

# BENG800: “COMPUTATIONAL FLUID DYNAMICS IN BIOENGINEERING” SEMINAR #3

## Speaker

Rainald Lohner

## Location

Research Hall 163

## Date

12:00pm-1:00pm (lunch will be provided)

Thursday October 6, 2016



## Biography:

Rainald Lohner, PhD, DSc

Rainald Lohner is the head of the CFD Center at the College of Sciences of George Mason University in Fairfax, VA, in the outskirts of Washington, D.C. He received a MSc in Mechanical Engineering from the Technische Universitaet Braunschweig, Germany, as well as a PhD and DSc in Civil Engineering from the University College of Swansea, Wales, where he studied under Profs. Ken Morgan and Olgierd Zienkiewicz. His areas of interest include numerical methods, solvers, grid generation, parallel computing, visualization, pre-processing, fluid-structure interaction as well as shape and process optimization. His codes and methods have been applied in many fields, including aerodynamics or airplanes, cars and trains, hydrodynamics of ships, submarines and UAVs, shock-structure interaction, dispersion analysis in urban areas and haemodynamics of vascular diseases. He is the author of more than 750~articles covering the fields enumerated above, as well as a textbook on Applied CFD Techniques.

## **Talk Overview:** Computational Fluid Dynamics in Bioengineering

The development of numerical methods to compute complex flows, and the ever-increasing memory and speed of computers, has allowed the basic understanding, analysis and optimization of many applications in bioengineering.

The CFD Center's main thrust application areas over the last two decades have been blast simulation, free surface flows, dispersion analysis and haemodynamics. While only the last one of these has a direct connection to bioengineering, the methods and codes developed at the CFD center have been used for the basic understanding, analysis and optimization of fish and insect motion, flapping wing UAVs and UUVs, blood pumps, DNA micro channels, stents, and many other devices. The feedback from these application areas has also led to the development of new numerical methods, advancing measurably the range of applicability of CFD in general.

The talk will give a brief overview of the CFD Center, and then consider applications in bioengineering, as well as the numerical methods and techniques that made them possible.