

III WORKSHOP BIOFLUMEN
“Biological Fluid Mechanics Network”

**TECHNOLOGICAL INNOVATION AND EVALUATION OF
MEDICAL DEVICES FOR THE CARDIOVASCULAR SYSTEM**

15 novembre 2004

Organized by
ISTITUTO SUPERIORE DI SANITÀ

With the support of
AIVELA (Associazione Italiana di Velocimetria Laser e
Diagnostica non Invasiva)

The importance of the study of the circulatory system and the related pathologies calls for novel investigational techniques. The III BioFluMeN (“Biological Fluid Mechanics Network”) Workshop is meant to contribute to the discussion of the potentialities of advanced techniques for the study of biomedical devices. The Workshop will also address the characterization of cardiovascular fluid dynamics, as well as the discussion of in vivo monitoring techniques.

9.30 Welcome address
G.A. Zapponi

9.40 *Presentation of the III BioFluMeN Workshop*
A new theme proposal: Technology assessment of
medical devices – discussion of case studies
M. Grigioni

I Session
INNOVATIVE TECHNIQUES TO STUDY MEDICAL DEVICES
Chairman: **E.P. Tomasini**

10.00 *Laser Vibrometry for the study of prosthetic heart valves*
kinematics
L. Scalise

10.15 *Thermoelasticity for the measurement of stress distribution*
on prosthetic heart valves
G. Rossi

10.30 *Acoustic analysis to investigate closing behaviour of*
prosthetic heart valves
C. Del Gaudio

10.45 *Stereo PIV to investigate the fluid dynamics of prosthetic*
heart valves
U. Morbiducci

11.00 *Flow visualization by bubble generation*
A. Delogu

11.15 Break

II Session
TECHNOLOGICAL INNOVATIONS IN ULTRASOUND SYSTEMS
Chairman: **G. Pedrizzetti**

11.30 *Quantitative ultrasound and improved diagnosis*
G. Tonti

11.45 *Ultrasound and ventricular fluid dynamics*
F. Domenichini

12.00 *The road through three-dimensional ultrasound*
S. De Castro

12.15 *Phase-domain methods in Doppler ultrasound*
G. D’Avenio

12.30 Discussion

13.00 Break

III Session
**COMPUTATIONAL FLUID DYNAMICS AS A SUPPORT IN THE
EVALUATION OF MEDICAL DEVICES**
Chairman: **A. Redaelli**

14.00 *Numerical approach for the analysis of the behaviour of*
prosthetic mechanical heart valves
M. Soncini

14.15 *Evaluation of innovative systems for the automated*
anastomosis in CABG
A. Redaelli

14.30 *Imaging and numerical fluid dynamics for the study of the*
cardiovascular system
L. Antiga

14.45 *Multiscale models of the cardiovascular system applied to*
the study of the flow in a carotid bifurcation
R. Balossino

IV Session
**IMPACT OF IMPLANTABLE MEDICAL DEVICES ON MAGNETIC
RESONANCE**
Chairman: **P. Bartolini**

15.00 *Interactions of implantable cardiovascular medical*
devices with NMR: a review
R. Canese

15.15 *A novel method for torque measurement on implantable*
medical devices by NMR at 4.7 T
G. D’Avenio

15.30 *Interaction of implantable medical devices with MRI:*
methods of investigation
G. Calcagnini

15.45 *Interaction of implantable medical devices with MRI:*
effect of implant geometry on catheter heating
F. Censi

16.00 *The need to increase knowledge and recommendation*
M. Grigioni

16 15 Break

16.30 Discussion

17.00 End of Workshop

SPEAKERS AND CHAIRMEN

L. Antiga - Mario Negri Institute for Pharmacological Research, Bergamo

R. Balossino - Department of Bioengineering, Politecnico of Milan, Milan

P. Bartolini - Department of Technology and Health, I.S.S., Rome

G. Calcagnini - Department of Technology and Health, I.S.S., Rome

R. Canese - Department of Cell Biology and Neuroscience, I.S.S., Rome

F. Censi - Department of Technology and Health, I.S.S., Rome

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C. Del Gaudio - Department of Technology and Health, I.S.S., Rome

A. Delogu - Department of Technology and Health, I.S.S., Rome

F. Domenichini - Department of Civic Engineering, University of Florence

M. Grigioni - Department of Technology and Health, I.S.S., Rome

U. Morbiducci - Department of Technology and Health, I.S.S., Rome

G. Pedrizzetti - Department of Civic Engineering, University of Trieste

A. Redaelli - Department of Bioengineering, Politecnico of Milan, Milan

G. Rossi - Department of Industrial Engineering, University of Perugia

L. Scalise - Department of Mechanical Engineering, Università Politecnica delle Marche, Ancona

M. Soncini - Department of Bioengineering, Politecnico of Milan, Milan

E.P. Tomasini - Department of Mechanical Engineering, Università Politecnica delle Marche, Ancona

G. Tonti - Department of Cardiovascular Diseases, Università Cattolica del Sacro Cuore, Campobasso

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A. REDAELLI, P. BARTOLINI

Organizing Committee

M. GRIGIONI

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GENERAL INFORMATION**Workshop site**

Aula G.B. Rossi, Istituto Superiore di Sanità
Via Giano Della Bella 34 - Roma

Potential audience

The Workshop is especially meant for bioengineers and researchers in the field of the cardiovascular biomechanics and fluid dynamics, and is addressed also to cardiologists and cardiac surgeons.

Registration

Participation in the Workshop is free.
For organisation issues please communicate your intention to participate to the Scientific Secretariat.

Language

The official language is Italian.

Certificate of attendance

At the end of the Workshop a certificate of attendance will be issued upon request.

For any further information please contact the Technical Secretariat.