SIMBIO 2011
PROGRAM
(12/09/11)

Program for Wednesday 21-September 2011

14:00-14:15 — **Room: D0.03**

Welcome Address
Prof. Chris Lacor, As a Chairman of SIMBIO Conference 2011

14:15-15:00 — **Keynotes Address** — **Room: D0.03**

Invited talk: Prof. Anne Robertson
Structurally motivated constitutive models for the arterial wall - Theory and experiments
Department of Mechanical Engineering at the University of Pittsburgh, USA
Chaired by: Prof. Adélia Sequeira

Session 1-1 Room: D0.03 — **Chaired by : Prof. A. Robertson**	**Session 2-1** Room:E0.05 — **Chaired by : Prof. C. Lacor**
15:05-15:25 Analysis of various haemodynamic parameters in subject-specific carotid bifurcations (45) Rhodri L.T. Bevan[1], Perumal Nithiarasu[1], Raoul van Loon[1], Igor Sazonov[1], Heyman Luckraz[2] *[1]Civil and Computational Engineering Centre, Swansea University, UK; [2]Heart and Lung Centre, Royal Wolverhampton Hospital, UK*	**15:05-15:25** Flow patterns and mass transport in a three dimensional model of the human lung (17) Katrin Bauer, Alexander Rudert, Christoph Brücker *Institute of Mechanics and Fluid Dynamics, TU Bergakademie Freiberg, Germany*
15:25-15:45 Study of a Lattice–Boltzmann immersed boundary coupled method for fluid-structure interactions in haemodynamics (42) Daniel R. Golbert[1,2], Pablo J. Blanco[1,2], Raúl A. Feijóo[1,2] *[1]Laboratório Nacional de Computação Científca (LNCC), Brazil; [2]Instituto Nacional de Ciência e Tecnologia em Medicina Assistida por Computação Científca, Brazil*	**15:25-15:45** Multiplane-Stereo PIV measurements for steady flow in the first two bifurcations of the upper human airways during exhalation (43) Franka Schröder, Michael Klaas, Wolfgang Schröder *Institute of Aerodynamics, RWTH Aachen University, Germany*
15:45-16:05 Modeling effects on fluid-structure interaction phenomena in haemodynamics (16) Paolo Tricerri[1,2], Alexandra Moura[2], Adélia Sequeira[2], Simone Deparis[1] *[1]CMCS/EPFL, [2]CEMAT/IST, Portugal*	**15:45-16:05** Quality open source mesh generation for biological flow simulations (6) E. Marchandise[1], E.Sauvage[1], J.F Remacle[1], C. Geuzaine[2] [1]Institute of Mechanics, Materials and Civil Engineering, Université Catholique de Louvain-la-Neuve, Belgium; [2]Department of Electrical Engineering and Computer Science, Université de Liege, Belgium

16:05-16:30 — **Coffee Break**

Session 1-2 Room: D0.03 — **Chaired by : Prof. J. Vierendeels**	**Session 2-2** Room: E0.05 — **Chaired by : Prof. E. Marchandise**
16:30-16:50 Haemodynamics in a 3D 90-degree Bifurcation (25) Stevin van Wyk, Lisa Prahl Wittberg, Laszlo Fuchs *Linné FLOW Centre, Sweden*	**16:30-16:50** Unsteady self-cleaning effect in the lung air ways (44) Nadezhda Fedosenko , Anna Iatcenko *St .Petersburg State Polytechnical University, Russia*
16:50-17:10 Partitioned algorithms for the solution of fluid-structure interaction problems for real applications in haemodynamics (23) F. Nobile[1], M. Pozzoli[1], C. Vergaray[2] *[1]MOX-Dipartimento di Matematica, Politecnico di Milano, Italy; [2]Dept. of Information Technology and Mathematical Method, Università degli Studi di Bergamo, Italy*	**16:50-17:10** Unsteady surfactant-laden liquid plug propagation: A model for surfactant replacement therapy (11) Ufuk Olgac, Metin Muradoglu *Koc University, Department of Mechanical Engineering, Istanbul, Turkey*

17:10 — **Reception**

Program for Thursday 22-September 2011

09:00-09:45 — **Keynotes Address** — **Room: D0.03**

Invited talk: Prof. Luca Formaggia

Coupling different models for an integrated cardiovascular simulation

Dipartimento di Matematica, Politecnico di Milano, Italy

Chaired by : Prof. H. Deconinck

Session 1-3 — **Room: D0.03** — **Chaired by: Prof. A. Sequeira**	**Session 2-3** — **Room: E0.05** — **Chaired by : Prof. G. Degrez**
09:50-10:10 Simulation and optimization of a multi-layer axial impedance pump (22) Jan Alexander, Joris Degroote, Jan Vierendeels *Department of Flow, Heat and Combustion Mechanics, Faculty of Engineering, Ghent University, Belgium*	**09:50-10:10** Simulation of influencing parameters upon the instabilities of the glottal jet (31) Ch. Brücker, M. Triep, W. Mattheus, R. Schwarze, C. Kirmse *Institute of Mechanics and Fluid Dynamics (IMFD), TU Bergakademie Freiberg, Germany*
10:10-10:30 Numerical prediction of hemolysis based on computational fluid dynamics (10) Hai Yu, Gábor Janiga, Dominique Thévenin *Institut für Strömungstechnik und Thermodynamik, Fakultät für Verfahrens und Systemtechnik, Otto-von-Guericke-Universität Magdeburg , Germany*	**10:10-10:30** Analysis of the fluid dynamic characteristics of the obstructive pulmonary diseases using a three dimensional CFD model of the upper conductive zone of the lung airways (32) Ana F. Tena[2], Pere Casan[2], Alfonso Marcos[1], Raul Barrio[3], Eduardo Blanco[3] *[1]Universidad de Extremadura, Spain; [2]Instituto Nacional de Silicosis, Spain; [2]Universidad de Oviedo, Spain*
10:30-10:50 Algorithms for the coupling of one-dimensional arterial networks with three-dimensional fluid-structure interaction problems (5) A. Cristiano I[1]. Malossi , Pablo J. Blanco[2], Simone Deparis[1], Alfio Quarteroni[1,3] *[1]CMCS, Chair of Modelling and Scientific Computing, MATHICSE, Mathematics Institute of Computational Science and Engineering, EPFL, École Polytechnique Fédérale de Lausanne Station 8, Switzerland; [2]LNCC, Laboratório Nacional de Computação Científica, Quitandinha, 25651-075, Petrópolis, Brazil; [3]MOX, Modeling and Scientific Computing, Department of Mathematics, Politecnico di Milano, Italy*	**10:30-10:50** Investigations of the inspiration and heating capability of the human nasal cavity based on a Lattice-Boltzmann method (50) A. Lintermann, M. Meinke, W. Schröder *Institute of Aerodynamics and Chair of Fluid Mechanics of RWTH Aachen University, Germany*

10:50-11:15 — **Coffee Break**

Session 1-4 — **Room: D0.03** — **Chaired by : Prof. H. Deconinck**	**Session 2-4** — **Room: E0.05** — **Chaired by : Prof. L. Formaggia**
11:15-11:35 Secondary flows in thoracic aorta with torsion (18) Hiroshi Suito[1,4], Takuya Ueda[2,4], Daniel Sze[3] *[1]Graduate School of Environmental Science, Okayama University, Japan; [2]Department of Radiology, St. Luke's Hospital, Japan;[3]Department of Radiology, Stanford University, School of Medicine, USA; [4]CREST, Japan Science and Technology Agency, Japan*	**11:15-11:35** A Poroelastic Model of Intestinal EDEMA (37) Jennifer J. Young, Béatrice M. Rivière *Rice University, USA*
11:35-11:55 Time–resolved measurements of wall–shear stress, dilatation and static pressure in an elastic, stenotic vessel (40) Kai Pielhop, Michael Klaas, Wolfgang Schröder *Institute of Aerodynamics, RWTH Aachen University, Germany*	**11:35-11:55** Adaptive free boundary approach to simulate liquid flow in micro channels with slip boundary conditions (47) Raman Balu[1], Selvakumar Ulaganathan[2] *[1]School of Mechanical Engineering, Noorul Islam Centre for Higher Education, India; [2]Dept. of Aerospace Sciences, Cranfield University, United Kingdom.*

12:00-13:30 — **Lunch**

Program for Thursday 22-September 2011

13:45-14:30 **Keynotes Address** Room: D0.03

Invited talk: Prof. Ching-Long Lin

A Predictive Multi-scale Image-based Lung

Department of Mechanical and Industrial Engineering, IIHR-Hydroscience & Engineering, University of Iowa, U.S.A

Chaired by: Prof. S. Verbanck

Session 1-5 Room: D0.03 Chaired by: Prof. J. Vierendeels	**Session 2-5** Room: E0.05 Chaired by: Prof. C. Brücker
14:35-14:55 Energy absorbing layer for the structure outflow boundary applied to heart valve dynamics (1)	**14:35-14:55** Numerical and experimental investigation of ultrafine particle transport and deposition in a human upper airway model (2)
Thomas Wick	F. Krause[1], A. Wenk[2], W. Möller[2], S. Verbanck[3], C. Lacor[1], W. G. Kreyling[2]
Institute of Applied Mathematics, University of Heidelberg, Germany	*[1]Vrije Universiteit Brussel, Department of Mechanical Engineering, Belgium; [2]Helmholtz Zentrum München, Comprehensive Pneumology Center, Institute for Lung Biology and Disease, Germany; [3]University Hospital Brussels, Respiratory Division, Belgium*
14:55-15:15 An orthotropic active strain formulation in cardiac mechanics (20)	**14:55-15:15** A study on implantable micropump systems for drug delivery (49)
Simone Rossi[1,2], Ricardo Ruiz-Baier[2], Luca Pavarino[4], Alfio Quarteroni[1,3], Adélia Sequeira[1]	Ali Mahnama[1], Mehrdad Raisee[1], Tony. S. Hashemia D.D.S[2], Ahmad Nourbakhsh[1], Roya Marjanian[3]
[1]Departamento de Matématica and CEMAT/IST, Instituto Superior Técnico, Portugal; [2]CMCS-MATHICSE-SB, École Polytechnique Fédérale de Lausanne, Switzerland; [3]MOX - Dipartimento di Matematica F. Brioschi, Politecnico di Milano, Italy; [4]Dipartimento di Matematica, Università degli Studi di Milano, Italy	*[1]Hydraulic Machinery Research Inst., College of Engineering, University of Tehran, Iran; [2]Arizona School of Dentistry & Oral Health (ATSU), USA; [3]Drug and Food Organization, Ministry of Health, Iran.*
15:15-15:35 Exact and numerical solutions of a model for one-dimensional collapsible tubes with variable properties (29)	**15:15-15:35** Inverse numerical simulation of drug movement in the middle ear and the cochlear (39)
Annunziato Siviglia, Eleuterio F. Toro	Kuo-Chan Hung[1], Ming-Lung Li[1], Chia-Fone Lee[2], Lung-Cheng Lee[1]
Laboratory of Applied Mathematics, University of Trento, Italy	*[1]National Center for High-Performance Computing, Taiwan; [2]Buddhist Tzu Chi General Hospital, Taiwan*

15:35-16:00 **Coffee Break**

Session 1-6 Room: D0.03 Chaired by: Prof. C. L. Lin	**Session 2-6** Room: E0.05 Chaired by: Prof. E. Marchandise
16:00-16:20 Multiscale simulation of an idealized left ventricle with fluid-structure interaction effects coupled to a one-dimensional viscoelastic arterial tree (35)	**16:00-16:20** A methodology to generate a patient specific high quality structured computational domain from medical imaging data (7)
Toni Lassila[1], Matteo Astorino[1], Simone Deparis[1], A. Cristiano I. Malossi[1], Alfio Quarteroni[2]	Evangelos Makris[1,2], Christos Housiadas[2]
[1]CMCS, Chair of Modelling and Scientific Computing, MATHICSE, Mathematics Institute of Computational Science and Engineering, EPFL, École Polytechnique Fédérale de Lausanne Station 8, Switzerland; [2]MOX, Modeling and Scientific Computing, Department of Mathematics, Politecnico di Milano, Italy	*[1]Thermal Hydraulics & Multiphase Flow Laboratory, National Centre for Scientific Research Greece; [2]National Technical University of Athens, School of Mechanical Engineering, Greece*
16:20-16:40 Modeling of red blood cell motion and deformation using particle based method (38)	**16:20-16:40** Impact of the mesh on the accuracy and efficiency of cardiovascular Simulations (14)
Takami Yamaguchi[1], Yohsuke Imai[1], Takuji Ishikawa[2]	E. Sauvage[1], E. Marchandise,[1] J.F. Remacle[1], C. Geuzaine[2]
[1]Dept. Biomedical Engineering, Graduate School of Biomedical Engineering, Tohoku University, Japan; [2]Dept. Bioengineering and Robotics, Graduate School of Engineering, Tohoku University, Japan	*[1]Institute of Mechanics, Materials and Civil Engineering, Université Catholique de Louvain-la-Neuve, Belgium; [2]Department of Electrical Engineering and Computer Science, Université de Liege, Belgium*
16:40-17.00 Mathematical modeling and numerical simulations in blood coagulation (21)	**16:40-17.00**
Jevgenija Pavlova, Alexandra Moura, Adélia Sequeira	
Department of Mathematics and CEMAT/IST, Instituto Superior Técnico, Technical University of Lisbon, Portugal	

19:30 **Dinner at Restaurant La Manufacture**

Program for Friday 23-September 2011

10:00-10:45 **Keynotes Address** Room: D0.03

Invited talk: Prof. Jean-Frédéric Gerbeau

Some inverse problems in cardiovascular modeling

INRIA Paris-Rocquencourt, France

Chaired by: Prof. G. Degrez

10:45-11:10

Coffee Break

Session 1-7 Room: D0.03 Chaired by : Prof. C. Lacor	**Session 2-7** Room: E0.05 Chaired by : Prof. J-F Gerbeau
11:10-11:30 Semi-implicit numerical modeling of axially symmetric flows in compliant arterial systems (9) Vincenzo Casulli, Michael Dumbser and Eleuterio Toro *Laboratory of Applied Mathematics, University of Trento, Italy*	**11:10-11:30** Flow dynamics in growing aneurysms (46) Shinobu Otsuka[1], Hiroyuki Takao[2], Yuichi Murayama[2], Shunsuke Masuda[2], Ashraf Mohamed[2], Yi Qian[3], Masaya Suzuki[4], Makoto Yamamoto[4], Toshiaki Abe[2] *[1]Graduate School of Mechanical Engineering, Tokyo University of Science, Japan; [2]Department of Neurosurgery, Jikei University School of Medicine, Japan; [3]The Australian School of Advanced Medicine, Macquarie University, Australia; [4]Department of Mechanical Engineering, Tokyo University of Science, Japan*
11:30-11:50 Numerical simulation of blood flow through insufficient mitral valves (8) Simon Sonntag *Algorithms & Research, TomTec Imaging Systems, Unterschleissheim, Germany*	**11:30-11:50** Analysis of cerebral aneurysm hemodynamics: Sensitivity to rheological model and geometry description (19) Alberto M. Gambaruto, Alexandra B. Moura, Susana Ramalho, Adélia Sequeira *Department of Mathematics and CEMAT - Center for Mathematics and its Applications, Instituto Superior Técnico, Portugal*
	11:50-12:10 Flow analysis with stent placement in the cerebral aneurysm (48) M. L. Li[1], Y. C. Wang[2], C. A. Lin[3] *[1]Department of Power Mechanical Engineering, National Tsing Hua University, Taiwan; [2]National Center for High Performance Computing, Taiwan; [3]Chang Gung Medical Foundation, Taiwan*

12:10-13:30

Lunch