

## Miscellanea

### Blood Flow – Modelling and Diagnostics (BF2005)

Advanced Course and Workshop **Blood Flow – Modelling and Diagnostics (BF2005)** took place from 20 to 23 June 2005, in Warsaw. The meeting was organized by Centre of Excellence ABIOMED located at the Institute of Fundamental Technological Research of Polish Academy of Sciences (IPPT PAN), conjoined with ERCOFTAC SIG-37: Bio-Fluid Mechanics and Heat Transfer.

The main objective of the workshop was to merge activities of several groups working on Cardiovascular Fluid Mechanics, both experimentally as well as performing numerical modelling. The course given by experienced senior lecturers gave good overview of the most demanding research problems investigated in this field. The meeting aimed to promote in the European Research Area scientific discussions on this challenging multidisciplinary field, appeared to be a good foundation for facilitating new collaborations between “traditional” fluid mechanics and people using ultrasound diagnostic methods. It addressed researchers and PhD students from Europe working in the field of bio-mechanics. With 70 participants, 13 invited lecturers and 13 oral contributed presentations the meeting gave during the fully packed four days scientific program a successful platform for exchanging knowledge and discussions.

The main interest of today’s research in haemodynamics is more and more dedicated to accurate modelling of blood flow characteristics. It became evident that blood is a complex fluid, with properties depending on many factors, not only shears rate and hematocrit. The cardiovascular tubing system is characterized by large variety of scales, shape and wall properties. The fluid mechanics strongly varies inside different vascular regions, altering pressure drops and blood redistribution in a flexible way. Moreover, the heat and mass transfer within the system plays an important role. The pulsating flow characteristic, laminar to turbulent transitions insert additional complications, yet very difficult to deal with analytical and numerical tools. On the other hand rapid development of different diagnostic tools allows for more and more detailed verification and validation of the modelling attempts. The BF2005 program made an effort to give a good overview of these problems. Generally, it consisted of three main parts: modelling of blood as a flow media, numerical modelling of the cardiovascular flow and experimental diagnostics by optical and acoustic means. The course program consisted of the following invited lectures:

- A. Kucaba-Piętal (Poland) – Blood as a complex fluid, flow of suspensions

- A. Nowicki (Poland) – Doppler music – Listen to the blood flow
- G. Romano (Italy) – Heart valves, experimental and modelling
- J. Westerweel and P. Vennemann (Holland) – Blood flow measurements
- G. van Leeuwen and A. van Steenhoven – Heat transfer in blood circulatory system
- K. Affeld (Germany) – Flow in artificial valves and blood pumps
- A.P.G. Hoeks (Holland) – Do Doppler motion detectors colour arteries red?
- U. Kertzscher (Germany) – Experimental assessment of wall shear flow
- F. van de Vosse (Holland) – Wave propagation in arteries, coronary circulation or aneurysms
- M. Vogt (Germany) – Concepts for high resolution blood flow imaging with high frequency ultrasound
- P. Tortoli- Experimental investigations of blood flow behaviour in large human arteries
- L. Formaggia and A. Veneziani (Italy) – Multiscale modelling of the cardiovascular system
- J. Szumbarski and J.K. Mizerski (Poland) – Mathematical and numerical modelling of cardiovascular flows

The contributed talks given covered modeling of the blood properties (E. Taran), problems of heat transfer (N. Severens, F. Janssen, A. Nowak, M. Stańczyk), modelling cardiovascular systems and wave propagation (P. Stroev, K. Fraser, S. Tokarzewski, G. Pontrelli, A.J. Narracott), and flow diagnostics methods (W. Secomski, R. Kaminsky). The detailed BF2005 program and abstracts of the contributed papers are available on the BF2005 web site <http://fluid.ippt.gov.pl/bf2005>.

The meeting enabled a wide range of researchers from a number of different backgrounds (mechanical engineering, mathematics, electronics, acoustics and medicine) to meet together and discuss their different experience and tools used in the area of cardiovascular fluid mechanics. A number of the attendees noted how useful they found to meet together “partners” using different approaches to the same problems. It was especially interesting to discover similarities and differences in optical and acoustic methods of the blood flow measurements, as well as to compare numerical modelling of cardiac surgery with practical experience of medical doctors. It is believed that BF2005 will soon conclude with several joint projects, merging efforts of these different fields of expertise.

Tomasz A. Kowalewski  
Chairman

## **Actualities**

With the exceptional satisfaction we announce that:

Professor **Władysław Włosiński**, corresponding member of the Polish Academy of Sciences, the Chairman of the Division IV – Technical Sciences of PAS, was honoured with the title of the Doctor Honoris Causa of the Silesian University of Technology on 12 July 2005.

Professor **Stanisław Kocańda**, full member of the Polish Academy of Sciences associated with our

Division IV – Technical Sciences PAS, has been honoured with the exceptional title of the Doctor Honoris Causa of the Lublin University of Technology.

Professor **Antoni Mazurkiewicz**, associated with our Division IV – Technical Sciences PAS, has been honoured with the exceptional title of the Doctor Honoris Causa of the University of Bordeaux.

We would like to congratulate all privileged professors and wish them further successes.