

## The 9<sup>th</sup> International Conference on Computational Fluid Dynamics



July 11-15, 2016 • Grand Cevahir Hotel, Şişli • Istanbul Turkey



### **MERHABA!**

Welcome to Istanbul and the 9th International Conference on Computational Fluid Dynamics (ICCFD9).

As the leading international conference devoted to both basic and applied CFD, this event brings the latest innovations to a large international community. ICCFD was founded in 2000 with the merger of the International Conference on Numerical Methods in Fluid Dynamics (ICNMFD) and the International Symposium on Computational Fluid Dynamics (ISCFD).

This year's conference introduces several new benefits for participants, including continued longer, more in-depth papers, availability of abstracts and technical papers on the conference website, and the introduction of "Young CFD Investigator Award, In memory of Prof. Kunio Kuwahara of Japan" and the Student Support Programs. In addition, we are honored to have distinguished invited speakers from the international CFD community.

We would like to thank each of you for attending this year's conference and bringing your expertise to our gathering. As CFD experts, you have the vision, the knowledge, and the experience to help pave our way into the future. We encourage you to network with your international colleagues both during and after the technical sessions and at our social events. Please also take time to interact with and encourage the ICCFD9 student members—our future colleagues and leaders.

Our personal respect and thanks to all of you for attending.

## **CONFERENCE CO-CHAIRS**

Prof. Alim Rüstem Aslan



Dr. Ayşe Gül Güngör



Prof. İlyas Bedii Özdemir



## **ICCFD9 Invited Speakers**

Each day of the conference, we will feature a distinguished invited speaker in the 8–9 am timeslot.

### Monday

### Prof. Metin Muradoglu (Koc University)

Dr. Muradoglu is a professor in Mechanical Engineering at Koc University. He received BS degree from Istanbul Technical University (ITU) in Aeronautical Engineering in 1992, and MS and PhD degrees both from Cornell University in 1997 and 2000, respectively. He also worked as a postdoc at Cornell for about 18 months before joining Koc University faculty in 2001 as an assistant professor. He has had visiting positions at Harvard, Notre Dame and Princeton Universities.



Some of his CFD contributions include:

- The first consistent hybrid finite-volume/particle method for solving the PDF equations of turbulent reacting flows.
- A front-tracking method for direct numerical simulations of soluble surfactant in multiphase flows.
- An auxiliary grid method for computations of multiphase flows in complex geometries.
- Development of a front-tracking method for computational modeling of viscoelastic two-phase systems

Prof. Muradoglu is the recipient of Turkish Academy of Sciences (TUBA) outstanding young scientist award (2009) and encouragement award by Scientific and Technical Research Council of Turkey (TUBITAK) (2010).

His web site is http://home.ku.edu.tr/~mmuradoglu/

## Dr. Ayşe Gül Güngör (ITU)

Dr. Gungor received her double-major B.S degrees in aerospace and mechanical engineering and her M.S degree in aerospace engineering from Istanbul Technical University in Turkey in 2000, 2001, and 2004, respectively. She joined Computational Combustion Lab at School of Aerospace Engineering, Georgia Institute of Technology in 2003 for her graduate studies where she completed her M.S and PhD in 2007 and 2009, respectively. Between 2009 and 2012 she worked as a postdoctoral fellow at Fluid Mechanics Lab at Polytechnic University of Madrid. She joined Department of Astronautics, Istanbul Technical University in 2001 as a research assistant and became an



assistant professor in 2012. Her areas of research interest include turbulent flows and its modeling, computational fluid dynamics, numerical methods and lattice Boltzmann approach.

Web: http://web.itu.edu.tr/~gungoray/

### **Tuesday**

### Prof. Georges-Henri Cottet (University of Grenoble Alpes)

Georges-Henri Cottet received his PhD form University Paris 6 in 1982. He then joined CNRS as a Research Assistant. After two years at UCLA as Assistant Professor he was appointed Professor at the Université of Grenoble in 1990. He was elected senior member of the Institut Universitaire de France in 2009.

G.-H. Cottet was the founder in 2007 and chairman until 2011 of the Laboratoire Jean Kuntzmann, a laboratory gathering about 250 people in Applied Math and Computer Science. In 2011 he founded AMIES (Agency for Mathematics in Interaction with Enterprises and Society), a national initiative of CNRS with INRIA and



University of Grenoble, to foster interactions between mathematics and enterprises. The research of G.-H. Cottet is in numerical analysis and scientific computing. His contributions in particular deal with the following topics:

-design, numerical analysis and applications of particle methods in CFD -nonlinear anisotropic diffusion for image processing -sub-grid scale modeling for Large Eddy Simulations -level set and penalization methods for fluid-structure interaction.

His website and recent papers are at the following address: http://ljk.imag.fr/membres/Georges-Henri.Cottet/

## Prof. Laiping Zhang (CARDC )

Laiping Zhang is a research professor of fluid mechanics in Computational Aerodynamics Institute (CAI) of China Aerodynamics Research and Development Center (CARDC). He graduated from the Department of Modern Mechanics, University of Science and Technology of China (USTC) in 1990. Then, he received his MSc and PhD degrees from CARDC, in 1993 and in 1997, respectively, where he studied under Prof. Hanxin Zhang. He visited Michigan State University as a visiting scholar in 2002-2003, and worked with Prof. ZJ Wang. His areas of interest include hybrid and dynamic grid generation techniques, numerical methods, parallel computing and CFD applications in aerodynamics. His code,



HyperFLOW, has been applied in many fields, including aerodynamics of airplanes, cars and trains, multi-body separation and interaction, bio-fluid dynamics of fishes and birds. His current research interests are high-order schemes on unstructured grids (such as DG/FV hybrid schemes), automatic and robust super-large scale hybrid grid generation and adaptation, DES and LES of turbulence flow over complex geometries, multidisciplinary coupling simulations and numerical virtual flight, bionic flow mechanics of UAVs. He is the author of more than 150 articles covering the fields enumerated above.

### Wednesday

### Assoc. Prof. Mehmet Şahin (ITU)

Mehmet Şahin is an Associate Professor at the Faculty of Aeronautics and Astronautics of Istanbul Technical University. He received B.Sc. degrees in both Aeronautical Engineering and Physics Engineering from Istanbul Technical University. Then he obtained a scholarship from the Ministry of Japanese Education Culture and Sport and completed his MSc degree at the Mechanical Engineering Department of Yokohama National University in Japan. He also received another MSc degree from the Aerospace Engineering Department of Georgia Institute of Technology. He completed his PhD degree in Mechanical Engineering from the Swiss Federal Institute of Technology at Lausanne in 2004.



Prior to joining to Istanbul Technical University in 2009, he worked as a postdoc at the Mathematics Department of University College London as a part of the Microscale Polymer Processing (MuPP2) project supported by ESPRC and as a research associate at the Aerospace Engineering Sciences Department at the University of Colorado at Boulder. His current research and teaching interest include advanced numerical algorithms, ALE methods, high-performance computing, flow instabilities, non-Newtonian flows, multi-phase flows, fluid-structure interactions, dynamic mesh adaptation, low Reynolds number aerodynamics and animal locomotion. His codes and numerical methods have been applied to the simulation of three-dimensional viscoelastic instabilities, polymer processing, fluid-structure interaction in arteries, insect flight, jellyfish swimming, MAVs, etc. He is a currently working within the Fluid Mechanics Research Center - FMRC group at ITU.

His website is http://web.itu.edu.tr/~msahin/

## Thursday

## Prof. Shigeru Obayashi (M'96)

Shigeru Obayashi received B.S. and M.S. degree from University of Tsukuba in 1982 and 1984, respectively. He received Doctor of Engineering from University of Tokyo in 1987.

He worked as a visiting scientist at NASA Ames Research Center from 1987, and then joined the faculty of engineering at Tohoku University as an associate professor in 1994. He is a professor at Institute of Fluid Science, Tohoku University, Sendai, Japan since 2003. He also serves as Director of the Institute since 2014. His current research interests include computational fluid dynamics, multidisciplinary design optimization,



evolutionary computation, data mining and their real-world applications.

Prof. Obayashi is currently President of the Japanese Society for Evolutionary Computation (2015-2016), Associate Fellow of the American Institute of Aeronautics and Astronautics, Fellow of the Japan Society for Aeronautical and Space Sciences, Fellow of the Japan Society of Mechanical Engineer, Fellow of the Japan Society of Fluid Mechanics. His awards and honors include 1993 NASA Ames Honor Award, 2012 Computational Mechanics Award, the Japan Society of Mechanical Engineers and 2014 the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology.

His website is http://www.ifs.tohoku.ac.jp/edge/e index.html.

## **ICCFD9 Schedule Overview**

Time		Monday July 11 , 2016	Tuesday July 12 , 2016	Wednesday July 13 , 2016	Thursday July 14 , 2016	Friday July 15 , 2016
7:00-17:00		Registration	Desistuation	Degistration	Desistration	Desistration
7:45-8:00		Openning	Registration	Registration	Registration	Registration
8:00-9:00	PLANERY TALKS	M MURADOGLU	GH COTTET	M SAHIN	S OBAYASHI	
9:00-9:30				TEA/COFFEE BREAK		
9:30-10:00	1					
10:00-10:30	2					
10:30-11:00	3					
11:00-11:30	4			2 PARALLEL SESSION		
11:30-12:00	5					
12:00-12:30	6					
12:30-14:00		LUNCH				
14:00-14:30	KEYNOTE TALKS	AG GUNGOR	Z LAIPING		POSTER SESSION	POSTER SESSION
14:00-14:30 14:30-15:00	KEYNOTE TALKS 1	AG GUNGOR	Z LAIPING		POSTER SESSION	POSTER SESSION
14:00-14:30 14:30-15:00 15:00-15:30	KEYNOTE TALKS 1 2	AG GUNGOR 2 PARALLEL	Z LAIPING SESSIONS		POSTER SESSION 2 PARALLE	POSTER SESSION
14:00-14:30 14:30-15:00 15:00-15:30 15:30-16:00	KEYNOTE TALKS 1 2 3	AG GUNGOR 2 PARALLEL	Z LAIPING SESSIONS	CITY Tour	POSTER SESSION 2 PARALLE	POSTER SESSION
14:00-14:30 14:30-15:00 15:00-15:30 15:30-16:00 16:00-16:30	KEYNOTE TALKS 1 2 3	AG GUNGOR 2 PARALLEL TEA/COFFE	Z LAIPING SESSIONS EE BREAK	CITY Tour	POSTER SESSION 2 PARALLE TEA/COFFEE BREAK	POSTER SESSION
14:00-14:30 14:30-15:00 15:00-15:30 15:30-16:00 16:00-16:30 16:30-17:00	KEYNOTE TALKS 1 2 3 4	AG GUNGOR 2 PARALLEL TEA/COFFE	Z LAIPING SESSIONS EE BREAK	CITY Tour	POSTER SESSION 2 PARALLE TEA/COFFEE BREAK	POSTER SESSION
14:00-14:30 14:30-15:00 15:00-15:30 15:30-16:00 16:00-16:30 16:30-17:00 17:00-17:30	KEYNOTE TALKS 1 2 3 3 4 5	AG GUNGOR 2 PARALLEL TEA/COFFE 2 PARALLEL	Z LAIPING SESSIONS E BREAK SESSIONS	CITY Tour	POSTER SESSION 2 PARALLE TEA/COFFEE BREAK 2 PARALLEL SESSIONS	POSTER SESSION L SESSIONS CLOSING
14:00-14:30 14:30-15:00 15:00-15:30 15:30-16:00 16:00-16:30 16:30-17:00 17:00-17:30	KEYNOTE TALKS 1 2 3 3 4 5 6	AG GUNGOR 2 PARALLEL TEA/COFFE 2 PARALLEL	Z LAIPING SESSIONS E BREAK SESSIONS	CITY Tour	POSTER SESSION 2 PARALLE TEA/COFFEE BREAK 2 PARALLEL SESSIONS	POSTER SESSION L SESSIONS CLOSING











	ICCFD9 Program: Monday, July 11, 2016					
07:	00 am – 05:00 pm	R	egistration			Lobby
07:	45 am – 08:00 am	Opening Remark	s by Co-Chairs and	Secretary ICCFD		Ballroom 1
08:	00 am – 09:00 am		<b>Invited Lecture</b>			Ballroom 1
P1		Dept. of Mo Topic: "Comput	Prof. Metir echanical Engineering tational Modeling of S	n Muradoglu J, Koc University, Istar oluble Surfactant in M	ibul, Turkey ultiphase Flows"	
09:	00 am – 09:30 am		Break			
01	Chair: Satofuka, N.		Numerical M	ethods - I, LES - I		Ballroom 1
09:30am:12:30 pm	09:30am – 10:00am ICCFD9-2016-124 ENATE procedure for the Navier Stokes equations Antonio Pascau, Muslum Arıcı, Víctor Llorente University of Zaragoza and CSIC, Spain Kocaeli University, Turkey	10:00am – 10:30am ICCFD9-2016-152 An accurate and robust finite volume scheme based on the spline interpolation for solving the Euler and Navier–Stokes equations on non-uniform curvilinear grids Qiuju Wang, Yu-xin Ren Institute of Applied Physics and Computational Mathematics, China	10:30am – 11:00am ICCFD9-2016-140 Application of the BDDC method to incompressible flows Martin Hanek, Jakub Šístek, Pavel Burda Czech Technical University, Czech Republic Czech Academy of Sciences, Czech Republic	11:00am – 11:30am ICCFD9-2016-149 Recent Progresses in Large Eddy Simulations with the FR/CPR Method Z.J. Wang, Yanan Li University of Kansas,USA	11:30am – 12:00pm ICCFD9-2016-276 Implicit v.s. Explicit Large Eddy Simulation of Premixed Turbulent Combustion with Multi-scale Forcing Song Zhao, Fabien Thiesset, Ivan Fedioun, Iskender Gökalp ICARE-CNRS, France University of Orléans, France	12:00pm–12:30pm (YCFD) ICCFD9-2016-211 Large Eddy Simulation of End Wall Flows in Low Pressure Turbines Seyfullah Cay, Dogukan Tugberk Karahan, Ayse G. Gungor Istanbul Technical University, Istanbul , Turkey
02	Chair: Muradoglu, M.		Multiphase	Flows - I		Safir
09:30am:12:30 pm	09:30am–10:00am(YCFD) ICCFD9-2016-303 Simulations of Drop Impact on Hydrophobic Moving Walls Hosein Heidarifatasmi, Özgür Ertunç Ozyegin University, Turkey	10:00am – 10:30am ICCFD9-2016-130 A WELL-POSED TWO PHASE FLOW MODEL AND ITS NUMERICAL SOLUTIONS FOR REACTOR THERMAL-FLUIDS ANALYSIS Samet Y. Kadioglu, Ray Berry, Richard Martineau Idaho National Laboratory, USA	10:30am – 11:00am ICCFD9-2016-129 'Linear and Nonlinear Based Ship Motions of a Naval Combatant Model' Ferdi Çakıcı, Ömer F. Sukas, Ömer K. Kınacı, Ahmet D. Alkan Yildiz Technical University, Turkey	11:00am – 11:30am ICCFD9-2016-322 Effect of Bubbles Number on Cavitating Flow Through a Venturi Mohammed ZAMOUM, Mohand KESSAL, Rachid BOUCETTA Laboratoire Génie Physique des Hydrocarbures LGPH,Algérie	11:30am – 12:00pm ICCFD9-2016-288 Reducing numerical wave damping through accurate and efficient PLIC-VOF techniques Bülent Düz, Mart J.A. Borsboom, Arthur E.P. Veldman, Peter R. Wellens, Rene H.M. Huijsmans Maritime Research Institute (MARIN), The Netherlands	12:00pm – 12:30pm ICCFD9-2016-277 Simulation of Navier-Stokes Flows Including Rigid Particles Salah ZOUAOUI, Sofiane KHELLADI, Kamal MOHAMMEDI, Hassane DJEBOURI Mouloud Mammeri University of Tizi-Ouzou, Algeria

ICCFD9 Program: Monday, July 11, 2016				
12:	30 pm – 02:00 pm	Hosted Lunch		
02:	00 pm – 02:30 pm	KEYNOTE TALK		
K1	Topic: "Direct Numerical	Dr. Ayse Gul, GUNGOR Turkey Simulations of Adverse Pressure Gradient Tu	irbulent Boundary Layers "	
03	Chair: Koren, B	Mesh Refinement/Adaptation	Ballroom 1	
02:30pm:04:00 pm	02:30pm – 03:00pm ICCFD9-2016-237 High resolution, diffuse interface capturing methods for compressible, multi-phase flows on unstructured grids. Bora Kalpakli, Hakan Tarman, Yusuf Ozyoruk Roketsan, Turkey	03:00pm – 03:30pm ICCFD9-2016-146 Semi-Lagrangian finite volume transport scheme on adaptively refined grids Eray Uzgoren Middle East Technical University ,Northern Cyprus	03:30pm – 04:00pm ICCFD9-2016-117 ALE Residual Scheme for the time dependant penalized Navier Stokes equations on adapted grids L. Nouveau, H. Beaugendre, M. Ricchiuto, C. Dobrzinsky, R. Abgrall Inria Bordeaux Sud-Ouest, Team CARDAMOM, France	
	ICCFI	09 Program: Monday, July 11, 2	016	
04	Chair: Aslan, A.R.	Supersonic/Hypersonic Flows - I	Safir	
02:30pm:04:00 pm	02:30am – 03:00pm ICCFD9-2016-329 A Front Tracking Method for Computational Modeling of Temperature and Species Gradient Based Phase Change Muhammad Irfan, Metin Muradoglu Koc University, Turkey	03:00pm – 03:30pm ICCFD9-2016-185 Investigation of the Mechanical Integrity of Wings/Fins under Thermal Loading Emir ÖZKÖKDEMİR, Dilek Funda KURTULUŞ Roketsan Missiles Inc.,Turkey	03:30pm – 04:00pm ICCFD9-2016-164 Computational Investigation of Flow Structure and Aerodynamic Characteristics About Chine-Shaped Forebodies at High Angles of Attack Fangfang Si, Yufei Xie, Youda Ye CARDC, Computational Aerodynamics Institute, China	
04:	00 pm – 04:30 pm	Break		

	ICCFD9 Program: Monday, July 11, 2016				
05	Chair: Celik, B.	Supersonic/Hypersonic Flows - II	Safir		
04:30pm:06:00 pm	04:30pm – 05:00pm ICCFD9-2016-242 The effect of combination of counterflow jet and spike on drag reduction for a blunt body at high Mach number flow Ziba Eghlima, Kamyar Mansour AmirKabir University of Technology, Iran	05:00pm – 05:30pm ICCFD9-2016-286 Shock interaction mechanism for 3-D laminar hypersonic flow over a double wedge Ahmet Selim Durna, Bayram Celik Istanbul Technical Universtiy,Turkey	05:30pm – 06:00pm ICCFD9-2016-214 A Fully Compressible Multiphase Scheme for Hypervelocity Impacts Iason Zisis, Bas van der Linden, Barry Koren Eindhoven University of Technology, The Netherlands		
06	Chair: Ozdemir, B.	Heat Transfer - I	Ballroom I		
04:30pm:06:00 pm	04:30pm – 05:00pm (YCFD) ICCFD9-2016-299 Three Dimensional Hypersonic Flow Analysis Around a Re- entry Vehicle Using Navier-Stokes Equations Muharrem Özgün, Sinan Eyi Middle East Technical University, Turkey	05:00pm – 05:30pm ICCFD9-2016-218 Numerical Investigation of Entropy Generation in a C-shaped Channel for Laminar Non-Newtonian Fluid Under a Constant Heat Flux Naas Toufik Tayeb, Lasbet Yahia, Benzaoui Ahmed, Loubar Khaled Ziane Achour University, Algeria	05:30pm – 06:00pm ICCFD9-2016-200 Numerical analysis of Fully Developed Laminar Flow and heat transfer of Non-Newtonian Fluid in Ducts of Arbitrary Cross- Sectional Shape Naas Toufik Tayeb, Lasbet Yahia, Benzaoui Ahmed, Loubar Khaled Ziane Achour University, Algeria		

	ICCFD9 Program: Tuesday, July 12, 2016						
07:	00 am – 05:00 pm		Registration			Lobby	
08:	00 am – 09:00 am		<b>Invited Lecture</b>			Ballroom 1	
P2	Prof. Georges-Henri Cottet Grenoble University, France Topic: "Recent advances with Semi-Lagrangian particles for complex fluid and fluid-structure dyna					amics"	
09:	00 am – 09:30 am		Break				
07	Chair: Cottet, GH.		High Order M	lethods		Ballroom 1	
09:30am:12:30 pm	9:30am – 10:00am ICCFD9-2016-136 Development and Analysis of High-Order Vorticity Confinement Schemes Ilias Petropoulos, Michel Costes, Paola Cinnella ONERA, The French Aerospace Lab, France	10:00am – 10:30am ICCFD9-2016-115 A Numerical Strategy for the Freestream Preservation of the High-order Weighted Essentially Non-oscillatory Scheme in General Curvilinear Coordinates Yujie Zhu, Zhensheng Sun, Hu Yu, Shiying Zhang Xi'an Research Institute of High-tech, Xi'an, China	10:30am – 11:00am ICCFD9-2016-207 A coupled Discrete Element Method and Finite Volume Method for the simulation of elastic fishnets in interaction with fluid Paolo Sassi, Jorge Freiría, Gabriel Usera University of the Republic, Uruguay	11:00am – 11:30am ICCFD9-2016-123 Considerations of Stress Limiter for the SST Turbulence Model in Dual Throat Nozzle Predictions R. Tharwat, M. El-Samanoudy, A. M. R. El-Baz Ain Shams University,Egypt	11:30am – 12:00pm ICCFD9-2016-113 Development of A FVM-based code using Conjugate Gradient Approach Rico Morasata, Kürşad Melih Güleren University of Turkish Aeronautical Association, Turkey	12:00pm – 12:30pm ICCFD9-2016-126 Numerical Simulation of Incompressible Flows using Immersed Boundary Method Considering Pressure Condition Kyohei TAJIRI, Hidetoshi NISHIDA, Mitsuru TANAKA Kyoto Insititute of Technology, Japan	
80	Chair: Laiping, Z.		Flow Contro	I / Rotor Aerodynam	ics	Safir	
09:30am:12:30 pm	09:30am – 10:00am (YCFD) ICCFD9-2016-191 Optimal Flow Actuation for Separation Control and Noise Minimization Beckett Y. Zhou, Tim Albring, Nicolas R. Gauger TU Kaiserslautern, Germany	10:00pm – 10:30pm (YCFD) ICCFD9-2016-220 Channel and Cavity Flow Analysis Using Lattice Boltzmann Solvers Parallelized with Coarray Fortran F.Yudum Comez, Nevsan Sengil Middle East Technical University, Turkey	10:30am-11:00am(YCFD) ICCFD9-2016-174 Towards Higher Order Discretization Error Estimation by Error Transport using Unstructured Finite-Volume Methods for Unsteady Problems Gary Yan, Carl Ollivier-Gooch The University of British Columbia, Canada	11:00am – 11:30am ICCFD9-2016-172 The Effects of the Model Scale and Mach Number on the Aerodynamic Characteristics of one six-blade Propeller Liu Zhang, Litao Liu, Hui Zhang, Hong Chen China Aerodynamics Research and Development Center, China	11:30am – 12:00pm ICCFD9-2016-282 Aerodynamic Analysis of Flow Characteristics over Rotors Using CFD Methods Onur Öktem, Emre Başaran, Ünver Kaynak TOBB University of Economics and Technology, Turkey	12:00pm – 12:30pm ICCFD9-2016-281 Computational Fluid Dynamics Simulations of Ship Airwake with a Hovering Helicopter Rotor Ezgi Orbay, Nilay Sezer Uzol Middle East Technical University,Turkey	

	ICCFD9 Program: Tuesday, July 12, 2016					
12:	30 pm – 02:00 pm	Hosted Lunch				
02:	00 pm – 02:30 pm	KEYNOTE TALK	Location			
K2	Topic: "Numerical st	Prof. Z. Laiping, CARDC China tudy of the twist mechanism for the flapping m	otion of seagull wing"			
09	Chair: Gungor, A.Gul	<b>Optimization/Uncertainity - I</b>	Ballroom 1			
02:30pm:04:00 pm	02:30pm – 03:00pm ICCFD9-2016-213 Improved Non-Intrusive Uncertainty Propagation in Complex Fluid Flow Problems L.M.M. van den Bos, B. Koren, R.P. Dwight Eindhoven University of Technology, the Netherlands	03:00pm – 03:30pm ICCFD9-2016-199 Adjoint Shape Optimization of Hypersonic Blunt Bodies Including Graphite Ablation Effects Oguz K. Onay, Sinan Eyi Middle East Technical University, Turkey	03:30pm – 04:00pm ICCFD9-2016-246 CFD Optimization of Transonic Low Pressure Turbine Blade Firat Kiyici, Tolga Yasa, Emiliano Costa, Stefano Porziani Anadolu University, Turkey			
10	Chair: Ozgur, Ertunc	Heat Transfer - II	Safir			
02:30pm:04:00 pm	02:30pm – 03:00pm ICCFD9-2016-317 Numerical Analysis of Multiplicity and Transition Phenomena in Natural Convection Hadi Kafil, Ali Ecder Bogazici University, Turkey	03:00pm – 03:30pm ICCFD9-2016-111 Thermal and Flow Field Analysis of Electronic Components Inside a Desktop Computer Chassis Kutay ÇETİN, Kürşad Melih GÜLEREN University of Turkish Aeronautical Association, TURKEY	03:30pm – 04:00pm ICCFD9-2016-302 Flow Structures in Compact Plate Heat Exchangers: A Numerical Study with Experimental Validation Caner Şenkal, Özgür Ertunç Ozyegin University, Turkey			
04:	04:00 pm – 04:30 pm <b>Break</b>					

	ICCFD9 Program: Tuesday, July 12, 2016				
11	Chair: Son, Gihun	Numerical Methods - II	Ballroom1		
04:30pm:06:00 pm	04:30pm – 05:00pm ICCFD9-2016-202 A Level-Set Method for Droplet Evaporation in Porous Media Moonhyeok Choi, Gihun Son Sogang University, Korea	05:00pm – 05:30pm ICCFD9-2016-223 (YCFD) Improvement of weighted compact nonlinear scheme and its application in compressible turbulence simulations Zhenguo Yan, Huayong Liu, Yankai Ma , Meiliang Mao, Huajun Zhu CARDC,Computational Aerodynamics Institute, China	05:30pm – 06:00pm ICCFD9-2016-150 (YCFD) A Posteriori Stability Analysis of Finite-Volume Methods on Unstructured Meshes Reza Zangeneh, Carl Ollivier-Gooch University of British Columbia, Canada		
12	Chair: Kayakol, Nuray	Heat Transfer - III	Safiı		
04:30pm:06:00 pm	04:30pm – 05:00pm ICCFD9-2016-311 Highly-accurate Computation of Supersonic Flows around a Concave Body (I. Influences of perturbations) Daichi Inui, Yoko Takakura Tokai University, Japan	05:00pm – 05:30pm ICCFD9-2016-328 Multiphase modelling of compressible diesel fuel in a solenoid valve injector Nuray Kayakol Robert Bosch Bursa	05:30pm – 06:00pm ICCFD9-2016-326 Highly-accurate Computation of Supersonic Flows around a Concave Body (II. Motion analysis by mo ving-coordinate method) Masayuki Nomura, Yoko Takakura Tokai University, Japan		

	ICCFD9 Program: Wednesday, July 13, 2016					
07:	00 am – 12:00 pm		Registration		Lobby	
08:	00 am – 09:00 am		<b>Invited Lecture</b>		Ballroon	n 1
P3	Topic: "An arbitr	Dept. o rary Lagrangian Euleria	Assoc.Prof. of Aerospace Eng., Istan n (ALE) approach for mo	Mehmet Şahin ıbul Technical Universit oving-boundary problen	y, Turkey ns with large displacem	ents and rotations"
09:	00 am – 09:30 am		Break			
13	Chair: Sahin, M.		Numerical Met	hods - III		Ballroom 1
09:30am:12:30 pm	9:30am – 10:00am ICCFD9-2016-248 (YCFD) Numerical Investigation of Blood Flow through a Vein with Two Consecutive Leaflet Valves Zohreh Sheidaei, Rahim Vesal Tabriz University, Iran	10:00am-10:30am (YCFD) ICCFD9-2016-169 Numerical Validation for Aeroacoustic Transmission Loss Performance of a High Frequency Wave Bypass Filter Based On Destructive Interferometry Barış Elbüken, Alper Ata Alarko Carrier Research and Development Center, Turkey	10:30am –11:00am (YCFD) ICCFD9-2016-235 An investigation on hybrid upwind fluxes for improving the numerical shock stability on unstructured grids Fan Zhang, Jun Liu, Biaosong Chen, Zedong Chen Dalian University of Technology, China	11:00am–11:30am (YCFD) ICCFD9-2016-198 Comparative Study of the CTM and SDM-IDC Methods for Diffusive Fluxes Calculation in the CFD Code Based on SIMPLE Algorithm on Highly Skewed Meshes Pannasit Borwornpiyawat, Ekachai Juntasaro, Abdul Ahad Narejo The Sirindhorn International Thai-German Graduate School of Engineering, Thailand	11:30am–12:00pm (YCFD) ICCFD9-2016-167 All-speed Two-phase RoeM and AUSMPW+ Scheme for Unsteady Low Mach Number Flows Hyeongjun Kim, Hyunji kim, Yohan Choe, Chongam Kim Seoul National University, Republic of Korea	12:00pm–12:30pm (YCFD) ICCFD9-2016-182 Multilevel ADER Scheme For Computational Aeroacoustics S. M. Joshi, A. Chatterjee Indian Institute of Technology, India
14	Chair: Hong, Luo	1	<b>Biological Flows</b> /	FSII		Safir
09:30am:12:30 pm	09:30am – 10:00pm ICCFD9-2016-249 Study of Aero-elastic Behaviour of an Aerospike in Unsteady Supersonic Flow by FSI Simulation A Kamalesh, P Theerthamalai, G Jagadeesh RCI, Hyderabad, India	10:00am – 10:30am ICCFD9-2016-108 An IBM-FSI solver of exible objects in fluid flow for pumps clogging applications A. Albadawi, S. Marry, B. Breen, R. Connelly, Y. Delaure Dublin City University, Ireland	10:30am – 11:00am ICCFD9-2016-260 A Two-Dimensional Spectral Model of Blood Plasma Flow with Oxygen Transport and Blood Cell Membrane Deformation G. Bueno, W. Harris Massachusetts Institute of Technology, US	11:00am – 11:30am ICCFD9-2016-189 A Numerical Investigation of Urine Flow Rate Effects on Stag Horn Stones Formation in a Kidney Ducts Sevda Aghaei Zad, Esmaeel Razavi, Farhad Sadegh Moghanlou Tabriz University, Iran	11:30am – 12:00pm ICCFD9-2016-270 Application of CFD Methods to Wind Noise Estimation of A- Pillar/Side Glass Region on Passenger Vehicles Kerem Anbarci, H.Can Koman, Ibrahim Avsar, M. Berkay Acikgoz, A.Rustem Aslan Istanbul Technical University, Turkey	12:00pm – 12:30pm ICCFD9-2016-252 A Reconstructed Discontinuous Galerkin method for Compressible Multiphase flows in Arbitrary Lagrangian- Eulerian Formulation Aditya K. Pandare, Hong Luo North Carolina State University, USA
12:3	30 pm – 02:00 pm		Hosted Lunch	n		
<mark>02:</mark>	00 pm – 06:00 pm		CITY TOUR			

	ICCFD9 Program: Thursday, July 14, 2016					
07:	00 am – 05:00 pm		Registrati	on		Lobby
08:	00 am – 09:00 am		Invited Lect	ture		Ballroom 1
P4	Prof. Shigeru Obayashi Director, Institute of Fluid Science, Tohoku University, Japan Topic: "Multi-objective Design Exploration (MODE) with CFD"				ty, Japan vith CFD"	
09:	00 am – 09:30 am		Break			
15	Chairs: Obayashi, Shiger	u	<b>Discontinous Gale</b>	rkin Method / LES-2	:	Ballroom 1
09:30am:12:30 pm	09:30am – 10:00am ICCFD9-2016-196 A Robust High-Order Discontinuous Galerkin Solver for Fluid Flow with Cavitation Malte Hoffmann, Sebastian Boblest, Philipp Offenhäusery, Claus-Dieter Munz University of Stuttgart, Germany	10:00am – 10:30am ICCFD9-2016-251 Discontinuous Galerkin Methods for Hyperbolic Advection-Diffusion Equation on Unstructured Grids Jialin Lou, Hong Luo, Hiroaki Nishikawa North Carolina State University, USA	10:30am – 11:00am ICCFD9-2016-138 Large Eddy Simulations of Heavy Gas Dispersion within Building Group Weiming Liu, Abdullah Alakalabi, Tony Lee Graham, Xiaojun Gu University of Central Lancashire, UK	11:00am – 11:30am ICCFD9-2016-305 Large Eddy Simulation of Subsonic H2/N2 transverse jet in hot air cross-flow Mehmet Karaca, Ivan Fedioun, Iskender Gokalp Institut de Combustion Aérothermique Réactivité et Environnement (CNRS), France	11:30am – 12:00pm ICCFD9-2016-233 A SGS Model for LES of Turbulent Buoyant Flows Ilyas Yilmaz Istanbul Aydin University, Turkey	12:00pm – 12:30pm ICCFD9-2016-153 Temperature perturbation method to generate turbulent inflow conditions for LES/DNS simulations in OpenFOAM Sophia Buckingham, Lilla Koloszar, Clara Garcia- Sanchez, Yann Bartosiewicz, Grégoire Winckelmans von Karman Institute for Fluid Dynamics, Belgium
16	Chairs: Wang, Z.J.	I	Multiphase I	Flows - II	1	Safir
09:30am:12:30 pm	09:30am-10:00am (YCFD) ICCFD9-2016-287 An absorbing boundary condition for free surface water waves Bülent Düz, Mart J.A. Borsboom, Arthur E.P. Veldman, Peter R. Wellens, Rene H.M. Huijsmans Maritime Research Institute (MARIN), The Netherlands	10:00am – 10:30am ICCFD9-2016-291 An efficient interface capturing method for a large collection of interacting cells immersed in a fluid M. Jedouaa, C-H Bruneau, E. Maitre Univ. Grenoble Alpes and CNRS, France	10:30am – 11:00am (YCFD) ICCFD9-2016-175 Numerical Modelling of Immiscible Hele-Shaw Flow with Inhomogeneous Viscosity S.J. Jackson, H. Power, D. Giddings University of Nottingham, UK	11:00am – 11:30am ICCFD9-2016-166 A numerical method for the fluid-structure interaction problems based on the gas kinetic theory Xiaodong Ren, Kun Xu, Wei Shyy Hong Kong University of Science and Technology,China	11:30am – 12:00pm ICCFD9-2016-318 GAS-KINETIC SCHEME ON MOVING GRID AND ITS APPLICATION IN FREELY FALLING CARD Changqiu Jin, Liang Pan, Kun Xu Institute of Applied Physics and Computational Mathematics, China	
12:	30 pm – 02:00 pm		Hosted Lur	ich		

ICCFD9 Program: Thursday, July 14, 2016				
02:00 pm – 02:30 pm	POSTER SESSION	Coffee Break Area		
17 Chairs: Abdulaleen, Albadawi	<b>Optimization/Uncerteanity - II</b>	Ballroom 1		
02:30pm – 03:00pm ICCFD9-2016-148 Construction of Multi-Fidelity Surrogate Models for Aerodynamic Databases Markus Peer Rumpfkeil, Philip Beran University of Dayton, USA	03:00pm – 03:30pm ICCFD9-2016-160 Aerodynamic Optimisation of Active Flow Control on a Three- Element High-Lift Configuration Anil Nemili, Emre Özkaya, Nicolas Gauger, Felix Kramer, Frank Thiele TU Kaiserslautern, Germany	03:30pm – 04:00pm ICCFD9-2016-184 A Two-Level Approach for Design Optimization of Acoustic Liners. Emre Özkaya, Junis Abdel Hay, Nicolas R. Gauger, Norbert Schönwald, Frank Thiele TU Kaiserslautern, Germany		
18 Chairs: Cırpıcı, B.K.	Multiphysics - I	Safir		
02:30pm – 03:00pm ICCFD9-2016-145 girdap: Open source object oriented autonomous grid management library for multi-physics simulations Eray Uzgoren Middle East Technical University ,Northern Cyprus	03:00pm – 03:30pm ICCFD9-2016-315 FeatFlow: A Fast, Efficient and Robust CFD solver for Multiphysics Problems Evren Bayraktar, Otto Mierka, Stefan Turek Technische Universität Dortmund, Germany	03:30pm – 04:00pm ICCFD9-2016-228 Numerical Investigation of Winglets Used to Improve the Flying Performance of Unmanned Aerial Vehicle Prof. Ünver Kaynak, Ahmet Buğra Çoban TOBB University of Economics and Technology, Turkey		

	ICCFD9	Program: Thursday, July 14, 2	016		
04:	00 pm – 04:30 pm Break				
19	Chairs: Droubi, M.Gazi	Multiphysics - II	Safi		
04:30pm:06:00 pm	04:30pm – 05:00pm ICCFD9-2016-325 Simulating 3-D Single Gas Bubble Growth in a Polymer Melt Using Multi-Phase SPH Burak Kaan Cirpici, Benedict D. Rogers, Yong C. Wang Namik Kemal University, Turkey	05:00pm – 05:30pm ICCFD9-2016-289 Numerical Solution of Burgers-Huxley Equation using Improved Nodal Integral Method Niteen kumar, Suneet singh Indian Institute of Technology,India	05:30pm – 06:00pm ICCFD9-2016-128 Computational Fluid Dynamic Analysis of Sand Erosion in 90° Sharp Bend Geometry M.G Droubi, R. Tebowei, S.Z. Islam, M. Hossain, E. Mitchell Robert Gordon University, UK		
20	Chairs: Tyliszczak, Artur	Numerical Methods - IV	Ballroom 1		
04:30pm:06:00 pm	04:30pm – 05:00pm ICCFD9-2016-274 An Implicit Meshless RBF-based Di erential Quadrature Method Applied to the Lid-Driven Cavity Problem Y. Yeginer, M. Sahin, A. Altinkaynak Istanbul Technical University, Turkey	05:00pm – 05:30pm ICCFD9-2016-158 LES-IB computations of flows with large temperature and density variations Artur Tyliszczak, Witold Elsner, Mariusz Ksiezyk Czestochowa University of Technology, Poland	05:30pm – 06:00pm ICCFD9-2016-271 Comparison of artificial compressibility method with and without subiteration for unsteady flow Itaru Tanno, Tomohisa Hashimoto, Takahiro Yasuda, Yoshihiro Tanaka, Koji Morinishi, Nobuyuki Satofuka Tsukuba University of Technology, Japan		

ICCFD9 Program: Friday, July 15, 2016						
07:00 am – 12:00 pm	Registr	ation		Lobby		
09:00 am – 09:30 am	9:00 am – 09:30 am <b>Break</b>					
21 Chairs: R.G. Rajagopalan	Computational A	erodynamics		Ballroom1		
9:30am – 10:00am ICCFD9-2016-125 Runge-Kutta Based Algorithms for More Efficient Simulation of Unsteady Incompressible Flows Matthew V. Fischels, R. G. Rajagopalan Iowa State University,Iowa 10:00am – 10:30am ICCFD9-2016-139 Numerical investigations of the flow around a ground vehicles platoon Charles-Henri Bruneau, Khodor Khadra, Iraj Mortazavi Univ. Bordeaux IMB, INRIA Bordeaux Sud-Ouest MEMPHIS,France	10:30am – 11:00am ICCFD9-2016-239 Drag Analysis of a Supersonic Fighter Aircraft Osman Akgun, Ali Ihsan Golcuk, Dilek Funda Kurtulus, Ünver Kaynak Middle East Technical University, Turkey	11:00am – 11:30am ICCFD9-2016-168 Aerodynamic Design of Buses Inspired by Sperm Whale Seda Kırmacı Arabacı, Mehmet Pakdemirli Celal Bayar University, Turkey	11:30am – 12:00pm ICCFD9-2016-141 A Numerical Study of Circulation Control on a Flapless UAV Huaixun Ren, Lihua Gao, Jian Liu, Yong Huang China Aerodynamics Research and Development Center, China	12:00pm – 12:30pm ICCFD9-2016-226 Parametric Investigation of Hull Shaped Fuselage for an Amphibious UAV Emre Sazak, D. Funda Kurtulus Middle East Technical University, Turkey		
22 Chairs: Gadala, M.S.	Multiphase	Flows - III		Safir		
09:30pm - 10:00pm ICCFD9-2016-25610:00am - 10:30am ICCFD9-2016-132Research on Fluidic Amplifiers Dimensional Modifications via Computer Simulation (CFD)Hydrodynamics of Twin Water Jets Impingement on Flat Horizontal Moving SurfaceMasoud Baghaei, Josep M Bergada, David Del Campo, Vanessa Del Campo UPC-ESEIAAT, Terrassa, SpainSultan Al-Qash, M. M. Sera N. S. Gadala University of British Columbia, Canada	10:30am – 11:00am ICCFD9-2016-330 A Front-Tracking Method for a Direct Numerical Simulation of Viscoelastic Interfacial Flows j, Daulet Izbassarov, Metin Muradoglu Koc University, Turkey	11:00am – 11:30am ICCFD9-2016-334 Simulation of Underwater Flow around a Projectile with Different Section Shape Yang Yongliang, Guo Rui, Liu Rongzhong Nanjing University of Science and Technology, China	11:30am – 12:00pm ICCFD9-2016-234 Benchmark Simulations of Flow Past Moving Rigid Bodies Using a Sharp Interface Immersed Boundary Method Utku Senturk, Daniel Brunner, Nicoleta Herzog, Hrvoje Jasak, Alexander J. Smits, C. W. Rowley Ege University, Turkey	12:00pm – 12:30pm ICCFD9-2016-236 Effects of Temperature on the Acoustic Waves from A Compressible Turbulent Mixing Layer Daiki Terakado, Taku Nonomura, Akira Oyama, Kozo Fujii The University of Tokyo,Japan		
12:30 pm – 02:00 pm	Hosted Lu	Inch				
02:00 pm – 02:30 pm	2:00 pm – 02:30 pm POSTER SESSIONS					

ICCFD9 Program: Friday, July 15, 2016			
35       Chairs: Gungor, A.G.         02:30pm – 03:00pm         ICCFD9-2016-263         Simulation of Flow Through Random Packed Beds – a Study         of Ordering Effects         Maciej Marek         Częstochowa University of Technology, Poland	FSI - II 03:00pm – 03:30pm ICCFD9-2016-259 Solving Fluid Structure Interaction Problems with an Immersed Boundary Method Michael F. Barad, Christoph Brehm, Cetin C. Kiris NASA Ames Reserch Center, USA	Ballroom 1	
35         Chairs: Aslan, A.R.           02:30pm – 03:00pm           ICCFD9-2016-190	Meshless Methods 03:00pm – 03:30pm ICCFD9-2016-229	Safir	
A Development of Meshless Point Generation Technique for analysis of the unsteady flow around the multi-body Jae Sang Rhee, Jin Young Huh, Kyu Hong Kim, Suk Young Jung Seoul National University, Republic of Korea	Numerical Simulation of Compressible Flow using Meshless Method Satisfying the Geometric Conservation Law Jin Young Huh, Jae Sang Rhee, Kyu Hong Kim, Suk Young Jung Seoul National University, Republic of Korea		
04:00 pm – 06:00 pm	Closing		

## ICCFD9 Program: Thursday Friday, July 14-15, 2016

14:00 pm - 14:30 pm

**Poster Presentations** 

#### ICCFD9-2016-104

Large Prandtl number effect on the velocity distribution field of free convective flow of two different types of immiscible fluids in a

vertical channel

M.N Bouaziz, A. Tetbirt, A.M Bouaziz, M. Tahar Abbes

Dr. Yahia Fares University, Algeria

#### ICCFD9-2016-105

Hydrodynamic dispersion in Darcy-non Darcy porous medium filled by a nanofluid

A.M Bouaziz, M.N Bouaziz, S. Hanini

Dr. Yahia Fares University, Algeria

#### ICCFD9-2016-170

Study of the three-dimensional flow characteristics inside the WWER-440 fuel assembly

Ts. Malakyan, H. Hovhannisyan, M. Zadoyan, A. Amirjanyan

Nuclear and Radiation Safety Center, Armenia

#### ICCFD9-2016-212

A New Computational Package for Using in CFD and Other Problems

Mohammad Reza Akhavan Khaleghi

The Office of Counseling and Research Fluid Engineering and Aerodynamic, Iran

#### ICCFD9-2016-264

Turbulent Wall Jet over a Forward-Backward facing Step Pair

Kabache Malika, Mataoui Amina

University of Sciences and Technology HOUARI BOUMEDIENE, Algeria

#### ICCFD9-2016-279

Inclined Slot Jet Impinging on a Moving Wall

Benmouhoub Dahbia, Mataoui Amina

University of Sciences and Technology HOUARI BOUMEDIENE, Algeria

# NOTES

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