

# PROGRAM

## 8<sup>th</sup> International Symposium on ADVANCES IN COMPUTATIONAL HEAT TRANSFER – CHT-21

August 15 – 19, 2021

**TIMES ARE GMT-3 (RIO DE JANEIRO TIME)**



**PROMOTED BY:**



**ASTFE**  
American Society  
of Thermal and Fluids Engineers



**SPONSORED BY:**



## PROGRAM AT A GLANCE

BRAZIL TIME (GMT-3)	August 15 Sunday	August 16 Monday	August 17 Tuesday	August 18 Wednesday	August 19 Thursday
8:00-9:00				WP	WP
9:00-10:00		Technical Sessions	Technical Sessions	Technical Sessions	Technical Sessions
10:00-11:00		PL2	PL5	PL8	PL11
11:00-12:00	Opening Ceremony	PL3	PL6	PL9	PL12
12:00-13:00	PL1	SC-CFD	SC-CFD	SC-CFD	SC-CFD
13:00-14:00	Sessions in honor of Brian Spalding	PL4	PL7	PL10	PL13
14:00-15:00		SC-CFD	SC-CFD	SC-CFD	SC-CFD
15:00-16:00		Technical Sessions	Technical Sessions	Technical Sessions	Closing and Awards Ceremony

PLENARY LECTURES - ROOM MARACANÃ			
August 15 Sunday	12:00-13:00	PL1	Past, present and future of CFD <b>Akshai K. Runchal &amp; Madhukar M. Rao</b> CFD Virtual Reality Institute
August 16 Monday	10:00-11:00	PL2	Advances in experimental and computational analysis of the neonate's brain cooling process <b>Andrzej Nowak</b> Silesian University of Technology, Poland
August 16 Monday	11:00-12:00	PL3	Pore scale analysis of thermal and fluid dynamics behaviors in open metal foams <b>Oronzio Manca</b> Università degli Studi della Campania "Luigi Vanvitelli", Italy
August 16 Monday	13:00-14:00	PL4	Modeling of liquid metal flows during assembly operations and characterization of the properties of these metals at high temperatures <b>Philippe Le Masson</b> Université Bretagne Sud, France
August 17 Tuesday	10:00-11:00	PL5	Computational methods of design and identification of thermal protection of spacecraft <b>Aleksey Nenarokomov</b> Moscow Aviation Institute, Russia
August 17 Tuesday	11:00-12:00	PL6	Cost-effective approaches to predictions of thermofluid phenomena in engineering systems <b>Bantwal R. (Rabi) Baliga</b> McGill University, Canada
August 17 Tuesday	13:00-14:00	PL7	Inverse methods in heat transfer through modelling and machine learning <b>Perumal Nithiarasu</b> Swansea University Bay Campus, Swansea SA1 8EN, UK
August 18 Wednesday	10:00-11:00	PL8	Direct numerical simulations of heat transfer from a cylinder immersed in the production and decay regions of grid turbulence <b>George Papadakis</b> Imperial College London, UK
August 18 Wednesday	11:00-12:00	PL9	Minimization procedures for thermal parameters identification from the experiment to the physical model <b>Jean-Luc Battaglia</b> Université Bordeaux 1, France
August 18 Wednesday	13:00-14:00	PL10	Lattice Boltzmann method for multi-phase flows <b>Abdulmajeed Mohamad</b> The University of Calgary, Canada
August 19 Thursday	10:00-11:00	PL11	Nonlinear computation: future of numerical simulation <b>L. Q. "Rick" Wang</b> The University of Hong Kong, Hong Kong
August 19 Thursday	11:00-12:00	PL12	Growth and dynamics of vapor bubbles in various regimes of boiling with and without external electric field <b>Gautam Biswas</b> Indian Institute of Technology Kanpur, India
August 19 Thursday	13:00-14:00	PL13	Mutual interactions of evaporative heat transfer phenomena and wetting phenomena: numerical simulation and experimental validation <b>Peter Stephan</b> Technische Universität Darmstadt, Germany

SHORT COURSE - ROOM COPACABANA			
August 16 - 19	12:00-13:00 and 14:00-15:00	SC-CFD	Introduction to Modern CFD Akshai Kumar Runchal

WORKSHOP - ROOM MARACANÃ			
August 18 - 19	8:00-9:00	WP	Publishing your Research Swati Meherishi

TECHNICAL SESSIONS					
BRAZIL TIME (GMT-3)					
DAY	ROOM	9:00-10:00		15:00-16:00	
August 16 Monday	IPANEMA	BIO	CHT-21-144 CHT-21-145 CHT-21-161 CHT-21-163 CHT-21-282	SMP	CHT-21-102 CHT-21-110 CHT-21-134 CHT-21-170 CHT-21-251
	LEBLON	IF	CHT-21-120 CHT-21-142 CHT-21-171 CHT-21-186 CHT-21-257 CHT-21-271	RAD	CHT-21-103 CHT-21-109 CHT-21-133 CHT-21-214 CHT-21-227 CHT-21-262
	URCA	INV-1	CHT-21-117 CHT-21-125 CHT-21-138 CHT-21-158 CHT-21-210 CHT-21-223	INV-2	CHT-21-131 CHT-21-168 CHT-21-175 CHT-21-228 CHT-21-242 CHT-21-266
August 17 Tuesday	IPANEMA	MN	CHT-21-124 CHT-21-127 CHT-21-130 CHT-21-135 CHT-21-196 CHT-21-219	SOLM & MM	CHT-21-101 CHT-21-155 CHT-21-167 CHT-21-195 CHT-21-240 CHT-21-249
	LEBLON	CM-1	CHT-21-106 CHT-21-118 CHT-21-229 CHT-21-232 CHT-21-250 CHT-21-274	CM-2	CHT-21-154 CHT-21-179 CHT-21-181 CHT-21-183 CHT-21-255 CHT-21-287
	URCA	NC-1	CHT-21-113 CHT-21-126 CHT-21-132 CHT-21-165 CHT-21-273	NC-2 & COMB	CHT-21-178 CHT-21-198 CHT-21-225 CHT-21-235 CHT-21-254 CHT-21-277
August 18 Wednesday	IPANEMA	FC	CHT-21-114 CHT-21-115 CHT-21-226 CHT-21-270 CHT-21-281	OF-1	CHT-21-112 CHT-21-129 CHT-21-137 CHT-21-203 CHT-21-220
	LEBLON	EN-1	CHT-21-121 CHT-21-188 CHT-21-201 CHT-21-211 CHT-21-212	EN-2	CHT-21-105 CHT-21-157 CHT-21-199 CHT-21-206 CHT-21-230
	URCA	TURB	CHT-21-169 CHT-21-176 CHT-21-185 CHT-21-191 CHT-21-217 CHT-21-224	OF-2	CHT-21-184 CHT-21-197 CHT-21-244 CHT-21-275 CHT-21-278
August 19 Thursday	IPANEMA	OF-3	CHT-21-276 CHT-21-280 CHT-21-283 CHT-21-284 CHT-21-285		

## PROGRAM PER DAY

**August 15, Sunday**

### Room MARACANÃ

**11:00-12:00** Opening Ceremony

**12:00-13:00** Plenary Lecture PL1: Past, present and future of CFD, **Akshai K. Runchal**  
*Chairperson: Ilker Tari*

**13:00-15:00** Sessions in honor of Professor Brian Spalding - *Chairperson: Akshai K. Runchal*

**CHT-21-BS-101** Development and applications of a high-order meshless method for fluid flow and heat transfer in complex domains, by **Surya P. Vanka**, S. Shahane, A. Radhakrishnan, M. Xu, P. Kumar, N. Bartwal, A. Unnikrishnan, S. Roy and V. Narayanan

**CHT-21-BS-102** Computational-analytical integral transforms in transport phenomena, by **Renato Machado Cotta**

**CHT-21-BS-103** Direct numerical simulation of evaporating falling films in laminar gas streams, by Avijit Karmakar and Sumanta Acharya

**CHT-21-BS-104** Recent developments in modelling of polymer electrolyte cells, by **Steven Beale**, Shidong Zhang, Steffen Hess, Uwe Reimer, Norbert Weber, Holger Marschall and Werner Lehnert

**CHT-21-BS-105** Examples of computational fluid dynamics models for nuclear industry applications, by **Milorad Dzodzo**

## August 16, Monday

### Room MARACANÃ

- 10:00-11:00** **Plenary Lecture PL2:** Advances in experimental and computational analysis of the neonate's brain cooling process, **Andrzej Nowak - Chairperson: Perumal Nithiarasu**
- 11:00-12:00** **Plenary Lecture PL3:** Pore scale analysis of thermal and fluid dynamics behaviors in open metal foams, **Oronzio Manca - Chairperson: Denis Maillet**
- 13:00-14:00** **Plenary Lecture PL4:** Modeling of liquid metal flows during assembly operations and characterization of the properties of these metals at high temperatures, **Philippe Le Masson**  
**Chairperson: Aleksey Nenarokomov**

### Room COPACABANA

- 12:00-13:00** **Short Course SC-CFD:** Introduction to Modern CFD – Lesson 1, **Akshai Kumar Runchal**
- 14:00-15:00** **Short Course SC-CFD:** Introduction to Modern CFD – Lesson 2, **Akshai Kumar Runchal**

### Room IPANEMA

- 9:00-10:00** **Technical Session BIOLOGICAL HEAT TRANSFER - Chairperson: Victoria Timchenko**
- CHT-21-144** Design under uncertainties of the thermal ablation of tumors with high-intensity focused ultrasound, by **Rodrigo L. S. Silva, Mohsen Alaeian and Helcio R. B. Orlande**
- CHT-21-145** Thermal transport within porous biological tissue for thermal therapeutics, by **Amit Kumar Shaw and Sanjeev Soni**
- CHT-21-161** Numerical analysis of radiofrequency ablation in a tumour tissue bounded by healthy tissue, by **Claudio Tucci, Macarena Trujillo, Enrique Berjano, Marcello Iasiello, Assunta Andreatti and Giuseppe Peter Vanoli**
- CHT-21-163** A concise and accurate solution for radiative transfer problems relevant in hyperthermia models, by **Fernando Groff, Liliane Basso Barichello and Esequia Sauter**
- CHT-21-282** Finite difference solution of bio-magnetic flow of heat transfer over moving horizontal plate by the presence variable viscosity and temperature, by **Sadia Anjum Jumana, M. Ferdows and E.E. Tzirtzilaki**
- 15:00-16:00** **Technical Session SINGLE AND MULTIPHASE FLOW - Chairperson: Bantwal R. Baliga**
- CHT-21-102** Flow and heat transfer inside a rotating annular space, by **Ahmed M. Teamah and Mohamed S. Hamed**
- CHT-21-110** Stability analysis of a second order discretized 1D two-fluid model for vertical annular flow, by **R. L. Castello Branco, E. M. G. Fontalvo, I. B. de Paula, J. N. E. Carneiro and A.O. Nieckele**

- CHT-21-134** The adaptive PLIC-VOF method in cavitating flow simulations, by **Dezhi Dai** and **Albert Y. Tong**
- CHT-21-170** Particle-laden multiphase flows: a finite element analysis on biofuel particle emissions, by **Joao P. I. Souza** and **Gustavo R. Anjos**
- CHT-21-251** Numerical investigation of cavitating flow in a horizontal converging-diverging nozzle, by **Mohammed Zamou**, **Rachid Boucetta** and **Mohand Kessal**

### Room LEBLON

- 9:00-10:00** Technical Session **INTERNAL FLOW AND HEAT TRANSFER** - **Chairperson: Kazuya Tatsumi**
- CHT-21-120** Transient three-dimensional conjugated heat transfer with integral transforms and single domain formulation, by **Adam H. R. Sousa**, **Kleber M. Lisboa**, **Carolina P. Naveira-Cotta** and **Renato M. Cotta**
- CHT-21-142** Numerical analysis of a MHD generator with helical geometry, by **Tomas S. Quirino**, **Gabriel L. Verissimo** and **Marcelo J. Colaço**
- CHT-21-171** Decoupled mesh method for finite element simulation of two-phase systems, by **Daniel B. V. Santos** and **Gustavo R. Anjos**
- CHT-21-186** Laminar flow heat transfer through a square duct with combined transverse ribs and helical screw tape inserts, by **Hrishiraj Ranjan** and **Sujoy Kumar Saha**
- CHT-21-257** Overheating in compressible heat transfer near the thermodynamic critical point due to non-normality, by **Luiz Ricardo C. de Almeida** and **Leonardo S. de B. Alves**
- CHT-21-271** Heat transfer performance of a supercritical CO<sub>2</sub> based microchannels recuperator including thermal buoyancy, by **Janhavi Chitale** and **George S. Dulikravich**
- 15:00-16:00** Technical Session **RADIATION** - **Chairperson: Olivier Farges**
- CHT-21-103** An improved solution for shielding of thermal radiation of fires using mist curtains of pure water or sea water, by **Leonid A. Dombrovsky** and **Siaka Dembele**
- CHT-21-109** The  $\omega$ -absorption line distribution function for rank correlated SLW model prediction of radiative transfer in non-uniform gases, by **Frédéric André**, **Vladimir P. Solovjov** and **Brent W. Webb**
- CHT-21-133** Enhancement of the RC-SLW model for prediction of gas radiation in non-uniform media, by **Brent W. Webb**, **Vladimir P. Solovjov** and **Frédéric André**
- CHT-21-214** Study of radiative heat transfer in nucleate boiling under microgravity conditions, by **M. Naarendharan** and **Ankit Bansa**
- CHT-21-227** Optical properties and thermal conductivity of heat-insulating material based on mesoporous silica with various thermal radiation absorbers, by **Roman A. Mironov**, **Olga V. Tomchani**, **Viktoria O. Guydenko** and **Maxim O. Zabezhailov**
- CHT-21-262** Computer-generated images of the absorption/scattering of a laser sheet in an heterogeneous medium by a new optimized Monte-Carlo method, by **Morgan Sans**, **Mouna El Hafi**, **Vincent Eymet**, **Vincent Forest**, **Richard Fournier** and **Najda Villefranque**



## Room URCA

- 9:00-10:00**    **Technical Session INVERSE PROBLEMS 1 - Chairperson: César Pacheco**
- CHT-21-117**    Critical assessment of the moisture distribution in existing building walls, by **Ainagul Jumabekova, Julien Berger, Rafik Belarbi and Jean-Claude Krapez**
- CHT-21-125**    Heat transfer characteristics and effective thermal conductivity for ceramic matrix composites, by **Anshul Suri and Ankit Bansal**
- CHT-21-138**    Numerical solving of geometry-radiative inverse problem, by **Aleksey V. Nenarokomov, Evgeny V. Chebakov and Dmitry L. Reviznikov**
- CHT-21-158**    Identification of impulse responses in heat transfer: Dirac comb parameterization, cumulated doses and partial time moments, by **Denis Maillet and Benjamin Rémy**
- CHT-21-210**    An inverse analysis of the brain cooling process in neonates using the particle filter method, by **Felipe S. Nunes, Helcio R. B. Orlande and Andrzej J. Nowak**
- CHT-21-223**    Modeling and identification of mathematical model of high-temperature superconducting coil, by **Oleg M. Alifanov, Aleksey V. Nenarokomov, Aleksey G. Vikulov, Alena V. Morzhukhina, Sergey A. Budnik and Vladislav V. Ilyin**
- 
- 15:00-16:00**    **Technical Session INVERSE PROBLEMS 2 - Chairperson: Terrence Simon**
- CHT-21-131**    Particle filter-model predictive control for oil reservoir management, by **Carlos Eduardo Rambalducci Dalla, Tarsis Baia Fortunato, Julio Cesar Sampaio Dutra, Wellington Betencurte da Silva, Jose Mir Justino da Costa and Marcelo Jose Colaço**
- CHT-21-168**    Estimation of thermal contact conductance on irregular interfaces using the reciprocity functional approach, by **Guilherme C. de Freitas and Marcelo J. Colaço**
- CHT-21-175**    Heat transfer dissipation estimation in extrusion processes, by **Carlos E. L. Nóbrega**
- CHT-21-228**    A particle-filter based framework for inverse problems using ANSYS Fluent and Python, by **Bruno Henrique Marques Margotto, Carlos Eduardo Polatschek Kopperschmidt, Marcelo José Colaço, Wellington Betencurte da Silva, Julio Cesar Sampaio Dutra and Luiz A. Silva de Abreu**
- CHT-21-242**    Sequential boundary heat flux estimation using the method of Fundamental Solutions and Bayesian filters, by **Carlos Eduardo Polatschek Kopperschmidt, Bruno Henrique Marques Margotto, Carlos Eduardo Rambalducci Dalla, Marcelo Jose Colaço, Wellington Betencurte da Silva and Julio C. Sampaio Dutra**
- CHT-21-266**    Inverse heat transfer problem for the characterization of a palladium nanofluid, by **Nilton P. Silva, Cláudia C. R. Cruz, Henrique M. Fonseca, Leonardo A. B. Varon, Claudio L. Cesar, Dilson S. Dos Santos and Helcio R. B. Orlande**

## August 17, Tuesday

### Room MARACANÃ

- 10:00-11:00** **Plenary Lecture PL5:** Computational methods of design and identification of thermal protection of spacecraft, **Aleksey Nenarokomov** - **Chairperson: Liliane Barichello**
- 11:00-12:00** **Plenary Lecture PL6:** Cost-effective approaches to predictions of thermofluid phenomena in engineering systems, **Bantwal R. (Rabi) Baliga** - **Chairperson: Renato M. Cotta**
- 13:00-14:00** **Plenary Lecture PL7:** Inverse methods in heat transfer through modelling and machine learning, **Perumal Nithiarasu** - **Chairperson: Philippe Le Masson**

### Room COPACABANA

- 12:00-13:00** **Short Course SC-CFD:** Introduction to Modern CFD – Lesson 3, **Akshai Kumar Runchal**
- 14:00-15:00** **Short Course SC-CFD:** Introduction to Modern CFD – Lesson 4, **Akshai Kumar Runchal**

### Room IPANEMA

- 9:00-10:00** **Technical Session MICRO AND NANOSCALE HEAT TRANSFER**  
**Chairperson: Carolina Naveira-Cotta**
- CHT-21-124** Metal-insulator-metal selective emitter design with an emissivity matching with GaSb thermophotovoltaic cell, by **Eslem Enis Atak, Elif Begüm Elçioğlu and Tuba Okutucu-Özyurt**
- CHT-21-127** Spectral analysis on heat transfer between liquid and structured surface based on molecular dynamics, by **Kunio Fujiwara, Shogo Nakata and Masahiko Shibahara**
- CHT-21-130** Thermal performances of cross-flow microchannel heat sinks, by **Carlo Nonino and Stefano Savino**
- CHT-21-135** Molecular dynamic study of local interfacial thermal resistance of solid-liquid and solid-solid interfaces: water and nanotextured surface, by **Yoshitaka Ueki, Satoshi Matsuo and Masahiko Shibahara**
- CHT-21-196** Heat transfer enhancement in a two-phase immiscible flow in microchannel, by **V. C. Teixeira, A. G. B. da Cruz, G. M. Guerra and F. P. Duda**
- CHT-21-219** Molecular dynamics study on interactions between wall surface and solidification interface of water molecules, by **Uchida Shota, Kunio Fujiwara and Masahiko Shibahara**

**15:00-16:00 Technical Sessions SOLIDIFICATION AND MELTING and MATERIALS PROCESSING AND MANUFACTURING - Chairperson: Alexander Gelfgat**

- CHT-21-101** A study of the melting of n-octadecane in horizontal cylindrical annuli: onset of convection and global melting, by **Mohammad Azad and Dominic Groulx**
- CHT-21-155** Numerical analysis of explosive solidification under the effect of different boundary conditions, by **Çiğdem Susantez, Bruna R. Loiola and Aldélio B. Caldeira**
- CHT-21-167** Optimized design of phase change packed beds, by **Carlos E.L. Nobrega and Sérgio L. Braga**
- CHT-21-195** Experimental and numerical study of the effect of composition on GaN thin films grown by deposition, by **Omar Dhannoon Jumaah and Yogesh Jaluria**
- CHT-21-240** Numerical study of latent heat thermal energy storage based on an innovative hexagonal heat exchanger: Performance evaluation, by **Imad Ait Laasri, Zakaria Elmaazouzi, Abdelkader Outzourhit, Mustapha El Alami and El Ghali Bennouna**
- CHT-21-249** Dynamic GMAW process model for layer geometry control in wire arc additive manufacturing, by **Rafael M. Bendia, Fernando Lizarralde, Augusto V. Passos and Victor H.P.M. Oliveira**

**Room LEBLON**

**9:00-10:00 Technical Session COMPUTATIONAL METHODS 1 - Chairperson: L. Q. Wang**

- CHT-21-106** Asymptotic properties of the radiation deep in an atmosphere, by **Menekse Senyigit and Ayse Kaskas**
- CHT-21-118** Real-time estimation of the heat transfer coefficient of Pitot Tubes undergoing freezing, by **Steve B. Diniz and Cesar C. Pacheco**
- CHT-21-229** Systems based CFD modelling of package steam boilers, by **Peter Klein, Marinus Potgieter and Bianca Ferreira**
- CHT-21-232** CHT modeling of an electronics cabinet using multi-scale meshing, by **Ilker Tari and Yanki Cobanoglu**
- CHT-21-250** Transfer function estimation with SMC method for combined heat transfer: insensitivity to detail refinement of complex geometries, by **L. Penazzi, S. Blanco, C. Caliot, C. Coustet, M. El Hafi, R. Fournier, J. Gautrais and M. Sans**
- CHT-21-274** Development and verification of meshless diffuse approximate method for simulation of single phase, compressible flow in axisymmetry, by **Khush Bakhat Rana, Rizwan Zahoor, Boštjan Mavrič and Božidar Šarler**

**15:00-16:00 Technical Session COMPUTATIONAL METHODS 2 - Chairperson: Carlo Nonino**

- CHT-21-154** Approximate semi-analytical method for solving of diffusion problems with variable properties, by **Isabela Florindo Pinheiro and Leandro Alcoforado Sphaier**
- CHT-21-179** A comparison of two approaches to extend nodal integral methods for heat and mass transfer to arbitrary geometries, by **Ibrahim Jarrah, Sundar Namala and Rizwan-uddin**

- CHT-21-181** CFD analysis of the thermal performance of a Trombe wall system, *by Afef Laribi, Yacine Ait-Oumeziane, Valérie Lepiller, Sylvie Begot and Philippe Desevaux*
- CHT-21-183** Numerical studies on underexpanded jet flows using commercial and open source CFD packages, *by Jonathan Ribeiro Martins, João Victor Barbosa, Luiz Fernando Lopes Rodrigues Silva, Fabio Pereira dos Santos*
- CHT-21-255** AI-Machine learning algorithms for the simulation of combustion thermal analysis, *by Arunim Bhattacharya and Pradip Majumdar*
- CHT-21-287** Integral transform solution of axial-diffusion Graetz-problems in infinite domains: hybrid symbolical-numerical computation, *by N. R. Braga Jr., D. J. N. M. Chalhub and L. A. Sphaier*

### Room URCA

- 9:00-10:00** **Technical Session NATURAL CONVECTION 1 - Chairperson: George Papadakis**
- CHT-21-113** Computational modeling of magnetoconvection in a laterally heated cube, *by Alexander Gelfgat and Oleg Zikanov*
- CHT-21-126** Onset of low-frequency shear-driven instability in differentially heated cavities, *by Krishna R. Maryada and Stuart E. Norris*
- CHT-21-132** Computational study of natural convection flow in an open-ended channel coupled with a room: application to building-integrated photovoltaic (BIPV) systems, *by S. Tkachenko, H. Ahmadi Moghaddam, J. Reizes, R. Raja, C. Menezes, S. Giroux-Julien and V. Timchenko*
- CHT-21-165** Thermal and fluid dynamic behaviors of a slightly horizontal ventilated roof under variable climatic condition, *by Bernardo Buonomo, Lucia Capasso, Oronzio Manca and Sergio Nardini*
- CHT-21-273** Numerical comparison of three different pin fin heat sink orientations, *by Eyub Canli, Mukaddes Ozdemir and Ahmet Ali Sertkaya*
- 15:00-16:00** **Technical Sessions NATURAL CONVECTION 2 and COMBUSTION - Chairperson: Brent Webb**
- CHT-21-178** Soot prediction in flames using a data-based machine learning approach, *by Joseph N. Squeo and Xinyu Zhao*
- CHT-21-198** Numerical study of natural convective heat transfer from a horizontal two-dimensional two-sided plate having either a central gap or an adiabatic center section, *by Santiago del Rio Oliveira and Patrick H. Oosthuizen*
- CHT-21-225** A computational study on hydrous ethanol flame development in a spark ignition engine, *by Fabiano Alves dos Santos and Albino José Kalab Leiroz*
- CHT-21-235** RANS based numerical simulations of turbulent diffusion flame using OpenFOAM®, *by Amit Makhija and Krishna Sessa Giri*
- CHT-21-254** Modeling of conjugate heat transfer within thermal barrier coatings for combustion environments, *by Nicolas Tricard and Xinyu Zhao*
- CHT-21-277** Convergence analysis of steady-state natural convection in an annular cavity filled with porous medium and heated by the inner wall, *by Beatriz Machado dos Santos, Ludimila Silva Salles de Sá and Jian Su*

## August 18, Wednesday

### Room MARACANÃ

- 8:00-9:00** Workshop WP: Publishing your Research, *Swati Meherishi*
- 10:00-11:00** Plenary Lecture PL8: Direct numerical simulations of heat transfer from a cylinder immersed in the production and decay regions of grid turbulence, *George Papadakis*  
*Chairperson: Angela O. Nieckele*
- 11:00-12:00** Plenary Lecture PL9: Minimization procedures for thermal parameters identification from the experiment to the physical model, *Jean-Luc Battaglia* - *Chairperson: Andrzej J. Nowak*
- 13:00-14:00** Plenary Lecture PL10: Lattice Boltzmann method for multi-phase flows, *Abdulmajeed Mohamad* - *Chairperson: Leonid Dombrovsky*

### Room COPACABANA

- 12:00-13:00** Short Course SC-CFD: Introduction to Modern CFD – Lesson 5, *Akshai Kumar Runchal*
- 14:00-15:00** Short Course SC-CFD: Introduction to Modern CFD – Lesson 6, *Akshai Kumar Runchal*

### Room IPANEMA

- 9:00-10:00** Technical Session FORCED CONVECTION - *Chairperson: Masahiko Shibahara*
- CHT-21-114** Convective heat transfer in open-cell foams: the effects of porosity and velocity on representative volume element size, by *Marcello Iasiello, Assunta Andreozzi, Nicola Bianco, Wilson K. S. Chiu and Vincenzo Naso*
- CHT-21-115** Numerical simulation of Al<sub>2</sub>O<sub>3</sub>-isopropanol nanofluid flows in a tube of circular cross-section, by *Pedro Romão and Pedro J. Coelho*
- CHT-21-226** Effect of various deposition configurations on film cooling characteristics of laidback fan shape hole, by *Ashutosh Kumar Singh, Dushyant Singh and Niranjan Sahoo*
- CHT-21-270** Viscoelastic fluid and Dean flow effects on flow and heat transfer characteristics of serpentine channel, by *Kazuya Tatsumi, Yousuke Tanaka, Reiko Kuriyama and Kazuyoshi Nakabe*
- CHT-21-281** Impulsion of space and temperature dependent internal heat generation/absorption on MHD boundary layer slip flow of a nanofluid over a moving plate with induced magnetic field, by *Shahina Akter and M. Ferdows*
- 15:00-16:00** Technical Session OPEN FORUM 1 - *Chairperson: Dominic Groulx*
- CHT-21-112** Numerical simulation of a fixed bed gasifier using two fluid model (TFM), by *Massoud Massoudi Farid, Andreas Richter*

- CHT-21-129** Numerical studies on the effects of different convex particle shapes and polydispersity on the heat transfer in Fixed Beds, by **Shreyas Rohit Srinivas**, *Massoud Massoudi Farid, Andreas Richter*
- CHT-21-137** Heat transfer through shadowed droplets in dropwise condensation, by **George Memos**, *George Kokkoris, Vassilios Constantoudis, Athanassios Milionis, Dimos Poulikakos, Evangelos Gogolides*
- CHT-21-203** The GeTe thermal conductivity, from experimental measurement to DFT simulation, by **Jean-Luc Battaglia**, *Kanka Gosh, Clément Chassain, Andrzej Kusiak, Pierre Noé and Helcio Orlande*
- CHT-21-220** State estimation problem in nano-enhanced phase change materials for thermal energy storage, by **Bruno dos Reis Jaccoud, Helcio Orlande, Marcelo Colaço**, *Ryszard Bialecki, Zbigniew Buliński and Ziemowit Ostrowski*

### Room LEBLON

**9:00-10:00** Technical Session ENERGY 1 - *Chairperson: Hiroshi Iwai*

- CHT-21-121** Modeling the process of solid fuel conversion in multi-stage gasification plants, by **A. Levin** and *A. Safarov*
- CHT-21-188** Orthogonal array optimization of the operational parameters for air-cooled cylindrical lithium-ion battery module, by **Dinesh Kumar Sharma** and *Aneesh Prabhakar*
- CHT-21-201** Electrochemical thermal modelling of Li-Ion battery cell at different discharge rates, by **Arundas Odungat** and *Samarjeet Chanda*
- CHT-21-211** Improving efficiency of a micro-thermophotovoltaic power generator with various recuperator configurations, by **Seok-Beom Yun, Sung Yeon Kim** and *Youn-Jea Kim*
- CHT-21-212** Influence of dimpled-wall tubes on the thermal performance of the plate-fin-tube heat exchanger, by **Sung Yeon Kim, Seok-Beom Yun** and *Youn-Jea Kim*

**15:00-16:00** Technical Session ENERGY 2 - *Chairperson: Yildiz Bayazitoglu*

- CHT-21-105** Transient response of different refrigerants used in single-pass dual chiller, by **Sambhaji T. Kadam**, *Anaya Bara, Ibrahim Hassan, Mohammad Azizur Rahman, Athanasios I. Papadopoulos and Panos Seferlis*
- CHT-21-157** A thermochemical energy storage reactor model – code formulation, verification, and experimental validation, by **Michael Wild** and *Aldo Steinfeld*
- CHT-21-199** Thermo-economic analysis of S-CO<sub>2</sub> power cycles for waste heat recovery applications, by **Francisco M. Miller**, *Manuel E. C. Cruz* and **Marcelo J. Colaço**
- CHT-21-206** A new method based on artificial neural network for radiative heat transfer calculation: Comparison with benchmark numerical solutions in homogeneous media, by **Alex Royer, Olivier Farges**, *Pascal Boulet* and *Daria Burot*
- CHT-21-230** Solar hybridization paths for cement production processes, by **Ilker Tari** and **Onur Polat**

## Room URCA

### 9:00-10:00 Technical Session TURBULENCE - *Chairperson: Surya Vanka*

- CHT-21-169** Numerical study of a wing section with a tangential blowing jet control system, by **Bruno Goffert**, *Ricardo Galdino da Silva, Cayo Prado Fernandes Francisco, Evgeny Pigusov, Chuang Wei, Zhansen Qian, Maria Luísa Collucci da Costa Reis*
- CHT-21-176** Influence of solving the wall-region on heat transfer over a circular cylinder in crossflow, by *Gabriel Rodrigues de Oliveira Anunciação* and **Tânia Suaiden Klein**
- CHT-21-185** Numerical simulation of liquid flow in a rotating and partially filled cylindrical cavity, by **Sergio de Albuquerque Souza**
- CHT-21-191** Numerical analysis of turbulent heat transfer in rectangular duct, by **Jan Kren**, *Blaz Mikuz and Iztok Tiselj*
- CHT-21-217** Large eddy simulation of jet -impingement on flat plate using sub-grid scale models, by **Ashutosh Narayan Singh** and *Dushyant Singh*
- CHT-21-224** Influence of a flexible vortex generator on hydrodynamic and heat transfer characteristics of a pin-fin array, by **Seyedmohsen Baghaei Oskouei** and *Özgür Bayer*

### 15:00-16:00 Technical Session OPEN FORUM 2 - *Chairperson: Xinyu Zhao*

- CHT-21-184** Coupled Monte Carlo-CFD model of a solar air receiver for high-temperature industrial processing, by **Vikas R. Patil** and *Aldo Steinfeld*
- CHT-21-197** Extreme (stochastic/random) boiling in the cryogenic zone, by **Charles Janeke**
- CHT-21-244** Influence of particle shape on turbulence induced flow dynamics and heat transfer in packed beds, by **Mona Al-Mqbas**, *Nico Jurtz and Matthias Kraume*
- CHT-21-275** Constrained optimization of microchannel cooling systems with and without uncertainty, by **Yogesh Jaluria** and *Xiaobing Zhang*
- CHT-21-278** Numerical analysis of heat transfer and fluid flow performance in different microchannels heat sink geometries, by **Isabelle Guimarães da Silva**, *João Batista Campos Silva and Elaine Maria Cardoso*

## August 19, Thursday

### Room MARACANÃ

- 8:00-9:00** Workshop WP: Publishing your Research, *Swati Meherishi*
- 10:00-11:00** Plenary Lecture PL11: Nonlinear computation: future of numerical simulation, *L. Q. "Rick" Wang* - Chairperson: *Jean-Luc Battaglia*
- 11:00-12:00** Plenary Lecture PL12: Growth and dynamics of vapor bubbles in various regimes of boiling with and without external electric field, *Gautam Biswas* - Chairperson: *Oronzio Manca*
- 13:00-14:00** Plenary Lecture PL13: Mutual interactions of evaporative heat transfer phenomena and wetting phenomena: numerical simulation and experimental validation, *Peter Stephan* Chairperson: *Abdulmajeed Mohamad*
- 15:00-16:00** Closing and Awards Ceremony

### Room COPACABANA

- 12:00-13:00** Short Course SC-CFD: Introduction to Modern CFD – Lesson 7, *Akshai Kumar Runchal*
- 14:00-15:00** Short Course SC-CFD: Introduction to Modern CFD – Lesson 8, *Akshai Kumar Runchal*

### Room IPANEMA

- 9:00-10:00** Technical Session OPEN FORUM 3 - Chairperson: *Mouna El Hafi*
- CHT-21-276** Artificial neural network aided multipoint temperature measurement using a grid-shape electric circuit of resistance temperature detectors, by *Runze Mao, Masashi Kishimoto and Hiroshi Iwai*
- CHT-21-280** Heat and fluid flow modelling of a high-temperature packed-bed reactor for solar thermochemical energy storage, by *Bo Wang, Lifeng Li, Florian Schaefer, Apurv Kumar, Vicent M. Wheeler and Wojciech Lipinski*
- CHT-21-283** Radiative heat transfer in a polydispersion of ceramic particles under high-flux solar irradiation, by *Jingjing Chen, Apurv Kumar, Joe Coventry, Jin-Soo Kim and Wojciech Lipinski*
- CHT-21-284** Heat transfer modelling of an isolated bubble in sodium pool boiling, by *Siddharth Iyer, Apurv Kumar, Joe Coventry and Wojciech Lipinski*
- CHT-21-285** Prediction of tortuosity factor of sphere-packing porous media by three-dimensional convolutional neural network, by *Yodai Matsui, Masashi Kishimoto and Hiroshi Iwai*