

UIT

UNIONE ITALIANA DI TERMOFLUIDODINAMICA

33rd UIT Heat Transfer Conference

PROGRAM



C'è un pò dell'Aquila in ognuno di noi

L'Aquila, June 22-24, 2015

Welcome letter

Dear Conference Delegate,

The 33rd UIT (Italian Union of Thermal-Fluid Dynamics) Heat Transfer Conference is organized by the Dept. of Industrial and Information Engineering and Economics, University of L'Aquila (Italy) and is held at the Engineering Campus of Monteluco di Roio, L'Aquila, June 22-24, 2015.

The annual UIT Conference, which has grown over time, comes back in L'Aquila after 21 years.

The scope of the conference covers a range of major topics in theoretical, numerical and experimental heat transfer and related areas, ranging from energy efficiency to nuclear plants. This year, there is an emphasis on IR thermography, which is growing in importance both in scientific research and industrial application. The 2015 is also the International Year of Light. The Organizing Committee honored this event by introducing a new section, Technical Seminars, which in this edition is mainly devoted to optical flow visualization (also the subject of three national workshops organized in L'Aquila by UIT in 2003, 2005 and 2008).

As a long time teacher of this University and of the Engineering School, I am also very proud to welcome you here, 6 years after the 2009 earthquake and 50 years after the beginning of the Engineering courses in L'Aquila.

Despite some logistic difficulties, 88 papers were contributed by about 270 authors. Also participation from abroad is increasing.

We hope this conference will be a useful occasion to stimulate discussion, further the understanding of heat transfer and related phenomena, present the state of the art of some topics, discuss emerging trends and promote collaborations.

A special thank is due to the Organizing and Scientific Committees, to the sponsors and to all the participants.

Domenica Paoletti
UIT 2015 Heat Transfer Conference Chair

CONFERENCE TOPICS

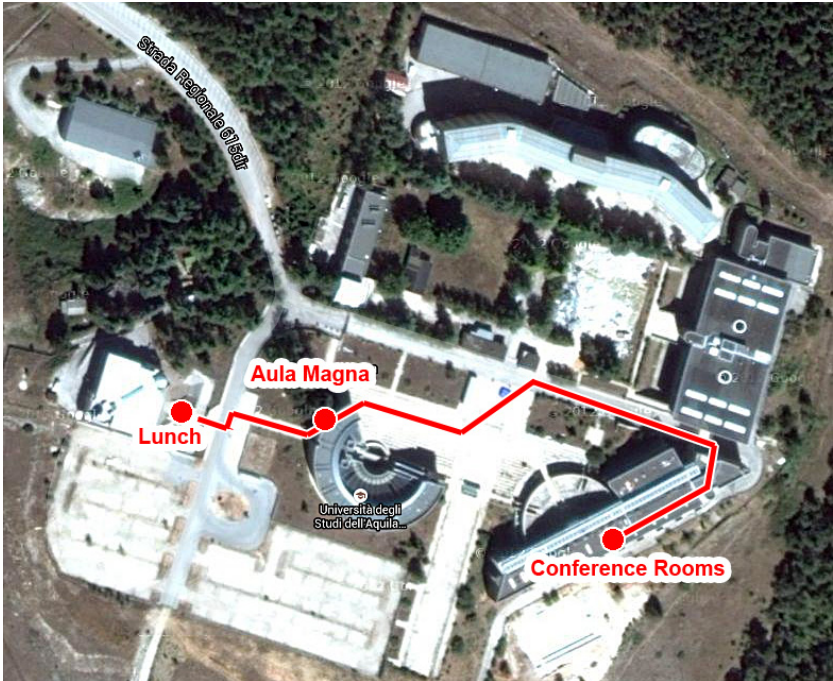
- A Heat transfer and efficiency in energy systems, environmental technologies and buildings
- B Micro and nano scale thermo-fluid dynamics
- C Multi-phase fluid dynamics, heat transfer and interface phenomena
- D Computational fluid dynamics and heat transfer
- E Heat transfer in nuclear plants
- F Natural, forced and mixed convection
- G IR thermography
- H Conduction and radiation

33rd UIT Heat transfer Conference

Program at a glance

Monday 22 June
09:00 – 10.00 Registration
10.00 – 11.30 Opening Ceremony – Presentation of UIT Prizes
11.30 – 11.45 Coffee Break
11.45 – 12.30 Keynote lecture 1
12.30 – 13.00 Technical seminar 1
13.00 – 14.00 Lunch
14.00 – 15.45 Technical sessions
15.45 – 16.00 Coffee break
16.00 – 18.10 Technical sessions

Day 2 -Tuesday 23 June	Wednesday 24 June
09.15 – 10.00 Keynotelecture 2	09.15 – 11.30 Technical sessions
10.00 – 10.30 Technical seminar 2	11.30 – 11.45 Coffee break
10.30 – 10.45 Coffee break	11.45 – 12.35 Technical sessions
10.45 – 13.00 Technical sessions	12.45 – 13.10 Closure
13.00 – 14.00 Lunch	
14.00 – 14.45 Keynotelecture 3	
14.45 – 16.05 Technical sessions	
16.15 – 16.30 Coffee break	
16.30 – 18.00 UIT assembly	
20.30 Gala Dinner	



Monday 22 June 2015

Aula Magna Beolchini	
09:00 – 10.00	Registration
10.00 – 11.30	Opening Ceremony – Presentation of UIT Prizes
11.30 – 11.45	Coffee Break
11.45 – 12.30	Keynote lecture I1 <i>Chair: A. Niro</i> <i>On the horizontal throughflow across a vertical porous wall</i> A. Barletta
12.30 – 13.00	Technical seminar 1 <i>Chair: P. Di Marco</i> <i>Fundamentals and recent advances in X-ray micro computed tomography (microCT) applied on thermal-fluid dynamics and multiphase flows</i> M. Santini

13.00 – 14.00	Lunch
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Room A-1.4	Session A1 <i>Chair: V. Naso</i>
14.00 – 14.20	031 <i>Optimisation of buildings CHP Systems by applying a Load Estimation Procedure</i> P Vocale, G Pagliarini, S Rainieri
14.20 – 14.40	033 <i>Experiments and simulations on a thermosyphon solar collector with integrated storage</i> P Toninelli, A Mariani, D Del Col
14.40 – 15.00	054 <i>Measurement of thermophysical properties coupled with LCA assessment for the optimization of a historical building retrofit</i> A Bortolin, P Bison, G Cadelano, G Ferrarini, S Fortuna
15.00 – 15.20	067 <i>A novel approach to CFD analysis of the urban environment</i> F Nardecchia, F Gugliermetti, F Bisegna
15.20 – 15.40	070 <i>Effects of new buildings on urban human comfort</i> G Battista, E Carnielo, E De Lieto Vollaro

Room A-1.2	Session G Chair: J-C. Batsale
14.00 – 14.20	009 <i>Passive and active infrared thermography: An overview of applications for the inspection of mosaic structures</i> P Theodorakeas, E Cheilakou, E Ftikou, M Kouï
14.20 – 14.40	010 <i>Towards the Use of Complex Wavelet Transform (CWT) Applied under Hybrid InfraRed Thermography (HIRT) Conditions for Flaws Detection</i> S Sfarra, M Regi
14.40 – 15.00	035_1 <i>The use of infrared thermography to detect the skintemperature response to physical activity</i> G Tanda
15.00 – 15.20	081 <i>Stream temperature estimated in situ from thermal-infrared images: best estimate and uncertainty</i> F Iezzi, M T Todisco

15.45 – 16.00	Coffee Break
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Room A-1.4	Session A2 Chair: S. Rainieri
16.00 – 16.20	107 <i>Air-Water Cooling System for Switch-Mode Power Supplies</i> G Casano, S Piva
16.20 – 16.40	072 <i>Innovative lightweight concrete hollow blocks: thermal performance analysis</i> F Asdrubali, G Baldinelli, F Bianchi, F Leccese, G Salvadori
16.40 – 17.00	076 <i>Experimental investigation of a packed bed thermal energystorage system</i> M Cascetta, G Cau, P Puddu, F Serra

Room A-1.2	Session B, D Chair: W. Grassi
16.00 – 16.20	051 <i>Non-encapsulated thermoliquid crystal particles: a way for temperature measurements inside microchannels</i> G Puccetti, M Rossi, C J. Kähler, G L Morini
16.20 – 16.40	097 <i>Flow boiling inside 2 mm and 4 mm channels: micro and macro scale correlation comparison</i> L Gugliermetti, G Zummo, D Vitale Di Maio, C M Valencia-Castillo, L Saraceno, G Caruso

16.40 – 17.00	111_1 <i>Nano-PCMs for passive electronic cooling applications</i> L Colla, L Fedele, S Mancin, B Buonomo, D Ercole, O Manca
17.00 – 17.20	067_2 <i>A numerical approach for the heat fluxes analysis in the nearwall region</i> F Nardecchia, F Pagliaro, F Gugliermetti, F Stella

Room A-1.2 and Poster Space	Poster Session 1 Topics: A, B, F, H Chair: S. Piva 17.20 – 18.10
	029_2 <i>A comparison between thermographic and flow-meter methods for the evaluation of thermal transmittance of different wall constructions</i> I Nardi, D Ambrosini, T de Rubeis, S Sfarra, S Perilli, G Pasqualoni
	056 <i>Beneficial effects of retroreflective materials in urban canyons: results from seasonal monitoring campaign</i> F Rossi, E Morini, B Castellani, A Nicolini, E Bonamente, E Anderini, F Cotana
	060 <i>Determination of droplet contours in liquid-liquid flows within micro-channels</i> B. Pulvirenti, B. Rostami, G. Puccetti, G. L. Morini
	077 <i>Analysis of the temperatures measured in very thick and insulating roofs in the vicinity of a chimney</i> M Neri, D Luscietti, S Bani, A Fiorentino, M Pilotelli
	084 <i>Development of CO2 heat pump for DHW production</i> R Trinchieri, N Calabrese, P Rovella, G Boccardi, G Ponticorvo
	088_1 <i>Computation of point transmittance of thermal bridges in precast concrete sandwich panels</i> M Benedetti, P Gervasio, D Luscietti, A M Lezzi
	088_2 <i>A note on calculation of efficiency and emissions from wood and wood pellet stoves</i> D Petrocelli, A M Lezzi
	092 <i>Numerical simulation of radiant ceiling panels for indoor cooling</i> G Cammarata, G Petrone, F Masi
	093_1 <i>Heat transfer characteristics in forced convection through a rectangular channel with broken V-shaped rib roughened surface</i> D Fustinoni, P Gramazio, L Colombo, A Niro

	<p>094_2 <i>Simulation of copper–water nanofluid in a microchannel in slip flow regime using the lattice Boltzmann method with heat flux boundary condition</i></p> <p>A D’Orazio, Z Nikkhah, A Karimipour</p>
	<p>106 <i>Thermal conductivity of the moist autoclaved aerated concrete. Experimental comparison between heat flow method (HFM) and transient plane source technique (TPS)</i></p> <p>M Campanale, L Moro</p>

Tuesday 23 June 2015

Room A-1.2	Keynote lecture I2 <i>Chair: G. Latini</i>
09.15 – 10.00	<i>Infrared image processing devoted to thermal noncontact characterization-Applications to Non-Destructive Evaluation, Microfluidics and 2D source term distribution for multispectral tomography</i> <u>J C Batsale</u> , C Pradere

Room A-1.2	Technical seminar 2 <i>Chair: P. Di Marco</i>
10.00 – 10.30	035_2 <i>Schlieren visualization of water natural convection in a Vertical ribbed channel</i> M Fossa, M Misale, <u>G Tanda</u>

10.30 – 10.45	Coffee Break
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Room A-1.4	Session C1 <i>Chair: D. Del Col</i>
10.45 – 11.05	113 <i>Thin Film Breakup and Rivulet Evolution Modeling</i> N Suzzi, G Croce, P D'Agaro
11.05 – 11.25	034 <i>Vaporization inside a mini microfin tube: experimental results and modeling</i> A Diani, L Rossetto
11.25 – 11.45	068 <i>Energy dissipation and transfer processes during the breaking of modulated wave trains</i> F De Vita, R Verzicco, A lafrati
11.45– 12.05	078_1 <i>Influence of electrolyte concentration on holdup, flow regime transition and local flow properties in a large scale bubble column</i> G Besagni, F Inzoli

Room A-1.2	Session D1 <i>Chair: E. Nobile</i>
10.45 – 11.05	045 <i>Numerical validation of a κ-ω-$\kappa\vartheta$-$\omega\vartheta$ heat transfer turbulence model for heavy liquid metals</i> D Cerroni, R Da Via, S Manservigi, F Menghini, G Pozzetti, R

	Scardovelli
11.05 – 11.25	046_1 <i>Numerical and Experimental Study of Local Heat Transfer Enhancement in Helically Coiled pipes. Preliminary Results.</i> F Bozzoli, L Cattani, S Rainieri, A Zachár
11.25 – 11.45	061 <i>A preliminary investigation of the growth of an aneurysm with a multiscale monolithic fluid-structure interaction solver</i> D Cerroni, S Manservisi, G Pozzetti

Room A-1.1	Session E Chair: G. Vella
10.45 – 11.05	079 <i>An anisotropic numerical model for thermal hydraulic analyses: application to liquid metal flow in fuel assemblies</i> C Galati, D Vitale Di Maio, F Vitillo, G Caruso
11.05 – 11.25	082 <i>Comparison among MELCOR 1.8.2 fusion version and MELCOR 2.1 during normal and accidental scenarios for the Primary Heat Transfer System of the DEMO Helium Cooled Pebble Bed blanket</i> B Gonfiotti, S Paci

Room A-1.2 and Poster Space	Poster Session 2 Topics: A, C, D Chair: M. De Salve 12.10 – 13.00
	038 <i>Backcoupling of acoustic streaming on the temperature field inside high-intensity discharge lamps</i> J Schwieger, B Baumann, M Wol, F Manders, J Suijker
	040 <i>Venturi flow meter and Electrical Capacitance Probe in a horizontal two-phase flow</i> G Monni, M Caramello, M De Salve, B Panella
	041 <i>Influence of temperature on oxygen permeation through ion transport membrane to feed a biomass gasifier</i> T Antonini, P U Foscolo, K Gallucci, S Stendardo
	058 <i>CFD study on electrolyte distribution in redox flow batteries</i> S Bortolin, P Toninelli, D Maggiolo, M Guarneri and D Del Col
	059 <i>Air entrainment in the primary impact of single drops on a free liquid surface</i> E Salerno, P Levoni, G S Barozzi
	085 <i>Analysis and clustering of natural gas consumption data for thermal energy use forecasting</i>

	A Franco, F Fantozzi
	091_1 <i>Theoretical Analysis and Design Criteria of Screened Heat Pipes for Low-Medium Concentration Solar Receivers</i> D Jafari, P Di Marco, S Filippeschi, A Franco
	091_2 <i>Design and experimental analysis of a screened heat pipe for solar applications</i> D Jafari, S Filippeschi, A Franco, P Di Marco
	116 <i>Capillary rise in an inclined tube: a numerical exercise</i> GS Barozzi, MA Corticelli, E Agnani
	119_1 <i>Pulsating Heat Pipe Only for Space: Results of the REXUS 18 Sounding Rocket Campaign</i> F Creatini, GM Guidi, F Belfi, G Cicero, D Fioriti, D Di Prizio, S Piacquadio, G Becatti, G Orlandini, A Frigerio, S Fontanesi, P Nannipieri, M Rognini, N Morganti, S Filippeschi, P Di Marco, L Fanucci, F Baronti, M Manzoni, M Mameli, M Marengo

13.00 – 14.00	Lunch
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Room A-1.2	Keynote lecture I3 <i>Chair: B. Panella</i>
14.00 – 14.45	<i>On sustainable and efficient design of ground-source heat pump systems</i> <u>W Grassi</u> , P Conti, E Schito, D Testi

Room A-1.4	Session A3 <i>Chair: A. Barletta</i>
14.45 – 15.05	043 <i>CO₂ post-combustion capture in coal-fired power plants integrated with solar systems</i> R Carapellucci, L Giordano, M Vaccarelli
15.05 – 15.25	094_1 <i>An innovative approach for the design of the transport network of the air for dual-duct systems</i> A D'Orazio, C Agostini
15.25 – 15.45	100 <i>Thermal design of spacecraft solar arrays using a polyimide foam</i> N Bianco, M Iasiello, V Naso
15.45 – 16.05	112 <i>Magnetic refrigeration: an eco-friendly technology for the refrigeration at room temperature</i> C Aprea, A Greco, A Maiorino, C Masselli

Room A-1.2	Session F, H, A Chair: G. Pagliarini
14.45 – 15.05	089 <i>Analytical solution on cooled turbine blade under parallel convective and radiation heat flux at leading edge and suction/pressure side</i> F Floris, B Illemin
15.05 – 15.25	093_2 <i>Spectral BRDF measurements of metallic samples for laserprocessing applications</i> L Vitali, D Fustinoni, P Gramazio, A Niro
15.25– 15.45	110 <i>Accuracy of lumped-parameter representations for heat conduction modeling in multilayer slabs</i> P Gori, C Guattari, R de Lieto Vollaro, L Evangelisti
15.45 – 16.05	105 <i>Some critical remarks about the radiative heat transfer in EN ISO 10077-2</i> G Cuccurullo, L Giordano

Room A-1.1	Session D2 Chair: G. S. Barozzi
14.45 – 15.05	046_2 <i>Parameter estimation approach to the thermal characterization of intumescent fire retardant paints</i> L Calabrese, F Bozzoli, G Bochicchio, B Tessadri, P Vocale, S Rainieri
15.05 – 15.25	086 <i>CFD Simulation of Melting and Solidification of PCM in Thermal Energy Storage Systems of Different Geometry</i> Simone Arena, Giorgio Cau, Chiara Palomba
15.25– 15.45	098 <i>Numerical investigation of the flow in axial water turbines and marine propellers with scale-resolving simulations</i> M Morgut, D Jošt, E Nobile, A Šker

16.15 – 16.30	Coffee Break
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Aula Magna Beolchini	
16.30 – 18.00	UIT Social Assembly

20.30 – 24.00

Gala Dinner *Restaurant "Villa Giulia"*

Wednesday 23 June 2015

Room A-1.4	Session A4 Chair: G. Cau
09.15 – 09.35	029_1 <i>Validation of quantitative IR thermography for estimating the U-value by a hot box apparatus</i> I Nardi, D Paoletti, D Ambrosini, T de Rubeis, S Sfarra
09.35 – 09.55	069_1 <i>The performance of a mobile air conditioning system with a water cooled condenser</i> D Di Battista, R Cipollone
09.55 – 10.15	071 <i>Uncertainty evaluation of EnPIs in industrial applications as a key factor in setting improvement actions</i> G D'Emilia, D Di Gasbarro, A Gaspari, E Natale
10.15– 10.35	115 <i>Green roofs for reducing the cooling need and mitigating the indoor conditions in educational building in Mediterranean climates. Results of a case study</i> F Ascione, N Bianco, R F De Masi, F De Rossi, G P Vanoli
10.35– 10.55	072_2 <i>Thermal and optical characterization of natural and artificial marble for roof and external floor installations</i> F Asdrubali, G Baldinelli, F Bianchi, A Presciutti, F Rossi, S Schiavoni
10.55– 11.10	069_2 <i>Development of an Organic Rankine Cycle system for exhaust energy recovery in internal combustion engines</i> R Cipollone, G Bianchi, A Gualtieri, D DiBattista, M Mauriello, F Fatigati
11.10– 11.25	127 <i>Integration between Concentrated Solar Power plant and Desalination</i> R Cipollone, A Cinocca, P Talebbeydokhti

Room A-1.2	Session C2 Chair: L. Rossetto
09.15 – 09.35	121 <i>Electric field effects on the dynamics of bubble detachment from an inclined surface</i> P Di Marco, N Morganti, G Saccone
09.35 – 09.55	055 <i>Modelling heat and mass transfer in a membrane-based air-to-air enthalpy exchanger</i> S Dugaria, L Moro, D Del Col

09.55 – 10.15	078_2 <i>Role of interfacial forces in bubble column simulations</i> G Besagni, F Inzoli
10.15– 10.35	099 <i>Experimental study of critical heat flux of refrigerant R1234yf in a multi-minichannel heat sink at medium saturation temperatures</i> W Imparato, R Mastrullo, A W Mauro, L Viscito
10.35– 10.55	069_3 <i>Experimental and numerical analyses on a plate heat exchanger with phase change for waste heat recovery at off-design conditions</i> R Cipollone, G Bianchi, D Di Battista, F Fatigati
10.55– 11.10	119_2 <i>Effect of the application of an electric field on the performance of a two-phase loop device</i> F Creatini, D Fioriti, M Mamelì, S Filippeschi, P Di Marco
11.10– 11.30	022 <i>An unsteady model for the simulation of the rapid depressurization of vessels containing two-phase mixtures in non-equilibrium conditions</i> R Ricci, V D'Alessandro, S Montelpare, L Binci, A Zoppi

Room A-1.4	Session D3 Chair: R. Cipollone
09.15 – 09.35	073 <i>Thermal behaviour of a ventilated wall: experimental data and CFD model validation</i> C Buratti, F Cristarella O, D Palladino
09.35 – 09.55	114 <i>A fast algorithm for Direct Numerical Simulation of natural convection flows in arbitrarily-shaped periodic domains</i> D Angeli, E Stalio, M A Corticelli, G S Barozzi
09.55 – 10.15	118 <i>Analysis of thermal field within an urban canyon with variables thermophysical characteristics of the building's walls</i> A De Lieto Vollaro, G Galli, R Romagnoli, A Vallati

11.30 – 11.45	Coffee Break
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Room A-1.2 and Poster Space	Poster Session 3 Topics: D, E, F Chair: G. Tanda 11.45 – 12.35
	036 <i>Characterization of the thermal conductivity for ceramic pebble beds</i>

	R Lo Frano, D Aquaro, L Scaletti, N Olivi
	042 <i>Steam–water two-phase flow pressure drop simulation in helical tubes by using modified Relap5/mod3.2 b code</i> A Cammi, F Castiglia, M Giardina, G Palermo, M E Ricotti, M Santinello
	050 <i>High performance, multiscale BOS technique in free convection</i> D Ambrosini, I Nardi, S Sfarra, D Paoletti, G Rajshekhar
	066 <i>ITER cryostat accidental scenario: fluid dynamics analysis of Ingress of Coolant Event Accident</i> N Olivi, R Lo Frano, D Aquaro
	101 <i>Comparative analysis of heat transfer for an advanced composite material used as insulation in the building field by means of ComsolMultiphysics® and Matlab™ codes</i> S Perilli, M Regi, S Sfarra, I Nardi
	102 <i>Transient analysis of "2 inch Direct Vessel Injection line break" in SPES-2 facility by using TRACE code</i> S D'Amico, C Lombardo, I Moscato, M Polidori, G Vella
	108 <i>Experimental Investigation on a Synthetic Jet</i> E Nino, R M Di Tommaso, N Ferrara, M Orlando
	109 <i>Scaled models in the analysis of fire-structure interaction</i> A Andreozzi, N Bianco, M Musto, G Rotondo
	111_2 <i>Experimental Investigation on Forced Convection in Channels with Transversal Ribs</i> B Buonomo, L Cirillo, O Manca, L Marinelli, S Nardini
	114_2 <i>Heat transfer along the route to chaos of a swaying thermal plume</i> D Angeli, M A Corticelli, A Fichera, A Pagano

12.35 – 13.10	Conference closure
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