes will be given. Raman spectroscopy is an extremely capable, suitable and prominent method for probing the relationship between structure, dynamics and function of biomolecules. In this context micro-Raman imaging, the surface enhanced Raman scattering (SERS) technique and resonance Raman spectroscopy are commonly applied. These Raman techniques allow one to characterize the structure of e.g. isolated pharmacological relevant substances and the investigation of biological tissues i.e. monitoring of low concentrated active components in plants and especially the localization of pharmaceutical relevant substances in tissues. Not only the localisation but also the investigation of the mode of action of drugs against infectious diseases on a molecular level will be presented. In addition Raman spectroscopy also allows the identification of microorganisms on a single cell level.

The main focus within the second major topic material photonics is concerned with the derivation of structure-property as well as structure dynamics relationships by means of Raman spectroscopy. In particular the characterization of mineralogical samples like e.g. extraterrestrial material (meteroites) and the derivation of structure-activity and dynamic relationships in artificial light harvesting systems or photocatalysts based on Ruthenium-polypyridyl complexes by means of resonance Raman spectroscopy will be presented.

In summary the presented examples convincingly demonstrate the great capabilities of Raman spectroscopy for life and material sciences making this technique to one of the most essential laser spectroscopical methods.
Abstract

**Bio**

Jürgen Popp, born in 1966, received his Ph.D. in chemistry from the University of Wüzburg in 1995. In 1996 he spent a year in the Department of Applied Physics of Yale University, USA. He subsequently joined the group of Prof. Dr. Dr. h.c. W. Kiefer, University of Wüzburg, where he finished his "Habilitation" in 2000. Since May 2002 he is a full professor at the Friedrich-Schiller University of Jena, Germany where he holds a chair of physical chemistry. In May 2005 he was also appointed head of Micro System Division of the Institute for Physical High Technology, Jena (since March 2007 Institute of Photonic Technology, Jena) and in June 2006 he became the scientific director of this institute. His work has been awarded by the faculty prize of chemistry (1995), by the "Bayerischer Habilitationsföderpreis" (1997), by the "Förderpreis der Würzburger Korporationen" (2001), and the Kirchhoff-Bunsen award (2002). His research interests are focused on natural science problems being resolved by means of innovative frequency-, time- and spatially resolved laser spectroscopic methods and techniques. Thereby bio- and material photonics are setting up the two main priorities of the research activities.

**Dinner Reservations:**

Please email Carolyn Benga at crbssp@yahoo.com or dinners@ssp-pgh.org call (412) 487-0915 to make dinner reservations NO LATER THAN FRIDAY, February 15, 2008. Dinner will cost $8 and checks can be made out to the SSP. If you have dietary restrictions, please let Carolyn know when you RSVP.

Parking Instructions:

The Duquesne University Parking Garage is located on Forbes Avenue. Upon entering the garage, receive parking ticket and drive to upper floors. Pick up a parking chit at the dinner or meeting. If any difficulties arise, contact Dr. Mitch Johnson at Duquesne University.