7th European Thermal-Sciences Conference

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This special issue of the *Heat and Mass Transfer* journal contains 38 papers that originate from presentations at the seventh European Thermal-Sciences Conference (EUROTHRERM 2016) held in Krakow, Poland from 19 to 23 June 2016.

The European Thermal-Sciences Conferences are taking place since 1992. The EUROTHERM 2016 in Krakow followed successful conferences in Birmingham (1992, 2004), Rome (1996), Heidelberg (2000), Eindhoven (2008), Poitiers, Futuroscope (2012).

The seventh European Thermal-Sciences Conference was organized under the auspices of the EUROTHERM Committee. The main goal of this conference was to provide a forum for the exposure and exchange of ideas, methods and results in heat transfer, fluid mechanics and thermodynamics.

During the EUROTHRERM 2016 seven state-of-the-art keynote papers have been delivered by the world's leading experts. Those invited talks have been followed by 210 presentations delivered in over thirty regular sessions and four special sessions devoted to Clean Coal and Gas Technologies, Fuel Cell Systems, High Magnetic Fields as well as to R744 Ejector Refrigeration Systems.

Contributions to this special issue of the *Heat and Mass Transfer* journal have been recommended by the international scientific committee. In all cases the authors were asked to extend their papers and they were then subjects of the usual peer-review process of the journal, which included at least two independent reviews. In this way the special issue provides a

window on the current interests in the heat transfer processes which is a fascinating research area.

Papers of this special issue have been generally selected to demonstrate, on the one hand, an overview of the most of the conference topics and, on the other hand, to present few hot and important topics in heat transfer. One of them are certainly advances in the coupling of the heat and mass transfer involving particularly the dendritic growth (Seredyński et al.), laser melting (Kuehndel et al.), film evaporation of aqueous lithium bromide solution (Olbricht and Luke) or axisymmetric bubble impingement and rebound (Donoghue et al.). To the same group of works coping with the heat and mass transfer belong also analysis of heat transfer in engine coolers influenced by the electromagnetic fields (Karcher and Kühndel), coupled processes in the protective clothing (Łapka and Furmański) as well as a new method to optimize of the natural convection heat sinks (Lampio and Karvinen).

Papers dealing with the phase change problems and multiphase flows represent subsequent big group of contributions. Authors analyse forced convection in the wakes of impacting and sliding bubbles (O'Reilly Meehan et al.), simulate of blood (treated as a multiphase mixture) flow within main thoracic arteries of 8-year-old child with coarctation of the aorta (Melka et al.) and investigate nucleating steam flow in nozzle and turbine cascade (Joseph et al.). Some authors concentrate on a numerical parametric study of heat transfer inside a PCM-air heat exchanger (Herbinger et al.) while some others focus on experiments with refrigerants flow boiling inside small sized microfin tubes (Diani and Rossetto) or on experiments with ice growth in antifreeze polypeptides solutions in a narrow space (Miyamoto et al.).

Other important and very challenging topics being dealt with in this special issue are the computational/numerical methodology and simulation of combustion. Investigators compare of RANS and IDDES solutions for turbulent flow and heat transfer (Smirnov et al.) and discuss recent advances in computational-analytical integral transforms for convection-diffusion problems (Cotta et al.). One contribution

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shows complexity of the soot and radiation modelling in buoyant turbulent diffusion flames (Snegirev et al.).

Few papers in this special issue demonstrate progress in convection, fluid mechanics and turbulence. Particularly, authors examine enhancement of natural heat transfer coefficient due to application of the MWCNT/Water nanofluid (Joshi and Pattamatta) or due to turbulent flow regime in coiled tubes (Bozzoli et al.). Interesting results are also reported (by Blythman et al.) in the parametric analysis of laminar pulsating flow and (by Bağcı et al.) in investigation of low-frequency-oscillating water flow in metal foam. Finally, a turbulent convective buoyant flow of sodium is studied by Schumm et al.

The above discussed papers are also supplemented by two considerations focused on inverse thermal problems. Malinowski et al. identified the heat transfer coefficient over the plate cooled by the circular water jets using both one and three dimensional models while Loussouarn et al. developed a reduced model for experimental thermal characterization of a holding furnace.

Many contemporary heat transfer models utilise the idea of the porous medium. In this context, transport properties of solid foams having circular strut cross section are estimated numerically by Jobic et al. while aluminium foam application in a tubular heat exchanger is investigated by Buonomo et al.

Quite modern topics in heat transfer are micro-nano systems represented by report on liquid temperature measurement method in microchannels (Tatsumi et al.) and heat transfer in life sciences represented by analysis of natural convection heat transfer coefficient for newborn baby thermal manikin (Ostrowski and Rojczyk).

The new era in natural convection research is directed to studies of a strong magnetic field impact on a paramagnetic fluid motion (Kraszewska et al.) and thermo magnetic convection of diamagnetic nanofluids (Roszko and Fornalik-Wajs).

The impact of research that focuses on the further sharpening-up of energy efficiency is presented in several papers in this special issue, for example; energy storage technologies in conjunction with flexible power plants (Koytsoumpa

et al.), the lignite drying system in superheated steam (Zakrzewski et al.), the steam reforming process of ethane (Tomiczek et al.). Solid oxide fuel cells (SOFCs) which directly convert the chemical energy of fuels into electrical energy through electrochemical reactions, are attracting to their high power generation efficiency, fuel flexibility and environmentally friendliness (Iwai et al., Onaka et al., Sugihara et al., Nakajima and Kitahara, Nakajima et al., Mozdzierz et al.).

The level and quality of contributions during EURO THERM 2016 Conference proved that Thermal-Science maintains its position as a subject of central importance in traditional and newly developing areas.

As the Guest Editors of this special issue of the Heat and Mass Transfer, we are indebted to all authors for their contributions, cooperation and support. We would also like to thank Professor Andrea Luke, editor-in-chief, for providing us an opportunity to publish this special issue with selected papers from the 7th European Thermal-Sciences Conference. We are also very grateful to Mr. Federico Lonardi, Managing Editor of the HAMT, and to editorial staff of the journal for highly professional handling of this special issue.

Special thanks go to the reviewers for the quality of their recommendations and opinions, and for the efforts they made to improve manuscripts quality and to fit with the requirements of the HAMT journal. Their contribution cannot be overestimated.

To conclude, we would like to inform that the 8th European Thermal-Sciences Conference will be held in 2020 in Lisbon, Portugal.

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