ERCOFTAC SPRING FETIVAL, 21-22 April 2016

Meeting room A1/0308 Thursday, 21st April 2016

9:00	Registration, Coffee
9.20	Welcome and Opening
	Invited Lectures
9.30	Liquid-gas dynamics in pressure-swirl atomization
09.55	Transport and deposition of aerosol in replicas of human airways
10.20	Numerical investigation of inspiratory airflow in a realistic model of the human tracheobronchial airways and a comparison with experimental results
10.45	**COFFEE BREAK**
11.00	Climate control as an integrated part of vehicle development to improve passenger comfort and energy efficiency
11.25	Meshless methods in computational aeroacoustics
11.50	Combustion CFD for contemporary industrial scale burners
12.15	***LUNCH BREAK***
14.15	Current possibilities and issues of CFD simulations for internal combustion engines
14:40	Laboratory of environmental aerodynamics of the Czech Academy of Sciences
15:10	**COFFEE BREAK**
15:30	TOUR OF LABORATORY

19.00 **DINNER**

Meeting room A1/0308 Thursday, 21st April 2016

9.30 – 9.55

Liquid-gas dynamics in pressure-swirl atomization

Jan Jedelsky, Brno University of Technology

Abstract: The presentation focuses on the analysis of spray produced by a small pressure-swirl atomizer. The formation of liquid film and breakup process are illustrated using high-speed imaging. The fully developed spray is probed with optical diagnostic methods and their results serve for description of the flow fields of air and droplets. Strong gas-liquid interaction appears; it is followed with several phenomena, such as droplet clustering, coalescence and turbulence generation. Spatially resolved turbulent characteristics of the liquid-induced entrained airflow are detailed.

9.55 – 10.20

Transport and deposition of aerosol in replicas of human airways

Frantisek Lizal, Brno University of Technology

Abstract: The presentation will introduce a set of human airway replicas and their development. Several experimental methods for measurement of flow and particle deposition will be described. The experimental results will be discussed with respect to the use as a validation tool for CFD.

10.20 – 10.45

Numerical investigation of inspiratory airflow in a realistic model of the human tracheobronchial airways and a comparison with experimental results

Jakub Elcner, Brno University of Technology

Abstract: The results of numerical simulations using computational fluid dynamics (CFD) and a comparison with experiments performed with phase-Doppler anemometry will be presented. The simulations and experiments were conducted in a realistic model of the human airways for inspiratory part of breathing cycle. Commercial CFD code (CD-Adapco) was used with an SST k-ω low-Reynolds Number RANS model. Comparisons were made at several points in eight cross sections selected according to experiments in the trachea and the left and right bronchi.

11.00 – 11.25

Climate control as an integrated part of vehicle development to improve passenger comfort and energy efficiency

Jan Pokorny, Brno University of Technology

Abstract: Design of climate control is an integral part of vehicle development process. It is influenced by compartment geometry, used materials (e.g. glazing), HVAC system sizing, etc. We present a fast design tool for calculation of the car cabin heat loads, which can be used in the early stage of developing process. And also the method how to test thermal comfort in already manufactured cars.

11.25 – 11.50

Meshless methods in computational aeroacoustics

Jaroslav Bajko, Brno University of Technology

Abstract: The talk will be dedicated to a brief description of meshless methods, their comparison to commonly used mesh-based numerical techniques and their applications in Computational Aeroacoustics. Mainly, the acoustic wave propagation phenomenon, simple acoustic sources and underlying flows with respect to the stability, accuracy and robustness of the numerical method will be discussed.

11.50 – 12.15

Combustion CFD for contemporary industrial scale burners

Marek Scholler, Honeywell

Abstract: The presentation shows issues which are solved within new burners development process for burners dedicated to heavy industry. As the physical prototyping in the industry is still cheap enough. The product development process is a combination of physical prototyping and virtual (CFD) prototyping. Then the simulation must respect quite short cycle time, which is a limiting point in terms of using modern models and approaches for combustion simulations.

14.15 – 14.40

Current possibilities and issues of CFD simulations for internal combustion engines

Oldrich Vitek, Jan Macek, Czech Technical University in Prague

Abstract: Main goals of aerodynamic simulation for ICE - processes of combustion, heat transfer, gas exchange and turbocharging. Meaning of unsteadiness for ICE, coherent structures and turbulence, LES and cycle-to-cycle variations. Application limits of current methods used for understanding, improvement and optimization of ICE design. Combination of 3-D and 1-D simulations with reasonable computational time demands. Examples of results (combustion, gas exchange and radial turbine simulations). Links to optimization methods for low emissions and high efficiency.

14.40 – 15.10

Laboratory of environmental aerodynamics of the Czech Academy of Sciences

Stepan Nosek, Zbynek Janour, Radka Kellnerova, Klara Jurcakova and Petr Bauer
Institute of Thermomechanics, Czech Academy of Sciences

Abstract: This presentation sums up the recent activities of the laboratory of environmental fluid mechanics. The focus will be on the experimental investigation of Atmospheric Boundary Layer flows. The experimental tools, methods and facilities will be described together with the outputs of several projects recently solved by the authors. Practical applications of this research will be shown, pointing out the mutual collaboration with external academic partners and industry.

Meeting room A1/0308 Friday, 22nd April 2016

9:00 - 11:30 Scientific Programme Committee and Knowledge Network Committee meetings to be held in parallel

SPC Venue: meeting room A1/0308
KNC Venue: meeting room A1/1445

11.30-12.30 Joint SPC and KNC meeting:
Venue: meeting room A1/0308

12:30 – 14:00 Lunch

14:00 - 16:30 Executive Committee Meeting

Venue: meeting room A1/0308