

# IMS Public Lecture

## Applied Partial Differential Equations: A Visual Approach



Speaker: Professor Peter A. Markowich  
University of Cambridge, UK and  
University of Vienna, Austria

Date: Tuesday, 11 December 2007

Time: 6:30 PM - 7:30 PM

Venue: LT31, Faculty of Science  
Block S16, Science Drive 1  
National University of Singapore  
Singapore 117543

### About the Speaker

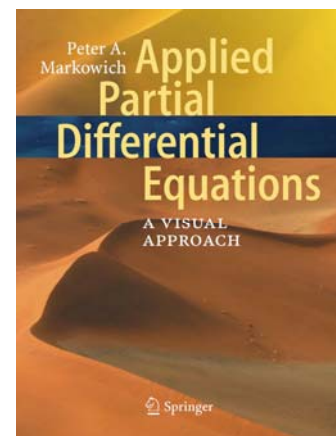


Peter A. Markowich works in the area of partial differential equations and their applications in science and engineering. He holds a Chair in Applied Mathematics at the Department of Applied Mathematics and Theoretical Physics of the

University of Cambridge. He is also Professor at the University of Vienna and leader of a research group at the Johann Radon Institute for Computational and Applied Mathematics in Linz. He was the recipient of the Austrian Wittgenstein Award in 2000 and of the Wolfson Research Merit Award of the Royal Society in 2007.

### Abstract

The lecture illustrates topics of science/engineering, which occur in nature and/or are part of our daily lives. The described natural/engineering phenomena are modeled by partial differential equations, which relate physical variables like mass, velocity, energy etc. to their spatial and temporal variations. Typically these equations are highly nonlinear, in many cases they are also vectorial systems, and they represent a challenge even for the most modern and sophisticated mathematical-analytical and mathematical-numerical techniques. The chosen topics reflect the longtime scientific interests of the author. They include flows of fluids and gases, granular material flows, biological processes like pattern formation on animal skins, kinetics of rarified gases and semiconductor devices. Each topic is briefly presented in its scientific or engineering context, followed by an introduction of the mathematical models in the form of partial differential equations with a discussion of the most basic mathematical properties. Also, each topic is highlighted by a series of high quality photographs, taken by the author. They illustrate in an allegoric way that partial differential equations can be used to address a large variety of phenomena occurring in and influencing our daily lives. The lecture is based on a book with the same title, authored by the speaker and published by Springer Verlag Heidelberg in 2006.



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