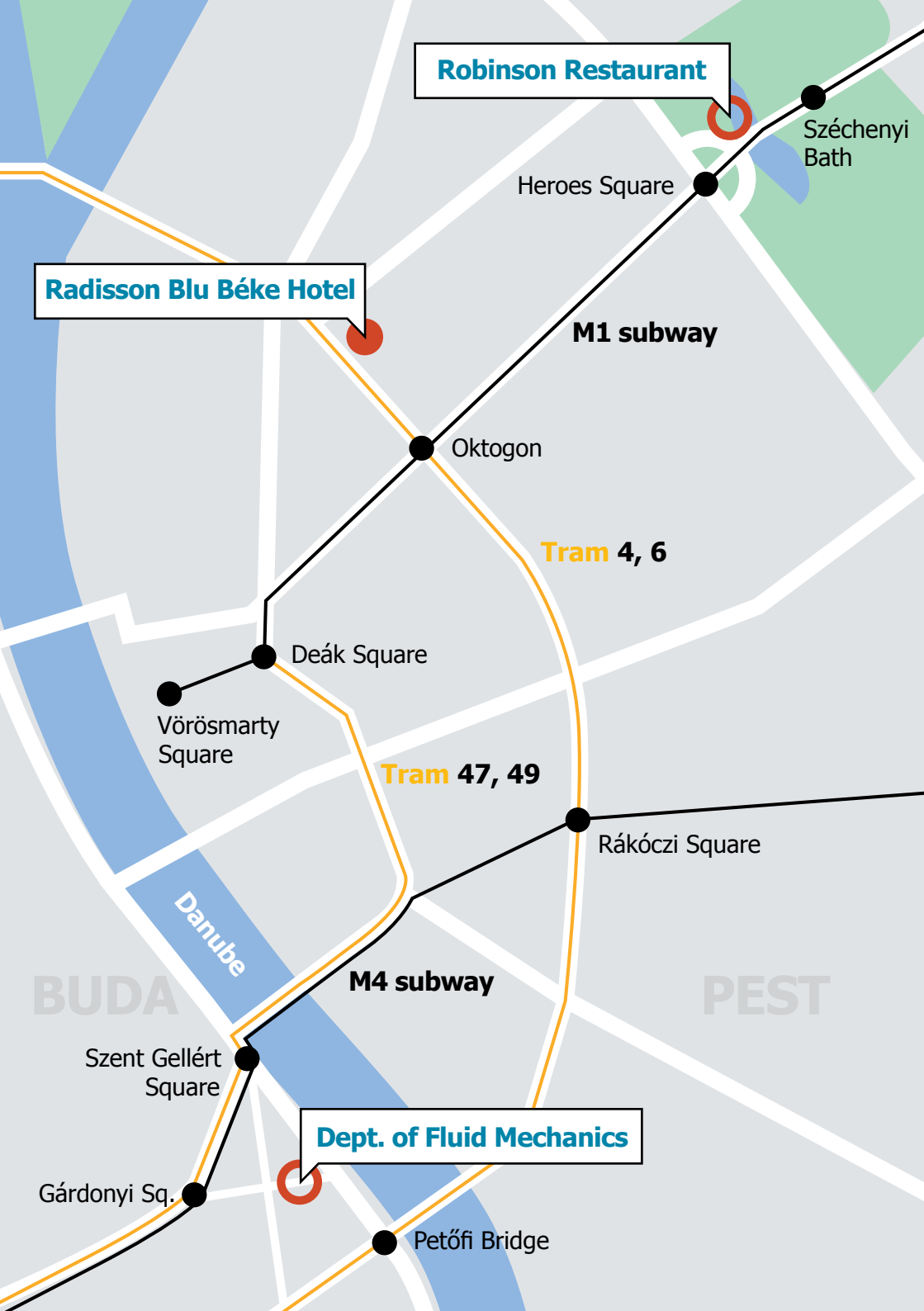
Conference
on Modelling Fluid Flow (CMFF'22)
Radisson Blu Béke Hotel

August 30 – September 2, 2022
Radisson Blu Béke Hotel
Budapest, Hungary

Final Programme

Department of Fluid Mechanics / Faculty of Mechanical Engineering
Budapest University of Technology and Economics


Robinson Restaurant
Széchenyi Bath
Heroes Square
Radisson Blu Béke Hotel
M1 subway
Oktogon
Tram 4, 6
Deák Square
Vörösmarty Square
Tram 47, 49
Rákóczi Square
Danube
BUDA
PEST
M4 subway
Szent Gellért Square
Dept. of Fluid Mechanics
Gárdonyi Sq.
Petőfi Bridge

Welcome to the 18th event of the international conference series on Fluid Flow Technologies!

Conference Venue - Buildings of Interest

Radisson Blu Béke Hotel

Teréz körút 43., H-1067 Budapest

From the 31st of August, the Plenary Sessions, oral presentations, and the Workshops will take place in this building. The venue of the Conference, Radisson Blu Béke Hotel at Teréz krt. 43. 1067 Budapest (see the map!)

Department of Fluid Mechanics

Bertalan Lajos u. 4-6., H-1111 Budapest
"AE" building of BME

Registration and Welcome Reception on the **30th of August** will take place in this building. The Department can be reached from Szent Gellért tér/square along the bank of the Danube or through the garden of the University, (take Budafoki út entrance). Also from Petőfi híd/bridge along the bank of the Danube or from Gárdonyi square along Bertalan L. utca (see the map!)

Robinson Restaurant

Városligeti tó, City Park H-1146 Budapest

On the **31st of August** from 19:30, the **Gala Dinner** of CMFF Conference will be held in this magical restaurant. From Radisson Hotel walk to Oktogon, take M1 (subway) towards Mexikói út, and get off at Széchenyi Bath/ Fürdő, or at Heroes square/ Hősök tere walk towards Városligeti tó/City Park Lake, to reach Robinson Restaurant.
(see the map!)

The 18th event of the international conference series
on Fluid Flow Technologies held in Budapest

CMFF'22 August 30 - September 2 Radisson Blu Béke Hotel

Conference Secretariat

Department of Fluid Mechanics / Faculty of Mechanical Engineering
Budapest University of Technology and Economics

Bertalan Lajos. u. 4-6., H 1111 Budapest, Hungary
Tel: +36 1 463 26 35
cmff@gpk.bme.hu www.cmff.hu

Registration and Information Desk

Opening hours:

Tuesday 30th of August, 6 pm -8 pm:
Located on the ground floor of the Department of Fluid Mechanics, AE building.

Wednesday 31th of August, 8 am - 6 pm:
Located in the Radisson Blu Béke Hotel

Lunch and coffee breaks

Lunch as well as coffee will be served in the Radisson Blu Béke Hotel.

Transportation

Radisson Blu Béke Hotel is easily accessible by public transport (tram 4/6, bus, M3/M1). You can find more information about public transport on the internet. www.bkk.hu

Restrictions

Videotaping or audio recording of any session and sale of any publication not authorised by the Conference Secretariat is prohibited.

Social programmes

Welcome Reception (30th of August, 6 pm - 8 pm)

offered by the Conference Organisers and hosted by the Department of Fluid Mechanics (AE Building).

Gala Dinner (31th of August, 7:30 pm)

to be held at Robinson Restaurant.

Speaker briefing

• Laptops for PowerPoint and pdf presentations, video projectors and pointers will be available in each conference room.

• Please contact your session chairperson 10 minutes prior to session opening and provide him/her with your data in a written format, in order to make it possible for him/her to introduce you to the audience:

- name of the presenting author
- title
- position
- affiliation
- year of receipt and subject of scientifc degree (as appropriate)

• Please also contact the session secretary 10 minutes prior to session opening to load your PowerPoint or pdf presentation onto the on-site laptop. You have to deliver your PowerPoint or pdf files on a pen-drive.

• Timing of presentation: You are requested to prepare an oral presentation of duration of 15 minutes. Please respect this time limit strictly, in order to avoid the disturbance of the time schedule. Your presentation will be followed by a 5-minute discussion.

The 4 keynote speeches will be in the topics of:

"Simulation of reacting and moving granular assemblies of thermally thick particles by DEM/CFD, a brief overview"

by **Prof. Viktor Scherer,** Bochum (DE)

_____

"Past, present, and new challenges for computational hemodynamics of cerebral circulation"

by **Prof. Marie Oshima,** Tokyo (JP)

_____

"State of art and challenges in computational aeroacoustics"

by **Prof. Manfred Kaltenbacher,** Graz (AT)

_____

"Optical measurements of drops in flows",

by **Prof. Cameron Tropea,** Darmstadt (DE)

CMFF'22 Programme of Tuesday

Dept. of Fluid Mechanics
Budapest University of Technology and Economics
1111 Budapest, Bertalan Lajos utca 4-6

30 August 2022

18:00 - 20:00	**Registration and Welcome Reception**

CMFF'22 Programme of Wednesday

Radisson Blue Béke Hotel

31 August 2022

	Juliet Room	Shakespeare Room	Venice Room
9 :00 - 9:10	-	**Welcome Address**	-
9 :10 - 9:55	-	**Plenary Session 1** Invited Speaker: Prof. Viktor Scherer	-
9:55 - 10:25	**Break**	**Break**	**Break**
10:25 - 12:25	**IF**	**TM1**	**WS1**
12:25 - 13:55	**Lunch**	**Lunch**	**Lunch**
13:55 - 14:40	-	**Plenary Session 2** Invited Speaker: Prof. Marie Oshima	-
14:40 - 15:10	**Break**	**Break**	**Break**
15:10 - 17:30	**BU**	**CF**	**WS2**

Robinson Restaurant
1146 Budapest, Városligeti tó, City Park (see map)

19 :30 -	**Gala Dinner**

WS1 **Workshop on DEM-CFD**
WS2 **Workshop on biomedical flows**
WS3 **Challenges in valve modelling & analysis**
WS4 **Industry 4.0 in smart ventilation: questions and challenges**
WS5 **Coupling techniques in multiscale atmospheric models: Microphysics, local scale simulations, PBL structure**
WS6 **Coupling techniques in multiscale atmospheric models: Numerical weather and climate modelling: scaling, coupling, parameterizations**

CMFF'22 Programme of Thursday

Radisson Blue Béke Hotel

1 September 2022

	Juliet Room	Shakespeare Room	Venice Room
9:00 - 9:10	-	**Technical information**	-
9:10 - 9:55	-	**Plenary Session 3** Invited Speaker: Prof. Manfred Kaltenbacher	-
9:55 - 10:25	**Break**	**Break**	**Break**
10:25 - 12:25	**TU**	**TM2**	**ET**
12:25 - 13.55	**Lunch**	**Lunch**	**Lunch**
13.55 - 14:40	-	**Plenary Session 4** Invited Speaker: Prof. Cameron Tropea	-
14:40 - 15:10	**Break**	**Break**	**Break**
15:10 - 16:50	**WS3**	**WS4**	**EV**

CMFF'22 Programme of Friday

Radisson Blue Béke Hotel

2 September 2022

	Juliet Room	Shakespeare Room	Venice Room
9 :00 - 11:00	**DPL**	**TM3**	**WS5**
11:00 - 11:30	**Break**	**Break**	**Break**
11:30 - 13:00	**AE**	**SV**	**WS6**
13:00	-	**Closing Plenary**	-

AE	**Aeronautics**	**IF**	**Internal and External Flow**
BU	**Cavitation and Bubbles**	**SV**	**Sound and Vibration**
CF	**Complex Flows**	**TM1**	**Turbomachinery**
DPL	**Droplets and Particle-Laden Flows**	**TM2**	**Turbomachinery**
ET	**Energy Transfer**	**TM3**	**Turbomachinery**
EV	**Environmental Flow**	**TU**	**Turbulent Flow**

Session Identifier	**Plenary Session 1** **Shakespeare Room**
Chairperson	**Prof. Dominique Thévenin** Laboratory of Fluid Dynamics and Technical Flows, Institute of Fluid Dynamics and Thermodynamics, University of Magdeburg "Otto von Guericke", Germany
Invited Speaker	**Prof. Viktor Scherer** Department of Energy Plant Technology, Ruhr-Universität Bochum, Bochum, Germany

Wed. 31. August 9 :10 - 9:55

#125

¬ Simulation of reacting and moving granular assemblies of thermally thick particles by DEM/CFD, a brief overview

Enric **Illana**, Maximilian **Brömmer**, Siegmar **Wirtz,**
and Viktor **Scherer**
Department of Energy Plant Technology,
Ruhr-Universität Bochum, Bochum, Germany.

Session Identifier	**IF1**	**Juliet Room**
Session Main Topic	**Internal and External Flow**	
Chairperson	**Dr. Katharina Zähringer** Laboratory of Fluid Dynamics and Technical Flows, Otto-von-Guericke-Universität Magdeburg, Germany	

Numb. of presentations 6 Wednesday August 10:25 - 12:25

#3 10:25 - 10:45

¬ Numerical simulation of a confined backward-facing step flow using hybrid turbulence models in OpenFOAM

Wim **Munters**, Lilla **Koloszar** and Philippe **Planquart**

Department of Environmental and Applied Fluid Dynamics.
von Karman Institute for Fluid Dynamics, Sint-Genesius-Rode, Belgium.

#14 10:45 - 11:05

¬ Efficient PIV measurements in the interior of complex, transparent geometries

Mirko **Ebert**[1], Christin **Velten**[2], Katharina **Zähringer**[2] and Christian **Lessig**[1]

1 Institute for Simulation and Graphics, Department of Computer Science,
Otto-von-Guericke-Universität Magdeburg, Magdeburg, Germany.

2 Lehrstuhl für Strömungsmechanik und Strömungstechnik, Fakultät für Verfahrens- und Systemtechnik, Otto-von-Guericke-Universität, Magdeburg, Germany.

#19 11:05 - 11:25

¬ Direct numerical simulation of the wake flow of a miniature vortex generator and its interaction with a laminar boundary layer

Maarten **Vanierschot**[1], András **Szabó**[2], Péter **Nagy**[2] and György **Paál**[2]

1 KU Leuven, Department of Mechanical Engineering, Group T Leuven campus,
Heverlee, Belgium.

2 Department of Hydrodynamic Systems, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics.

#23 11:25 - 11:45

¬ Stability analysis of a streaky boundary layer generated by miniature vortex generators

András **Szabó**[1], Péter Tamás **Nagy**[1], Maarten **Vanierschot**[2] and György **Paál**[1]

1 Department of Hydrodynamic Systems, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

2 Group T Leuven Campus, Department of Mechanical Engineering, KU Leuven,
Leuven, Belgium.

#37 11:45-12:05

¬ Fish injury assessment of a hydropower facility bypass

Dennis **Powalla**, Rishav **Saha**, Stefan **Hoerner** and Dominique **Thévenin**
Laboratory of Fluid Dynamics and Technical Flows,
University "Otto von Guericke" of Magdeburg, Magdeburg, Germany.

#46 12:05 - 12:25

¬ Steady and unsteady pressure drop due to a design obstruction variation within a small-scale channel

Mirza **Popovac** and Helmut **Kühnelt**
Austrian Institute of Technology, Electric Vehicle Technologies,
Center for Low-Emission Transport, Vienna, Austria.

Session Identifier **TM1** **Shakespeare Room**
Title **Turbomachinery**
Chairperson **Prof. Johan Revstedt,**
Dept. of Energy Sciences, Lund University, Lund, Sweden

Numb. of presentations **6** Wednesday 31. August. 10:25 - 12:25

#70 10:25 - 10:45
¬ Design recommendations for wastewater pumping stations – results from model tests
Tim **Nitzsche**, Julija **Peter**, Sebastian **Haueisen** and Paul Uwe **Thamsen**
Chair of Fluid System Dynamics, Faculty of Mechanical Engineering and Transport Systems, Technische Universität Berlin, Berlin, Germany.

#67 10:45 - 11:05
¬ Insights into the flow situation of a multi-stage centrifugal pump
Helmut **Benigni**[1], Stefan **Hoeller**[2], Bernhard **Lechner**[2], Jürgen **Konrad**[2] and Helmut **Jaberg**[1,2]
1 Institute of Hydraulic Fluidmachinery, Graz University of Technology, Graz, Austria.
2 Prof. Dr. Jaberg und Partner GmbH, Vasoldsberg, Austria.
3 Dickow Pumpen GmbH & Co. KG, Waldkraiburg, Germany.

#9 11:05 - 11:25
¬ Effect of leakage on the performance of a centrifugal pump with a vaneless diffuser
Meng **Fan**, Antoine **Dazin**, Gérard **Bois** and Francesco **Romano**
Univ. Lille, CNRS, ONERA, Arts et Métiers Institute of Technology, Centrale Lille, Laboratoire de Mécanique des Fluides de Lille - Kampé de Fériet, Lille, France.

#21 11:25 - 11:45
¬ Suitability of a profile with tubercles for axial pumps - Investigation using flow simulation
Mareen **Derda**, Ferdinand **Neumann** and Paul Uwe **Thamsen**
Department of Fluid System Dynamics, Institute of Fluid Dynamics and Technical Acoustics, Technische Universität Berlin, Berlin, Germany.

#63 11:45 - 12:05
¬ Development of sewage pumps with numerical and experimental support
David **Beck**, Yvonne **Holzbauer** and Paul Uwe **Thamsen**
Chair of Fluid System Dynamics, Faculty of Mechanical Engineering and Transport Systems, Technische Universität Berlin, Berlin, Germany.

#49 12:05 - 12:25

¬ Numerical study on the solid-liquid residence time distribution in a counter-current screw extractor

Annemarie **Lehr**, Gábor **Janiga**, Andreas **Seidel-Morgenstern** and Dominique **Thévenin**

Department of Fluid Mechanics and Technical Flows, Faculty of Process and Systems Engineering, Otto von Guericke University Magdeburg, Magdeburg, Germany.

Session Identifier	**WS1**	**Venice Room**
Title	**Workshop on DEM-CFD**	
WS Leader	**Prof. Viktor Scherer**	
	Department of Energy Plant Technology, Ruhr-Universität Bochum, Bochum, Germany.	
WS Co-organizers	**Prof. Dominique Thévenin**	
	Department of Fluid Mechanics and Technical Flows, Faculty of Process and Systems Engineering, Otto von Guericke University Magdeburg, M.burg, Germany.	
Numb. of presentations	**4**	Wed. 31. August. 10:25 - 12:25

¬ ABSTRACT

The combination of Computational Fluid Dynamics (CFD) with the Discrete Element Method (DEM) provides novel opportunities for more accurate simulations of particulate flows involving large particles. This is particularly true in process and energy engineering. However, many challenges remain from the methodological point of view as well as regarding requirements in terms of computing time and memory. Specific extensions are necessary for flows involving chemical reactions, phase changes, non-newtonian properties, or compressibility effects, to cite a few. This workshop will document recent advances and showcase challenging applications of DEM-CFD.

#117 10:25 - 10:45

¬ Machine learning-based closure development for modeling of cohesive gas-particle flows

Josef **Tausendschön**, Mohammadsadegh **Salehi** and Stefan **Radl**

Institute of Process and Particle Engineering, Graz University of Technology, Graz, Austria.

#122 10:45 - 11:05

¬ CFD-DEM modelling of shaft furnaces, using the volume fraction smoother approach

Christoph **Spijker** and Harald **Raupenstrauch**

Chair of Thermal Processing Technology, Montanuniversitaet Leoben, Leoben, Austria.

#118 11:05 - 11:25

¬ Local flow resolution with the blocked-off method in DEM-CFD: Gaseous fuel jet dispersion and combustion in a particle assembly

Enric Illana **Mahiques**, Max **Brömmer**, Siegmar **Wirtz** and Viktor **Scherer**

Institute of Energy Plant Technology, Ruhr-University Bochum, Bochum, Germany.

#116 11:25 - 11:45

¬ Discrete element modelling of non-spherical particles in turbulent gas-solid flows

Berend van **Wachem**[1], Victor **Chéron**[1] and Fabien **Evrard**[1,2]

1 Chair of Mechanical Process Engineering, Faculty of Process and Systems Engineering, Otto-von-Guericke University Magdeburg, Magdeburg, Germany.

2 Sibley School of Mechanical and Aerospace Engineering, Cornell University, Ithaca, NY, United States of America.

Session Identifier	**Plenary Session 2**	**Shakespeare Room**
Chairperson	**Prof. Dominique Thévenin** Laboratory of Fluid Dynamics and Technical Flows, Otto-von-Guericke-Universität Magdeburg, M.burg, Germany.	
Invited Speaker	**Prof. Marie Oshima** Interfaculty Initiative in Information Studies/ Institute of Industrial Science, The University of Tokyo, Tokyo, Japan.	

Numb. of presentations **1** Wednesday 31. August. 13:55 - 14:40

#126

¬ Past, present, and new challenges for computational hemodynamics of cerebral circulation

Marie **Oshima**[1], Changyoung **Yuhn**[2], Masaharu **Kobayashi**[2],

1 Interfaculty Initiative in Information Studies, The University of Tokyo, Tokyo, Japan.

2 Institute of Industrial Science, The University of Tokyo, Tokyo, Japan.

Session Identifier **BU** **Juliet Room**

Title **Cavitation and bubbles**

Chairperson **Prof. Shuhong Liu**

State Key Laboratory of Hydro Science and Engineering, and Department of Energy and Power Engineering, Tsinghua University, Beijing, China.

Numb. of presentations **7** Wednesday 31. August 15:10 - 17:30

#91 15:10 - 15:30

¬ Expansion and collapse of single cavitation bubbles right at a solid boundary

Christiane **Lechner**[1], Max **Koch**[2], Werner **Lauterborn**[2] and Robert **Mettin**[2]

1 Institute of Fluid Mechanics and Heat Transfer, TU Wien, Vienna, Austria.

2 Third Physical Institute, Georg-August University Göttingen. Göttingen, Germany.

#95 15:30 - 15:50

¬ Mushroom shaped bubbles and the jet of 1000 m/s

Max **Koch**[1], Christiane **Lechner**[1,2], Werner **Lauterborn**[1] and Robert **Mettin**[1]

1 Third Physical Institute, Georg-August University Göttingen, Göttingen, Germany.

2 Institute of Fluid Mechanics and Heat Transfer, TU Wien, Vienna, Austria.

#121 15:50 - 16:10

¬ Effect of different chemical mechanisms in sonochemical modelling

Csanád **Kalmár** and Ferenc **Hegedűs**

Department of Hydrodynamic Systems, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.

#34 16:10 - 16:30

¬ Flow around bubbles: 4D measurement concept with high-speed tomographic system

Conrad **Müller**[1], Yingjie **Chang**[1,2], Péter **Kováts**[1], Dominique **Thévenin**[1] and Katharina **Zähringer**[1]

1 Laboratory of Fluid Dynamics and Technical Flows, Otto-von-Guericke-Universität Magdeburg, Magdeburg, Germany.

2 State Key Laboratory of Multiphase Flow in Power Engineering, Xi'an Jiaotong University, Xi'an, China.

#61 16:30 - 16:50

¬ Resolving sub-kolmogorov bubble dynamics in turbulent flows: Formulation of a multiscale numerical framework

Niklas **Hidman**, Henrik **Ström**, Srdjan **Sasic** and Gaetano **Sardina**

Chalmers University of Technology, Department of Mechanics and Maritime Sciences-Division of Fluid Dynamics, Gothenburg, Sweden.

#32 16:50 - 17:10

¬ Fluid dynamics in a countercurrent bubble column: Experiments and simulations

Peter **Kovats**[1], Katharina **Zähringer**[1], Haris **Khan**[2], Roland **Rzehak**[2] and Dominique **Thévenin**[1]

1 Laboratory of Fluid Dynamics and Technical Flows, Otto-von-Guericke-Universität Magdeburg, Magdeburg, Germany.

2 Helmholtz-Zentrum Dresden – Rossendorf, Institute of Fluid Dynamics, Dresden, Germany.

#17 17:10 - 17:30

¬ Effects of tip leakage vortex cavitation on flow field under cavitation instability

Youngkuk **Yoon** and Seung Jin **Song**

Department of Mechanical Engineering, Seoul National University, Seoul, Korea.

Session Identifier **CF** **Shakespeare Room**

Title **Complex flows**

Chairperson **Dr. Mohammadsadegh Salehi**
Institute for Process and Particle Engineering,
Graz University of Technology, Graz, Austria.

Numb. of presentations **7** Wednesday 31. August 15:10 - 17:30

#4 15:10 - 15:30

¬ Effect of shear rate on polymer-induced flocculation for behavioural modification techniques

Lee **Mortimer** and Michael **Fairweather**
School of Chemical and Process Engineering, Faculty of Engineering and Physical Sciences, University of Leeds, Leeds, United Kingdom.

#83 15:30 - 15:50

¬ Investigations on the separation of two immiscible liquids in helical pipes with different conditions and dimensions

Michael **Mansour[1,2]**, Conrad **Müller[2]**, Dominique **Thévenin[2]**
and Katharina **Zähringer[2]**
1 Mechanical Power Engineering Department,
Faculty of Engineering - Mataria, Helwan University, Cairo, Egypt.
2 Lab. of Fluid Dynamics & Technical Flows, University of Magdeburg "Otto von Guericke", Magdeburg, Germany.

#78 15:50 - 16:10

¬ Classification of percolation clusters with artificial neural networks

Kálmán **Kustány[1]**, Gergely **Hajgató[2]**, Bendegúz Dezső **Bak[1]**
and Tamás **Kalmár-Nagy[1]**
1 Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics. Budapest, Hungary.
2 Department of Telecommunications and Media Informatics,
Faculty of Electrical Engineering and Informatics,
Budapest University of Technology and Economics, Budapest, Hungary.

#35 16:10 - 16:30

¬ Direct numerical simulation of shallow water breaking waves generated by wave plate

Shuo **Liu**, Hui **Wang**, Annie-Claude **Bayeul-Lainé**
and Olivier **Coutier-Delgosha**
Univ. Lille, CNRS, ONERA, Arts et Métiers Institute of Technology, Centrale Lille, Laboratoire de Mécanique des Fluides de Lille – Kampé de Fériet, Lille, France.

#11 16:30 - 16:50

¬ Comparison study of the k-kl-ω and γ-Reθ transition model in the open water performance prediction of a rim-driven thruster

Bao **Liu**[1], Maarten **Vanierschot**[1] and Frank **Buysschaert**[2]

1 Department of Mechanical Engineering, Group T Leuven Campus, KU Leuven, Leuven, Belgium.

2 Department of Mechanical Engineering, Bruges Campus, KU Leuven, Bruges, Belgium.

#73 16:50 - 17:10

¬ Optimization of the pressure increase of an adapted Pitot-tube jet-pump for the separation of oil-water mixtures

Jessica **Köpplin** and Dominique **Thévenin**

Laboratory of Fluid Dynamics and Technical Flows, Otto von Guericke University Magdeburg, Magdeburg, Germany.

#98 17:10 - 17:30

¬ Improving the incompressibility condition of the explicit SPH method using the control theory

Balázs **Havasi-Tóth**

Department of Fluid Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.

Session Identifier	**WS2**	**Venice Room**
Title	**Workshop on biomedical flows**	
WS Leader	**Prof. Gábor Janiga,** Laboratory of Fluid Dynamics and Technical Flows, Otto von Guericke University Magdeburg, Magd., Germany.	
WS Co-organizers	**Prof. György Paál** Department of Hydrodynamic Systems, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary. **Prof. Marie Oshima** Interfaculty Initiative in Information Studies / Institute of Industrial Science, The University of Tokyo, Tokyo, Japan.	
Numb. of presentations	**7**	Wednesday 31. August 15:10 - 17:30

¬ ABSTRACT

Numerical simulations are widely used to investigate biomedical problems including mainly but not exclusively blood flows. The quality of the obtained results strongly depends on the boundary conditions, as well as on the applied models. Therefore, their role should be carefully studied and the role of generic versus patient-specific conditions clarified. The present workshop aims at discussing such aspects and assessing the potential of numerical blood flow simulations for different problems, including intracranial aneurysms (IA) or arteriovenous malformations (AVM).

#66 15:10 - 15:30

¬ Boundary condition options for Carotid bifurcation analysis using Doppler velocity measurements

Márton Bence **Németh**[1], Benjamin **Csippa**[1], Zsuzsanna **Mihály**[2], Gyögy **Paál**[1] and Péter **Sótonyi**[2]

1 Department of Hydrodynamic Systems, Budapest University of Technology and Economics, Budapest, Hungary.
2 Department of Vascular and Endovascular Surgery, Semmelweis University Budapest, Budapest, Hungary.

#72 15:30 - 15:50

¬ Initiation of bifurcation aneurysms: a pilot study

Péter **Friedrich**[1], Benjamin **Csippa**[1], György **Paál**[1] and István **Szikora**[2]

1 Department of Hydrodynamic Systems, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.
2 Department of Neurointerventions, National Institute of Mental Health, Neurology and Neurosurgery, Budapest, Hungary.

#45 15:50 - 16:10

¬ Can black blood MRI predict hemodynamics in intracranial aneurysms? - An analysis of in-vitro signal intensity and CFD

Jana **Korte**[1,2], Laurel **Marsh**[1,2,3], Mariya **Pravdivtseva**[4], Franziska **Gaidzik**[1,2], Naomi **Larsen**[4], Gabor **Janiga**[1,2] and Philipp **Berg**[1,2]

1 Department of Fluid Dynamics and Technical Flows, University of Magdeburg, Magdeburg, Germany.
2 Research Campus STIMULATE, University of Magdeburg, Germany.
3 Department of Mechanical Engineering, University of Washington, Seattle, USA.
4 Department of Radiology and Neuroradiology, University Medical Center Schleswig-Holstein (UKSH), Kiel University, Kiel, Germany.

16:10 - 16:30

¬ Cerebral perfusion simulation of a virtual patient cohort based on clinical data integration

Tamás István **Józsa**[1] and Stephen John **Payne**[2]

1 University of Oxford, Oxford, United Kingdom.
2 National Taiwan University, Taipei, Taiwan.

#55 16:30 - 16:50

¬ Calculating particle residence times in vessel geometries with aneurysm

Dániel **Gyürki**[1], István **Szikora**[2] and György **Paál**[1]

1 Department of Hydrodynamic Systems, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.
2 Department of Neurointerventions, National Institute of Clinical Neurosciences, Budapest, Hungary.

#119 16:50 - 17:10

¬ Multimodal hemodynamic evaluation of vessel wall enhanced cerebral draining veins for the assessment of arteriovenous malformations

Janneck **Stahl**[1], Sylvia **Saalfeld**[2], Laura Stone **McGuire**[3], Denise **Brunozzi**[3], Ali **Alaraj**[3], David **Hasan**[4] and Philipp **Berg**[1]

1 Department of Fluid Dynamics and Technical Flows, Research Campus STIMULATE, University of Magdeburg, Magdeburg, Germany.
2 Department of Simulation and Graphics, Research Campus STIMULATE, University of Magdeburg, Germany.
3 Department of Neurosurgery, University of Illinois, Chicago, USA.
4 Duke Neurological Disorders Clinic, Durham, NC, USA.

#58 17:10 - 17:30

¬ One-dimensional modelling of the artery network using the method of characteristics with a lumped heart

Richárd **Wéber**, Dániel **Gyürki** and György **Paál**

Department of Hydrodynamic Systems, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.

Session Identifier	**Plenary Session 3**	**Shakespeare Room**
Chairperson	**Prof. Dominique Thévenin** Laboratory of Fluid Dynamics and Technical Flows, Otto-von-Guericke-Universität Magdeburg, M.burg, Germany.	
Invited Speaker	**Prof. Manfred Kaltenbacher** Laboratory of Fluid Dynamics and Technical Flows, Otto-von-Guericke-Universität Magdeburg, Magdeburg, Germany	

Numb. of presentations **1** Thursday 1. September 9:10 - 9:55

#127

¬ State of art and challenges in computational aeroacoustics

Manfred **Kaltenbacher,** Stefan **Schoder** and Clemens **Freidhager**
Institute of Fundamentals and Theory in Electrical Engineering,
Graz University of Technology, Graz, Austria.

Session Identifier	**TU**	**Juliet Room**
Title	**Turbulent flow**	
Chairperson	**Prof. Michael Fairweather,** School of Chemical and Process Engineering, University of Leeds, Leeds, United Kingdom.	

Numb. of presentations **6** Thursday 1. September 10:25 - 12:25

#20 10:25 - 10:45

¬ A wall-model for high-fidelity large-eddy simulation

Lukas **Unglehrt**[1], Johannes **Kreuzinger**[2] and Michael **Manhart**[1]

1 Professorship of Hydromechanics, TUM School of Engineering and Design, Technical University of Munich, München, Germany.
2 Kreuzinger und Manhart Turbulenz GmbH.

#62 10:45 - 11:05

¬ Use of high-order curved elements for direct and large eddy simulation of flow over rough surfaces

Kenan **Cengiz**, Sebastian **Kurth**, Lars **Wein** and Joerg R. **Seume**
Leibniz Universität Hannover, Institute of Turbomachinery and Fluid Dynamics, Garbsen, Germany.

#15 11:05 - 11:25

¬ Modeling electrohydrodynamically-enhanced drag in channel and pipe flows using one-dimensional turbulence

Marten **Klein**, Juan Alí **Medina Méndez** and Heiko **Schmidt**
Chair of Numerical Fluid and Gas Dynamics, Faculty of Mechanical Engineering, Electrical and Energy Systems, Brandenburg University of Technology (BTU) Cottbus-Senftenberg, Cottbus, Germany.

#96 11:25 - 11:45

¬ Turbulent mixing simulation using the Hierarchical Parcel Swapping (HiPS) model

Tommy **Starick**[1], Masoomeh **Behrang**[2], David O. **Lignell**[2], Heiko **Schmidt**[1] and Alan **Kerstein**[3]

1 Chair of Numerical Fluid and Gas Dynamics, Institute of Transport Technology, Brandenburg University of Technology Cottbus-Senftenberg, Cottbus, Germany.
2 Department of Chemical Engineering, Brigham Young University Provo, UT, USA.
3 Consultant, Danville, CA, USA.

#68 11:45 - 12:05

¬ Mechanistic turbulence: Targeted energy transfer in a multi-degree-of-freedom nonlinear oscillator

Bendegúz Dezső **Bak**, Róbert **Rochlitz**,

Tamás **Kalmár-Nagy** and Gergely **Kristóf**

Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

#6 12:05 - 12:25

¬ Approximate deconvolution model for two-dimensional decaying homogeneous isotropic turbulence using high order discretization schemes

Lena **Caban**, Agnieszka **Wawrzak** and Artur **Tyliszczak**

Department of Thermal Machinery,
Faculty of Mechanical Engineering and Computer Science,
Czestochowa University of Technology, Czestochowa, Poland.

Session Identifier **TM2** **Shakespeare Room**
Session Main Topic **Turbomachinery**
Chairperson **Prof. Helmut Benigni**
Graz University of Technology, Graz, Austria.

Numb. of presentations 6 Thursday 1. September 10:25 - 12:25

#40 10:25 - 10:45
¬ Industry 4.0 perspectives of axial and radial fans in smart industrial ventilation: conceptual case studies
Dominik **Tóth** and János **Vad**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

#7 10:45 - 11:05
¬ Flow control in air cooled condensers using leading edge serrations
Lorenzo **Tieghi**[1], Alessandro **Corsini**[1], Giovanni **Delibra**[1],
Johan van der **Spuy**[2] and Francesco Aldo **Tucci**[1]
1 Department of Mechanical and Aerospace Engineering,
Faculty of Industrial and Civil Engineering, Sapienza University of Rome, Rome, Italy.
2 Department of Mechanical & Mechatronic Engineering,
Faculty of Mechanical Engineering, Stellenbosh University, Cape Town, South Africa.

#28 11:05 - 11:25
¬ Artificial intelligent enhanced virtual blade model
Gábor **Zipszer**, Szilárd **Varró**, Bence **Darázs**,
Mátyás **Gyöngyösi** and Ákos **Horváth**
eCon Engineering Kft., Budapest, Hungary.

#94 11:25 - 11:45
¬ Study on the effect of sudden duct diameter change on the performance of an axial flow fan
Bálint **Lendvai** and Tamás **Benedek**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

#48 11:45 - 12:05
¬ Development of a radial flow fan family for contaminated gases of relatively high flow rate
Péter **Ferenczy**[1], Esztella **Balla**[2], Tamás **Benedek**[2], Gábor **Daku**[2],
Bálint **Kocsis**[2], Antal **Kónya**[1] and János **Vad**[2]
1 Szellőző Művek Kft, Budapest, Hungary.
2 Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

#10 12:05 - 12:25

¬ Performance prediction and CFD analysis of a variable-pitch axial flow fan

Chan **Lee**, Hyun Gwon **Kil**, Eui Jong **Noh**, Sang Ho **Yang**

Department of Mechanical Engineering, Faculty of Mechanical Engineering, University of Suwon. Hwaseong, South Korea.

Session Identifier	**ET**	**Venice Room**
Session Main Topic	**Energy Transfer**	
Chairperson	**Prof. Maarten Vanierschot** Department of Mechanical Engineering, Katholieke Universiteit Leuven, Leuven, Belgium	

Numb. of presentations **6** Thursday 1. September 10:25 - 12:25

#82 10:25 - 10:45

¬ Study of the influence of thermodynamic effects on Venturi cavitation flow

Xu **Meng**[1], Le **Xiang**[2], Kaifu **Xu**[3], Bo **Li**[1], Huan **Han**[3], Shuhong **Liu**[1] and Zhigang **Zuo**[1]

1 State Key Laboratory of Hydro Science and Engineering, and Department of Energy and Power Engineering, Tsinghua University, Beijing, China.
2 Xi'an Aerospace Propulsion Institute, Xi'an, Shaanxi, China.
3 College of Robotics, Beijing Union University, Beijing, China.

#87 10:45 - 11:05

¬ 1D thermal modelling of a wheel bearing to investigate energy losses

Márton **Kerényi**[1], István **Goricsán**[1] and Thomas **Pitour**[2]

1 Thermo- /Energy Management Development, AUDI HUNGARIA Zrt G/GF-1, Győr, Hungary.
2 Energiemanagement, AUDI AG I/EG-31, Ingolstadt, Germany.

#69 11:05 - 11:25

¬ Heat transfer and fluid flow analysis for electroosmotic flow of Carreau fluid through a wavy microchannel considering steric effect

Sumit Kumar **Mehta**[1], Sukumar **Pati**[1] and Laszlo **Baranyi**[2]

1 Department of Mechanical Engineering, National Institute of Technology Silchar, Silchar, India.
2 Department of Fluid and Heat Engineering, Institute of Energy Engineering and Chemical Machinery, University of Miskolc, Miskolc-Egyetemváros, Hungary.

#57 11:25 - 11:45

¬ Numerical modelling of ice deposition in a lyophilizer condenser

Blaž **Kamenik**, Matjaž **Hriberšek** and Matej **Zadravec**

Chair for Power, Process and Environmental Engineering, Faculty of Mechanical Engineering, University of Maribor, Maribor, Slovenia.

#26 11:45 - 12:05

¬ A novel model for glaze ice accretion

Robert **Szasz**[1], Stefan **Ivanell**[2] and Johan **Revstedt**[1]

1 Department of Energy Sciences, Lund University, Lund, Sweden.

2 Department of Earth Sciences, Uppsala University, Uppsala, Sweden.

#113 12:05 - 12:25

¬ LES of a non-premixed hydrogen flame stabilized by wavy-wall bluff-body

Agnieszka **Wawrzak**, Robert **Kantoch** and Artur **Tyliszczak**

Department of Thermal Machinery,
Faculty of Mechanical Engineering and Computer Science,
Czestochowa University of Technology, Czestochowa, Poland.

Session Identifier	**PLENARY 4**	**Shakespeare Room**
Session Main Topic	**Plenary Session**	
Chairperson	**Prof. Dominique Thévenin** Laboratory of Fluid Dynamics and Technical Flows, Otto-von-Guericke-Universität Magdeburg, Magd. Germany	
Invited Speaker	**Prof. Cameron Tropea** Institute for Fluid Mechanics and Aerodynamics, Technische Universitaet Darmstadt, Darm. Germany.	

Numb. of presentations **1** Thursday 1. September 13:55 - 14:40

#129

¬ Optical measurements of drops in flows

Cameron **Tropea**[1], Bastian **Stumpf**[1], Can **Li**[2] and Wu **Zhou**[3]

1 Institute for Fluid Mechanics and Aerodynamics,
Technische Universitaet Darmstadt, Darmstadt, Germany.

2 National Key Laboratory of Transient Physics,
Nanjing University of Science and Technology, Nanjing, China

3 School of Energy and Power Engineering, University of Shanghai for Science and Technology, China.

Session Identifier	**WS3- WORKSHOP**	**Juliet Room**
Title	**Challenges in valve modelling & analysis**	
WS Leader	**Prof. Csaba Hős** Department of Hydrodynamic Systems, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.	
Numb. of presentations	**4**	Thursday 1. September 15:10 - 16:50

¬ ABSTRACT

Valves are essential elements of every hydraulic system, yet their dynamic behavior is often overlooked, especially in the case of mass applications, such as e.g. the hundreds or thousands of safety valves in a chemical plant or oil refinery. Computational Fluid Dynamics (CFD) modeling provides novel opportunities for more accurate simulations, yet dynamic simulations, especially with non-ideal gas behavior or multiphase flow still require inefficient amount of computational effort. Thus, reduced order modeling is viable, especially when valve-pipeline interaction is addressed. The workshop aims at sharing recent findings of research groups in this field.

15:10 - 15:30

¬ Challenges in valve modelling & analysis: State of the art

Csaba **Hős**

Department of Hydrodynamic Systems, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

#105 15:30 - 15:50

¬ Effects of valve characteristic and fluid force on valve stability

Gergely **Keszthelyi**[1], Jürgen **Schmidt**[1] and Jens **Denecke**[2]

1 CSE Center of Safety Excellence gGmbH, Pfinztal, Germany.
2 Hochschule Karlsruhe; CSE Center of Safety Excellence gGmbH.

#109 15:50 - 16:10

¬ Dynamic pressure propagation in pipes: modelling and analysis by measurement

Goran **Pavic**[1] and Fabien **Chevillotte**[2]

1 Vibration-Acoustics Laboratory,
National Institute of Applied Science, Villeurbanne, France.
2 Matelys Research Lab, Vaulx-en-Velin, France.

#114 16:10 - 16:30

¬ On the effect of mass fraction of frozen mixture flow on the dynamic performance of a direct spring operated safety valve

Csaba **Hős** and Ghaith **Burhani**

Department of Hydrodynamic Systems, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

Session Identifier **WS4- WORKSHOP** **Shakespeare Room**

Title **Industry 4.0 in smart ventilation: questions and challenges**

WS Leader **Prof. János Vad**
Department of Fluid Mechanics,
Faculty of Mechanical Engineering,
Budapest University of Technology and Economics,
Budapest, Hungary.

WS Co-organizers **Prof. Alessandro Corsini**
Sapienza Università di Roma, Rome, Italy.

Thursday 1. September 15:10 - 16:50

¬ ABSTRACT

The recent view represented by Industry 4.0 enables substantially new features in industrial air technology as well as in industrial heating, ventilation, and air conditioning. Such new features expand the capabilities of traditional air technical systems – even if such traditional systems are highly controlled systems. Some examples for smart fans, and for smart ventilation systems incorporating them, meeting the Industry 4.0 concept, are as follows: multifunctional monitoring, control and rationalization of aerodynamics performance and power consumption; prediction of aerodynamics degradation due to blade erosion or contamination; vibration self-diagnostics for forecasting bearing fatigue and rotor imbalance due to blade wear or deposit, serving as an aid to demand-based fan maintenance.

Session Identifier **EV** **Venice Room**

Session Main Topic **Environmental Flow**

Chairperson **Dr. Miklós Balogh**

Department of Fluid Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary

Numb. of presentations **5** Thursday 1. September 15:10 - 16:50

#44 15:10 - 15:30

¬ Validation of an immersed boundary code for urban flows

Patricia **Vanky**[1], Andreas **Mark**[2], Marie **Haeger-Eugensson**[3], Joaquim **Tarraso**[4], Marco **Adelfio**[4], Angela Sasic **Kalagasidis**[4] and Gaetano **Sardina**[1]

1 Department of Mechanics and Maritime Sciences, Division of Fluid Dynamics, Chalmers University of Technology, Gothenburg, Sweden.
2 Fraunhofer-Chalmers Research Centre for Industrial Mathematics.
3 Department of Earth Sciences, Gothenburg University and COWI, Gothenburg, Sweden
4 Department of Architecture and Civil Engineering, Division of Urban Design and Planning, Chalmers University of Technology.

#56 15:30 - 15:50

¬ Comparison of OpenFOAM turbulence models for numerical simulation of thermally-driven winds

Jose I. **Rojas**, Santiago **Arias**, Rathan B. **Athota** and Adeline **Montlaur**

Dept. of Physics - Division of Aerospace Eng., Universitat Politècnica de Catalunya, Castelldefels, Spain.

#84 15:50 - 16:10

¬ Building patterns favorable for air quality: A parameter study using LES

Bálint **Papp** and Gergely **Kristóf**

Department of Fluid Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.

#90 16:10 - 16:30

¬ Perspectives on OpenFOAM numerical simulations of slope winds on Mars

Jose I. **Rojas**, Santiago **Arias** and Adeline **Montlaur**

Dept. of Physics - Division of Aerospace Eng., Universitat Politècnica de Catalunya, Castelldefels, Spain.

#89 16:30 - 16:50

¬ Surface layer's sound speed profiles: climatological analysis and application for the CNOSSOS-EU noise model

Tamás **Weidinger**, Petra **Fritz**, Arun **Gandhi**, Abderrahmane **Mendyl** and Ágoston Vilmos **Tordai**

Department of Meteorology, Institute of Geography and Earth Sciences, Faculty of Sciences, Eötvös Loránd University, Budapest, Hungary.

Session Identifier **DPL** **Juliet Room**

Session Main Topic **Droplets and Particle-Laden Flows**

Chairperson **Dr. Balázs Havasi-Tóth**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics,
Budapest, Hungary

Numb. of presentations 6 Friday 2. September 9:00 - 11:20

#33 9:00 - 9:20

¬ Dynamics of high-speed drop impact on deep liquid pool

Hui **Wang**, Shuo **Liu**,

Annie-Claude **Bayeul-Lainé** and Olivier **Coutier-Delgosha**

Univ. Lille, CNRS, ONERA, Arts et Metiers Institute of Technology, Centrale Lille, Laboratoire de Mécanique des Fluides de Lille - Kampé de Fériet, Lille, France.

#110 9:20 - 9:40

¬ Droplet spreading behaviour over a solid substrate mediated by surface wettability and interfacial tension

Drijit Kumar **Deka**[1], Sukumar **Pati**[1] and László **Baranyi**[2]

1 Department of Mechanical Engineering, National Institute of Technology Silchar, Silchar, India.

2 Department of Fluid and Heat Engineering, Institute of Energy Engineering and Chemical Machinery, University of Miskolc, Miskolc-Egyetemváros, Hungary.

#5 9:40 - 10:00

¬ Analysis of the repeat collision effect in simulated particle-laden flows with and without agglomeration

David **Rupp**, Lee **Mortimer** and Michael **Fairweather**

School of Chemical and Process Engineering,
Faculty of Engineering and Physical Sciences, University of Leeds,
Leeds, United Kingdom.

#92 10:00 - 10:20

¬ Effects of large particles in pipe flow at low and moderate Reynolds numbers

Johan **Revstedt**[1], Dragana **Arlov**[2] and Fredrik **Innings**[2]

1 Department of Energy Sciences, Faculty of Engineering, Lund University, Lund, Sweden.

2 Tetra Pak Processing Systems AB.

#27 10:20 - 10:40

¬ Effects of Stokes number on particle deposition in particle-laden turbulent pipe flows

Bisrat **Wolde**, Lee **Mortimer** and Michael **Fairweather**

School of Chemical and Process Engineering,
Faculty of Engineering and Physical Sciences, University of Leeds,
Leeds, United Kingdom.

10:40 - 11:00

¬ CFD Challenge: a benchmark study of violent expiratory events

Jordi **Pallares**[1], Alexandre **Fabregat**[1],

Salvatore **Cito**[1] and Cristian **Marchioli**[2]

1 Dept. of Mechanical Engineering. Universitat Rovira i Virgili. Tarragona. Spain.
2 Dept. of Engineering and Architecture. Università degli Studi di Udine. Italy.

Session Identifier **TM3** **Shakespeare Room**
Session Main Topic **Turbomachinery**
Chairperson **Dr. Esztella Balla**
Department of Fluid Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary

Numb. of presentations **5** Friday 2. September 9:00 - 11:00

#47 9:00 - 9:20
¬ Transient 3D CFD simulation of a Pelton turbine – A state-of-the-art approach for Pelton development and optimisation
Lukas **Sandmaier**, Helmut **Benigni** and Peter **Meusburger**
Institute of Hydraulic Fluid Machinery, Graz University of Technology, Graz, Austria.

#2 9:20 - 9:40
¬ Application of hybrid RANS/VMS modeling to rotating machines
Florian **Miralles**[1], Bastien **Sauvage**[2], Stephen **Wornom**[1], Bruno **Koobus**[1] and Alain **Dervieux**[3]
1 IMAG, Univ. Montpellier, CNRS, Montpellier, France.
2 Univ. Côte d'Azur/INRIA Projet Ecuador, Sophia-Antipolis, France.
3 Lemma, Biot, France, and Univ. Côte d'Azur/INRIA Projet Ecuador, Sophia-Antipolis, France.

#79 9:40 - 10:00
¬ A methodology for the blade shape optimization of a vertical axis tidal turbine under constraints
Karla Ruiz **Hussmann**[1,2], Pierre-Luc **Delafin**[2], Cyrille **Bonamy**[2], Yves **Delannoy**[2], Dominique **Thévenin**[1] and Stefan **Hoerner**[1]
1 Laboratory of Fluid Dynamics and Technical Flows, Institute of Fluid Dynamics and Thermodynamics, Otto von Guericke University, Magdeburg, Germany.
2 Univ. Grenoble Alpes, CNRS, Grenoble INP, LEGI, Grenoble, France.

#100 10:00 - 10:20
¬ Numerical analysis of the flow by using a free runner downstream the Francis turbine
Alin **Bosioc**[1], Raul **Szakal**[2], Adrian **Stuparu**[1] and Romeo **Susan-Resiga**[1]
1 Department of Mechanical Machines, Equipment and Transportation, Politehnica University Timișoara, Timișoara, Romania.
2 Romanian Academy – Timisoara Branch, Timișoara, Romania.

#54 10:20 - 10:40
¬ Performance investigation of a Savonius wind turbine with unconventional blade designs inspired by sand eels
Islam **Hashem**[1,2], Emeel **Kerikous**[1,2], Stefan **Hoerner**[1] and Dominique **Thévenin**[1]
1 Laboratory of Fluid Dynamics and Technical Flows, Otto von Guericke University Magdeburg, Magdeburg, Germany.
2 Mechanical Power Engineering Department, Faculty of Engineering-Mattaria, Helwan University, Cairo, Egypt.

Session Identifier **WS5- WORKSHOP** **Venice Room**

Title **Coupling techniques in multiscale atmospheric models: Microphysics, local scale simulations, PBL structure**

WS Leader **Dr. Tamás Weidinger**
Department of Meteorology,
Institute of Geography and Earth Sciences, Faculty of Sciences,
Eötvös Loránd University, Budapest, Hungary.

Numb. of presentations **4** Friday 2. September 9:00 - 11:00

¬ ABSTRACT

The recent view represented by coupling techniques in multiscale atmospheric models in field of meteorology-climatology and fluid dynamics. Scale-dependent atmospheric processes - the range of phenomena directly described and parameterized by numerical models - evolve with the available spatial and temporal resolution. Different climate, weather, and fluid dynamics models use several common methods and solutions. These include constructing initial and boundary conditions and assimilating the results to measurements or larger-scale model results, i.e., the issue of model initialization. There is a common interest in parameterization sub-grid-scale processes, be it in the description of convection, cloud formation, precipitation, or scale-dependent turbulent exchange processes. Parameterization of turbulence — modeling of the viscous sublayer, the constant-flux near-surface layer, and the planetary boundary layer — also connects modelers in engineering and meteorology/climatology. Model couplings and model embedding raise the question of one-way and two-way interactions between scales. Another critical issue is the modeling of scale-dependent pollutant dispersion and the description of urban effects.

9:00 - 9:20

¬ Can we have a better simulation of fog or haze formation in urban environment?

István **Geresdi**
University of Pécs, Faculty of Sciences, Institute of Geography and Earth Sciences,
Department of Geology and Meteorology, Pécs, Hungary.

9:20 - 9:40

¬ Wind-shear coupling method to implicate large turbulent structures in a building-scale large eddy simulation

Márton **Koren** and Gergely **Kristóf**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

9:40 - 10:00

¬ Dispersion simulation of firework-related aerosols

Miklós **Balogh**[1], Árpád **Farkas**[2], Tamás **Weidinger**[3] and Imre **Salma**[3]

1 Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.
2 Centre for Energy Research, Hungarian Academy of Sciences, Budapest, Hungary.
3 Eötvös Loránd University, Budapest, Hungary.

#123 10:00 - 10:20

¬ Examination of Saharan boundary layer by a single-column and 3D WRF model - a case study for Fennec campaign

Árpád **Bordás**, András Zénó **Gyöngyösi** and Tamás **Weidinger**,
Eötvös Loránd University, Budapest, Hungary.

Session Identifier **AE** **Juliet Room**

Session Main Topic **Aeronautics**

Chairperson **Dr. Bendegúz Bak**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics,
Budapest, Hungary

Numb. of presentations **3** Friday 2. September 11:30 - 13:00

#74 11:30 - 11:50

¬ Aeroservoelasticity investigation with panel method

Ábel **Olgyay**[1], Béla **Takarics**[1], Bence **Körösparti**[1], János **Lelkes**[2], Csaba **Horváth**[2] and Bálint **Vanek**[1]

1 Institute Computer Science and Control, Budapest, Hungary.
2 Department of Fluid Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.

#76 11:50 - 12:10

¬ Identification of data-driven aerodynamic models for reduced-order aeroelastic simulations

János **Lelkes**, Dávid András **Horváth** and Tamás **Kalmár-Nagy**
Department of Fluid Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.

#29 12:10 - 12:30

¬ CFD assessment of an ultralight aircraft including in-flight test data comparison

Gábor **Zipszer**[1], Bence **Darázs**[1], Ákos **Horváth**[1], Dávid **Toma**[1], Dániel **Laki**[1], Mátyás **Gyöngyösi**[1], Jenő Miklós **Suda**[2], Márton **Koren**[2] and Balázs **Farkas**[2]

1 eCon Engineering Kft., Budapest, Hungary.
2 Department of Fluid Mechanics, Faculty of Mechanical Engineering, Budapest University of Technology and Economics, Budapest, Hungary.

Session Identifier **SV** **Shakespeare Room**
Session Main Topic **Sound and Vibration**
Chairperson **Dr. Tamás Benedek**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics,
Budapest, Hungary

Numb. of presentations 4 Friday 2. September 11:30 - 13:00

#18 11:30 - 11:50
¬ Numerical study of vortex-induced vibration of a circular cylinder subject to oscillatory flow at high Keulegan-Carpenter numbers

Dániel **Dorogi**[1], Efstathios **Konstantinidis**[2] and László **Baranyi**[1]
1 Department of Fluid and Heat Engineering,
Institute of Energy Engineering and Chemical Machinery,
Faculty of Mechanical Engineering and Informatics, University of Miskolc, Hungary.
2 Department of Mechanical Engineering, University of Western Macedonia, Greece.

#111 11:50 - 12:10
¬ Identification of low frequency fluctuation in centrifugal fan

Magdalena **Stanik**, Dominika **Jaskóła** and Dominik **Deda**
Department of Power Engineering and Turbomachinery,
Silesian University of Technology, Gliwice, Poland.

#30 12:10 - 12:30
¬ The investigation of counter-rotating turbomachinery broadband noise sources as a function of rotational speed

Ádám **Romasz**, Kristóf **Tokaji** and Csaba **Horváth**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.

#86 12:30 - 12:50
¬ Aeroacoustic noise reduction of open photoacoustic cells supported by experiments and CFD simulations

Miklós **Balogh**[1], Gábor **Koscsó**[1], Bálint **Kocsis**[1],
Csaba **Horváth**[1] and Zoltán **Bozóki**[2]
1 Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics, Budapest, Hungary.
2 University of Szeged, Faculty of Science and Informatics,
Department of Optics and Quantum Electronics, Szeged,Hungary.

Session Identifier **WS6- WORKSHOP** **Venice Room**

Title **Coupling techniques in multiscale atmospheric models: Numerical weather and climate modelling: scaling, coupling, parameterizations**

WS Leader **Dr. Gergely Kristóf**
Department of Fluid Mechanics, Faculty of Mechanical Engineering,
Budapest University of Technology and Economics,
Budapest, Hungary

Numb. of presentations **3** Friday 2. September 11:30 - 13:00

¬ ABSTRACT

The recent view represented by coupling techniques in multiscale atmospheric models in field of meteorology-climatology and fluid dynamics. Scale-dependent atmospheric processes - the range of phenomena directly described and parameterized by numerical models - evolve with the available spatial and temporal resolution. Different climate, weather, and fluid dynamics models use several common methods and solutions. These include constructing initial and boundary conditions and assimilating the results to measurements or larger-scale model results, i.e., the issue of model initialization. There is a common interest in parameterization sub-grid-scale processes, be it in the description of convection, cloud formation, precipitation, or scale-dependent turbulent exchange processes. Parameterization of turbulence — modeling of the viscous sublayer, the constant-flux near-surface layer, and the planetary boundary layer — also connects modelers in engineering and meteorology/climatology. Model couplings and model embedding raise the question of one-way and two-way interactions between scales. Another critical issue is the modeling of scale-dependent pollutant dispersion and the description of urban effects.

11:30 - 11:50

¬ Testing convective parameterzation schemes in RegCM over the Carpathian region

Timea **Kalmár**, Ildikó **Pieczka** and Rita **Pongrác**
Eötvös Loránd University, Budapest, Hungary.

11:50 - 12:10

¬ Challenge in providing detailed information on future climate change in cities

Gabriella **Allaga-Zsebeházi**
Hungarian Meteorological Service, Budapest, Hungary.

#124 12:10 - 12:30

¬ High resolution experiments with the AROME numerical weather prediction model over Hungary

Balázs **Szintai** and Kristóf **Szanyi**
Hungarian Meteorological Service, Budapest, Hungary.

NOTES .....

The Organizing Committee of CMFF'22 would like to thank the contributions of the Review Organizers and Workshop Organizers:

Dr. Miklós Balogh
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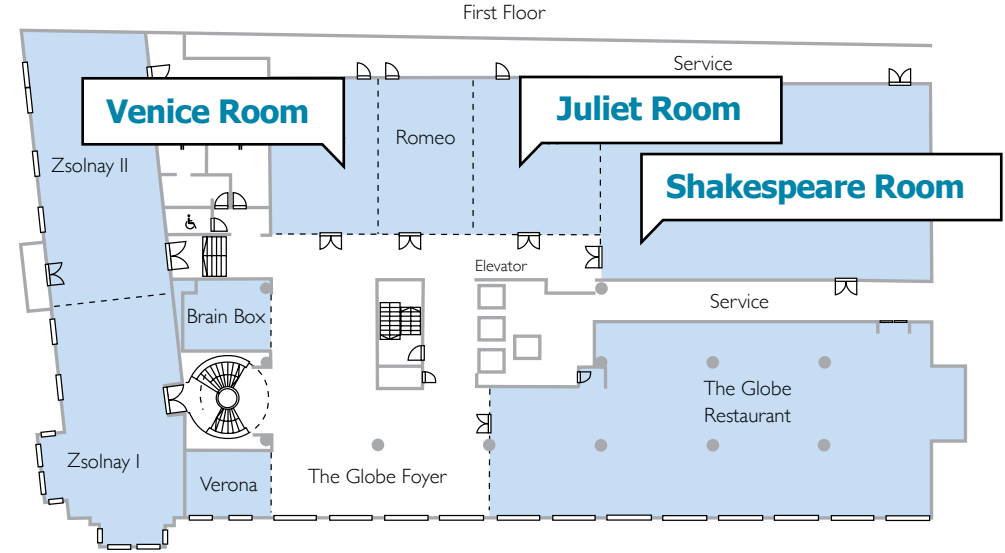
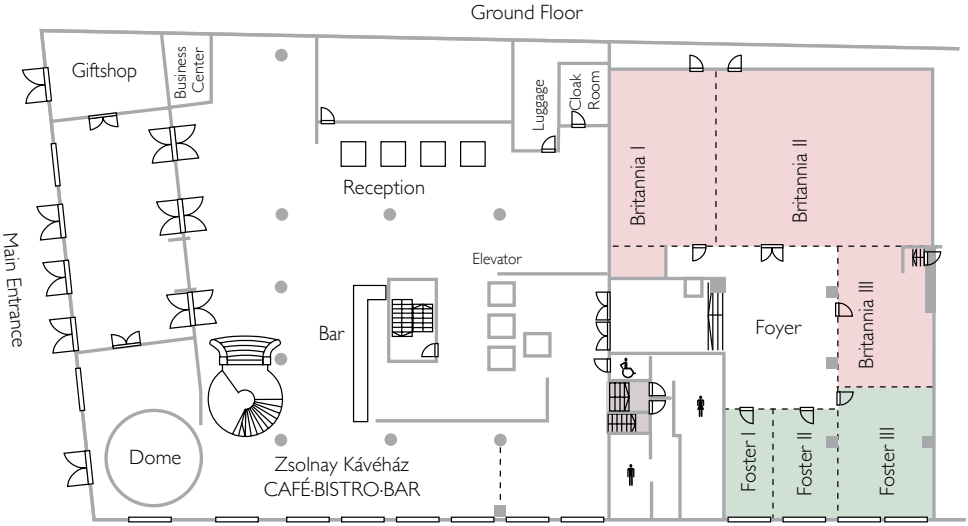
Author Index

Lecture room locations at Radisson Blu Béke Hotel





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The Visualization Society of Japan
www.visualization.jp

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