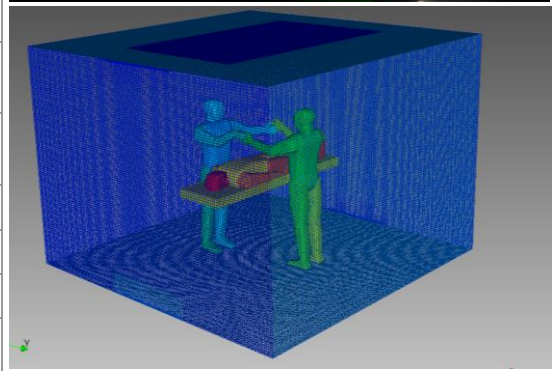
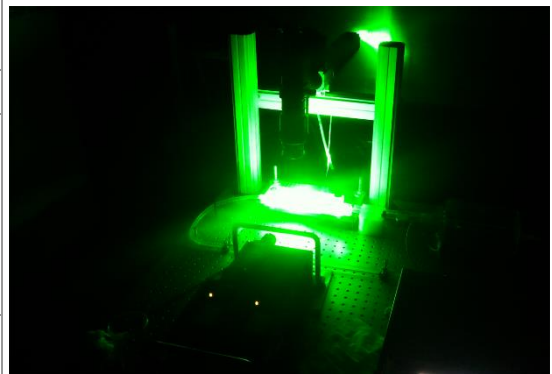


ADVANCED FLOW AND HEAT TRANSFER INVESTIGATION GROUP

Contact details

Name	Advanced Flow and Heat Transfer Investigation Group
Acronym	AtFLOW
Logo	
Site	www.atflow.utcluj.ro http://research.utcluj.ro/tl_files/research/Research_Domain/Mechanical_Engineering/3_Giurgea.pdf
Address	103-105 Muncii Blv., Rooms: B 303& D017, 400641, Cluj-Napoca, Romania
Faculty Department	Faculty of Mechanical Engineering Mechanical Engineering Department
Telephone	+40 752222732
Fax	
Director	Assist. Prof.Dr. Eng. Corina Giurgea
e-mail	Corina.Giurgea@termo.utcluj.ro



Areas of expertise

Biomedical Engineering

- Flows through Bypass Grafts and Mechanical Heart Valves - numerical (CFD) and experimental investigations (PIV)

Heat and Mass Transfer

-Free and Impinging Jets with application in Personalized Ventilation; Heating Ventilation and Air Conditioning; Heat Transfer; Combustion: Reactive and non reactive flows – numerical (CFD), experimental investigations

Fluid Flow Control Systems

- Design and manufacture of controllers for fluid systems; Sensorics; Analyse and signal processing

Team

Assist. Prof. Dr. Eng. Corina Giurgea, Prof. Dr. Eng. Victor Hodor, Assoc. Prof. Dr. Eng. Florin Bode, Assist. Prof. Dr. Eng. Lucian Nascutiu, Assist. Dr. Eng. Daniel Banyai, Dr. Med. Octavian Ioan Budiu

Representative projects

1. INSIDE, “Innovative strategies of HVAC systems for high indoor environmental quality in vehicles”, PN-II-PT-PCCA, <http://cambi.ro/inside/> (2014-2017)
2. EQUATOR, “Advanced strategies for high performance indoor Environmental QUALiTy in Operating Rooms”, PN-II-PT-PCCA, <http://cambi.ro/equator/index.html> (2012-2016)
3. “Fluid dynamics analysis for innovative personalized ventilation diffusers for automotive and building applications”, PN-II-RU-PD, <http://www.cambi.ro/ventilare-personalizata-pd-bode/index.html> (2011-2013)
4. MAACH, “Advanced Methods of Analysis and Control in Hemodynamics, with applications in peripheral vascular surgery”, CNMP PN-II- (Complex Partnership Project), <http://www.cnmp.ro:8083/pncdi2/program4/documente/2010/sedinta/rez/D8/82-086.pdf> (2008-2011)
5. “The control and numerical analysis of combustion instability by using the acoustic analogy”, CNCSIS PN II, http://www.termo.utcluj.ro/pncd2_2007_IDEI/ (2007-2010)
6. SHATEMP, “Adaptive hydraulic systems for small-scale wind turbines”, CNMP PN-II (Complex Partnership Project), <http://shatemp.tuiasi.ro/> (2007-2010)

Significant results

The most representative publications of the past 5 years:

1. Corina Giurgea, Florin Bode, Lucian Nascutiu, Cristian Dudescu, Considerations Regarding the Optically Transparent Rigid Model for PIV Investigations. A Case Study. Part 2: Notes on the Failure of the Model, in *Energy Procedia* 85 (2016) 235 – 243, 2016

2. Lucian Nascutiu, Corina Giurgea, Mihai Damian, Florin Bode, Octavian Budiu, Octavian Andercou, Considerations Regarding the Optically Transparent Rigid Model for PIV Investigations. A Case Study. Part1: Model Manufacturing, in *Energy Procedia 85* (2016) 358 – 365, 2016
3. Victor Hodor, Dan Birle, Lucian Nascutiu, Mircea Diudea, CFD Prediction with LES for Psycho Acoustic Relevance in Ventilation, in *Energy Procedia 85* (2016) 252 –259, 2016
4. Cristiana Croitoru, Ilinca Nastase, Florin Bode, Amina Meslem, Angel Dogeanu, Thermal comfort models for indoor spaces and vehicles - Current capabilities and future perspectives, in *Renewable and Sustainable Energy Reviews*, 44 (2015) 304–318, 2015
5. Florin Bode, Kodjovi Sodjavi, Amina Meslem, Ilinca Nastase, Numerical prediction of wall shear rate in impinging cross-shaped jet at moderate Reynolds number, in *Scientific Bulletin - University Politehnica of Bucharest Series D: Mechanical Engineering*, ISSN 1454 - 2358, Vol. 76, Iss. 2, pp251-258 (8p), 2014
6. Kodjovi Sodjavi, Brice Montagné, Pierre Bragança, Amina Meslem, Florin Bode, Magdalena Kristiawan, Impinging cross-shaped submerged jet on a flat plate: a comparison of plane and hemispherical orifice nozzles, in *Meccanica*, ISSN 0025-6455, Volume 50, Issue 12, pp 2927-2947,2015
7. Lucian Nascutiu, Olivier Reinertz, Christoph Siebert, Hubertus Murrenhoff, High Performance Actuators for Fluid Power Drives, *The 9TH INTERNATIONAL FLUID POWER CONFERENCE IFK2014*, Vol. III, 242-253, Aachen, Germany, March 2014.
8. A. Meslem, F. Bode, C. Croitoru, I. Nastase, “Comparison of turbulence models in simulating jet flow from a cross-shaped orifice”, in *European Journal of Mechanics - B/Fluids*, vol.44, pp.100-120, 2013
9. A. Meslem, V. Sobolik, F.Bode, K. Sodjavi, Y. Zaoali, I. Nastase, C. Croitoru, “Flow dynamics and mass transfer in impinging circular jet at low Reynolds number. Comparison of convergent and orifice nozzles”, in *International Journal of Heat and Mass Transfer*, vol. 67, pp. 25-45, 2013
10. C. Giurgea, F. Bode, O. I. Budiu, L. Nascutiu, D. Banyai, M. Damian, “Experimental investigations of the steady flow through an idealized model of a femoral artery bypass”, in *Proceedings of the International Conference Experimental Fluid Mechanics 2013*, November 19-22, 2013, Kutna Hora, Czech Republic, pp.223-231
11. C. Giurgea, F. Bode, L. Nascutiu, D. Banyai, L. Marcu, “On investigating the flow through an axisymmetric channel with sudden changes in geometry”, in *EPJ Web of Conferences*, vol. 45, 2013, pp. 211-216

Significant solutions:

High accuracy mapping of the flow fields by using PIV and CFD investigations with possible future applications for: the graft geometry optimization (flow through a femoral artery bypass) respectively the nozzle design optimization (in Personalized Ventilation)

Products and technologies:

A technology for manufacturing optically transparent models suited to PIV investigations. The models consist of idealized bifurcations or axisymmetric channels machined in blocks of Plexiglass with a high degree of transparency and refractive index that could be matched with that of certain working fluids (Technology developed in cooperation with colleagues from the Department of Machine Building of the UTCN).

An experimental setup integrating a flow circuit reproducing the flow through a femoral artery bypass and a 2D PIV system that would allow the investigation by the PIV method of pulsating flows similar to those in a segment of the human circulatory system

Others:

Creation of a laboratory that provides appropriate conditions (darkroom, flat surfaces, optical table and devices, 2D PIV system, experimental setups) for flow investigations through optical methods

The offer addressed to the economic environment

Research & development	<p>Providing support (expertise and facilities) for research in connected fields like: hemodynamics, biomedical flows, thermo-gas-dynamics/combustion by the complementary use of CFD techniques and optical PIV methods.</p> <p>Developing/upgrading the experimental setup used to investigate the pulsed flows similar to that through a bypass (currently in the experimental model stage) with a view toward potential use in testing vascular prostheses</p> <p>Designing and machining customized optically transparent models of axisymmetric channels and bifurcations appropriate for PIV investigations</p> <p>Developing solutions for PV (Personalized Ventilation) and HVAC (Heating Ventilation and Air Conditioning) based on CFD numerical simulations</p> <p>Measuring viscosities for a wide range of fluids, including non-Newtonian fluids, and low viscosity fluids (e.g. possible beneficiaries in cosmetics or pharma industries)</p> <p>Measuring parameters for monitoring the indoor air quality (temperature, humidity, air velocity, CO2 concentrations)</p>
Consulting	<p>Consulting and technical support for designing, building and evaluation of thermo-energy and combustion equipment</p> <p>Technical and judicial expertise in the area of: using thermal equipment and combustion</p>
Training	<p>Courses for providing surgeons with a new approach to reconstructive bypass surgery from the engineering perspective.</p> <p>Introductory course in numerical simulation of fluid flow and heat transfer for undergraduate students and students at the M.Sc. and doctoral level (2014-2015: 4 Undg. St. + 1M.Sc.St. + 1 PhD St.)</p> <p>Initial training in in PIV optical measurement techniques for students at the M.Sc. and doctoral level.</p>