**William J. Federspiel, Ph.D.**
William Kepler Whiteford Professor
Professor, Departments of Bioengineering, Chemical Engineering and Critical Care Medicine
Director, Medical Devices Lab (McGowan Institute for Regenerative Medicine)

**Brief Bio:**
Dr. William J. Federspiel received his PhD in 1983 and currently is the William Kepler Whiteford Professor of Bioengineering in the Swanson School of Engineering at the University of Pittsburgh, with a secondary appointment in Critical Care Medicine. He is a Co-Founder of Alung Technologies, a Pittsburgh based medical device company that develops respiratory assist systems and currently serves as Head of the Scientific Advisory Board for Alung. Dr. Federspiel is an elected Fellow of the American Institute of Medical and Biological Engineering (AIMBE) and the Biomedical Engineering Society (BMES). He has over 90 research publications and book chapters and holds numerous patents related to devices and methods for respiratory assist. He directs research in the Medical Devices Laboratory, a core laboratory of the McGowan Institute for Regenerative Medicine. His laboratory actively develops novel artificial lung devices for respiratory assist, as well as blood treatment devices for sepsis and other inflammatory disorders.

**Respiratory Dialysis: The New Wave in Extracorporeal CO₂ Removal**

Extracorporeal CO₂ removal represents an effective treatment strategy for patients with acute and acute-on-chronic respiratory insufficiency. The technology holds the most promise as a means of avoiding intubation and mechanical ventilation in patients with an acute exacerbation of Chronic Obstructive Pulmonary Disease (COPD), and as a means of allowing for lung protective ventilation in patients with Acute Respiratory Distress Syndrome (ARDS). Unlike oxygen supply, carbon dioxide can be removed at therapeutic levels from blood at relatively low extracorporeal blood flowrates, similar to those used in acute hemodialysis. To do so effectively, a novel integrated artificial lung and blood pump system called the Hemolung® Respiratory Assist System (RAS) has recently been developed and commercialized. This talk will introduce the audience to the history of extracorporeal CO₂ removal and to the concept of respiratory dialysis, including an overview of current and emergent respiratory dialysis systems. Emphasis will be placed on describing the evolution and current state of respiratory assist devices in the Medical Devices Laboratory at the University of Pittsburgh’s McGowan Institute of Regenerative Medicine. The talk will describe the early design and development work leading to the Hemolung RAS, and features which distinguish it from other systems focused on CO₂ removal. Key results from recent animal and human clinical trials of the Hemolung RAS will also be presented, along with current work on novel enzymatic coatings and other approaches being developed in the laboratory for next generation respiratory dialysis systems.