

Marco Marengo
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Employment

Professor of Thermal Engineering

School of Computing, Engineering & Maths
University of Brighton
1 Jan 2014 → present

Advanced Engineering Centre

University of Brighton
1 Jan 2015 → present

Centre for Regenerative Medicine and Devices

University of Brighton
1 Jul 2013 → present

Member of the Space Environment Advisory Committee

1 Jun 2018 → present

Visiting Professor

University of Toronto
Canada
15 Jun 2017 → 14 Aug 2017

Visiting Professor

York University Toronto
Canada
15 Jun 2017 → 14 Aug 2017

Senior Research Fellow

Polytechnic Institute of Lisbon
Portugal
1 Oct 2016 → present

Member of the Space Environment Working Group

1 Dec 2015 → 31 May 2018

Visiting Professor

Universite de Mons
Belgium
1 Oct 2005 → 30 Jun 2019

Research interests

My research is devoted to the science of thermodynamics, fluid mechanics, heat and mass transfer for ground and space applications. The research activities have a large spectrum of applications, from energy to combustion, from electronic cooling to ice-mitigation techniques, including phase transition phenomena like in pool and flow boiling, icing, evaporation

and condensation.

The research can be divided in five main branches

- 1 Physics of drop, sprays and liquid interfaces,
- 2 Phase change phenomena,
- 3 Heat pipes and passive thermal systems
- 4 DNS/VOF simulations of two-phase flows
- 5 Dynamic energy simulations of buildings

Particularly important are the works on drop-wall interaction, for which I have (I hope) an international reputation with more than two thousands citations.

In the last years, following a long industrial engagement in designing thermal systems, heat pipes (loop heat pipes and sintered heat pipes), I carried out a series of experiments on a specific passive two-phase thermal control system, called Pulsating Heat Pipe, which was characterized both on ground, in hypergravity and microgravity environments, such as during parabolic flights. I am currently leading an International Scientific Team of more than 10 Universities worldwide aiming at measuring the thermal performance of a Pulsating Heat Pipe on the International Space Station (ISS). The experiment is at the moment one of the three experiments in Europe selected for the new Thermal Platform on the EDR module of the ISS.

Finally, noteworthy is the fact that all the activities have been studied numerically and experimentally, trying to conjugate the experimental data with the detailed insights coming from numerical methods.

I am particularly interested in cogeneration systems and the exploitation of Energy+ energy simulations of commercial and residential buildings.

SPECIAL AWARDS, HONOURS AND DISTINCTIONS

10.05.2018 – present Editor-in-Chief of the Section ‘Thermal Management’ of the MDPI Journal Energies (IF = 2.676)

01.10.2016 - present Permanent UK scientific representative in the International Heat Pipe Conference Committee

01.10.2013 - present Scientific Coordinator of the International Pulsating Heat Pipe Scientific Team for the Thermal Platform on the International Space Station, European Space Agency, The Netherlands

01.01.2009 - 31.12.2018 Editor-in-Chief (Europe) of the International Journal ‘Atomization and Sprays’, Begell House Inc., Danbury, Connecticut, U.S.A

19.06.2004 - present 5 Invited Plenary Lectures in recognised International Conferences (see below)

01.03.2016 - 30.09.2017 Guest Editor of ‘Energies’ Journal, Advanced Thermal Simulation of Energy Systems, MDPI (IF = 2.676)

Research Awards

Projects

Enhanced Condensers for Microgravity (ENCOM 3)

Marengo, M., Georgoulas, A. & Miche, N.

1/02/16 → 31/01/19

HyHP: Novel Hybrid Heat Pipe for Space and Ground Applications

Marengo, M., Georgoulas, A. & Miche, N.

1/04/17 → 31/03/20

RESEARCH AND ENTERPRISE

My research has been mainly dedicated to the field of thermofluids, both with experimental and modelling activities. The main topics are the physics of droplet and sprays, microfluidics, boiling and two-phase systems, surface wettability and, more recently, passive heat transfer devices, such as heat pipes. I perform at international level (as shown below by Journal Publications, Editorial roles, Chair of International Conferences, member of editorial boards, organiser of workshops and conferences, reviewers for important journals, expert for European and UK funding institutions) for all of the topics I worked on in my career. Every time I initiated a new subject, I planned an ambitious strategy in terms of novelty, impact and deliverables. Most of my research is carried out within International collaborations. I have published 285 papers in total, among which more than 70 are in International peer-reviewed Journal Papers (from 2010 I published an average of 20.9 papers/yr with 7.8 papers/yr in International Journals). I have written 6 Chapters in books and I have 5 International patents. Working in the sector of space applications, I took the opportunity to coordinate experimental tests in microgravity flight campaigns with the European Space Agency, which led to the selection of my experiment on Pulsating Heat Pipes as one of the three European experiments in physical sciences on the International Space Station in 2021. My research has been recognised with covers in Journals, such as Physics of Fluids and Langmuir, and with more than 30 invited lectures around the world, among which 5 were as plenary lectures in recognised International Conferences.

Research outputs (from 2014)

Spreading of low-viscous liquids on a stationary and a moving surface

Buksh, S., Almohammadi, H., Marengo, M. & Amirfazli, A., 5 Apr 2019, 60, 4, 76.

An original look into pulsating heat pipes: Inverse heat conduction approach for assessing the thermal behaviour

Cattani, L., Mangini, D., Bozzoli, F., Pietrasanta, L., Miche, N., Mameli, M., Filippeschi, S., Rainieri, S. & Marengo, M., 26 Feb 2019, 10, p. 317-326 10 p.

Start-Up and Operation of a 3D Hybrid Pulsating Heat Pipe on Board a Sounding Rocket

Mameli, M., Piacquadio, S., Viglione, A. S., Catarsi, A., Bartoli, C., Marengo, M., Di Marco, P. & Filippeschi, S., 19 Feb 2019, p. 1-11 11 p.

A study of the effect of nanoparticle concentration on the characteristics of nanofluid sprays

Kang, B., Marengo, M. & Begg, S., 1 Jan 2019, 12, 2, p. 413-420 8 p.

A review of liquid droplet impacting onto solid spherical particles: A physical pathway to encapsulation mechanisms

Khojasteh, D., Kazerooni, N. M. & Marengo, M., 23 Nov 2018, 71, p. 50-64

Drop impact onto attached metallic meshes: liquid penetration and spreading

Boscariol, C., Chandra, S., Sarker, D., Crua, C. & Marengo, M., 20 Nov 2018, 59, 12, 189.

Thermal Performance of Pulsating Heat Stripes (PHS) Built with Plastic Materials

Der, O., Marengo, M. & Bertola, V., 12 Nov 2018

Drop impact onto suspended and surface-attached metallic meshes: liquid penetration and spreading

Boscariol, C., Sarker, D., Chandra, S., Crua, C. & Marengo, M., 26 Jul 2018, p. 0-0. 1 p.

Pulsating Heat Pipes: Basics of Functioning and Modeling

Nikolayev, V. S. & Marengo, M., Jul 2018, *Encyclopedia of Two-Phase Heat Transfer and Flow IV: Modeling Methodologies, Boiling of CO₂, and Micro-Two-Phase Cooling*. Thome, J. R. (ed.). Vol. 1: Modeling of Two-Phase Flows and Heat Transfer. p. 63-139

Pulsating heat pipes: experimental analysis, design and applications

Marengo, M. & Nikolayev, V. S., Jul 2018, *Encyclopedia of Two-Phase Heat Transfer and Flow IV: Modeling Methodologies, Boiling of CO₂, and Micro-Two-Phase Cooling*. Thome, J. R. (ed.). Singapore, Vol. 1: Modeling of Two-Phase Flows and Heat Transfer. p. 1-62

Lumped parameter network simulation of a Loop Heat Pipe for energy management systems in full electric vehicles

Bernagozzi, M., Charmer, S., Georgoulas, A., Malavasi, I., Michè, N. & Marengo, M., 5 Jun 2018, 141, p. 617-629 13 p.

Pulsating heat pipes: basics of functioning and numerical modelling

Nikolayev, V. S. & Marengo, M., 1 Jun 2018, *Encyclopedia of Two-Phase Heat Transfer and Flows III*. Thome, J. R. (ed.). Singapore, Vol. 4.

A new model to predict the influence of surface temperature on contact angle

Villa, F., Marengo, M. & De Coninck, J., 25 Apr 2018, 8

Infrared analysis of the two phase flow in a single closed loop pulsating heat pipe

Mangini, D., Marengo, M., Araneo, L., Mameli, M., Fioriti, D. & Filippeschi, S., 24 Apr 2018

Maximum Spreading and Rebound of a Droplet Impacting onto a Spherical Surface at low Weber numbers

Bordbar, A., Taassob, A., Khojasteh, D., Marengo, M. & Kamali, R., 10 Apr 2018, 34, 17, p. 5149-5158

Experimental analysis of a Flat Plate Pulsating Heat Pipe with Self-ReWetting Fluids during a parabolic flight campaign
Cecere, A., De Cristofaro, D., Savino, R., Ayel, V., Solé-Agostinelli, T., Marengo, M., Romestant, C. & Bertin, Y., 27 Mar 2018, 147, p. 454-461

Numerical Investigation of isolated bubble growth and detachment in cases of pool boiling with different wettability characteristics: Implementation of a dynamic contact angle treatment in OpenFOAM
Andredaki, M., Villa, F., Georgoulas, A., De Coninck, J. & Marengo, M., 15 Mar 2018, p. 1-2. 2 p.

Wettability effect on pool boiling: a review

Malavasi, I., Teodori, E., Moita, A. S., Moreira, A. L. N. & Marengo, M., 1 Mar 2018, *Encyclopedia of Two-Phase Heat Transfer and Flows III*. Thome, J. R. (ed.). Singapore, Vol. 3.

Visualization of Flow Patterns in Closed Loop Flat Plate Pulsating Heat Pipe Acting as Hybrid Thermosyphons under Various Gravity Levels

Ayel, V., Araneo, L., Marzorati, P., Romestant, C., Bertin, Y. & Marengo, M., 8 Feb 2018, 40, 3-4, p. 227-237 10 p.

Simulation of micro-flow dynamics at low capillary numbers using adaptive interface compression

Aboukhedr, M., Georgoulas, A., Marengo, M., Gavaises, M. & Vogiatzaki, K., 16 Jan 2018, 165, p. 13-32

A single loop pulsating heat pipe in varying gravity conditions: Experimental results and numerical simulations

Pietrasanta, L., Mangini, D., Fioriti, D., Miche, N., Andredaki, M., Georgoulas, A., Araneo, L. & Marengo, M., 2018, *International Heat Transfer Conference 16*. Vol. 18. p. 4877-4884 8 p. IHTC16-23891. (International Heat Transfer Conference 16).

Computational study on break-up mechanisms of isolated vapour slugs during saturated flow boiling conditions

Andredaki, M., Georgoulas, A., Mangini, D., Araneo, L., Pietrasanta, L., Miche, N. & Marengo, M., 2018, *Proceedings of the International Heat Transfer Conference 16*. Vol. 18. p. 6361-6368 IHTC16-23952. (International Heat Transfer Conference 16).

Effect of Flow Oscillations on the Liquid Film Evaporation and Instability Formation for Elongated Vapour Slugs within Heated Microchannels

Andredaki, M., Georgoulas, A., Miche, N. & Marengo, M., 2018.

Enhanced VOF- based direct numerical simulations of slug flow boiling within micro-channels with smooth and finned heated walls

Teodori, E., Andredaki, M., Georgoulas, A., Moita, A., Moreira, A. & Marengo, M., 2018, *Proceedings of the International Heat Transfer Conference 16*. Vol. 18. p. 6503-6510 IHTC16-23596. (International Heat Transfer Conference 16).

Experimental Study of Start-up in a Closed Loop Pulsating Heat Pipe with Alternating Superhydrophobic Channels

Betancur, L. A., Mangini, D., Facin, A., Mantelli, M., Paiva, K. & Marengo, M., 2018.

Infrared analysis and pressure measurements on a single loop pulsating heat pipe at different gravity levels

Mangini, D., Pozzoni, M., Mamei, M., Pietrasanta, L., Bernagozzi, M., Fioriti, D., Miche, N., Araneo, L., Marengo, M. & Filippeschi, S., 2018.

Large Diameter Pulsating Heat Pipe for Future Experiments on the International Space Station: Ground and Microgravity Thermal Response

Mamei, M., Catarsi, A., Mangini, D., Pietrasanta, L., Fioriti, D., La Foresta, M., Caporale, L., Marengo, M., Di Marco, P. & Filippeschi, S., 2018.

L'impatto della Building Automation nelle nuove costruzioni residenziali NZEB

Fusco, D., Picco, M., Chiaroni, D. & Marengo, M., 2018.

L'impatto della digitalizzazione nelle nuove costruzioni residenziali NZEB

Fusco, D., Picco, M., Chiaroni, D. & Marengo, M., 2018, *Rapporto Annuale sull'Efficienza Energetica 2018*. p. 101

Numerical investigation of oscillating vapour slugs within heated microchannels in saturated flow boiling conditions

Andredaki, M., Georgoulas, A., Miche, N., Teodori, E., Moita, A., Moreira, A. & Marengo, M., 2018.

Is drop impact the same for both moving and inclined surfaces?

Buksh, S., Marengo, M. & Amirfazli, A., 21 Nov 2017, p. 0-0. 1 p.

A benchmark study for the crown-type splashing dynamics of two-component droplet-wall film interactions

Geppert, A., Terzis, A., Lamanna, G., Marengo, M. & Weigand, B., 16 Nov 2017, 58

Flat Plate Pulsating Heat Pipe with Self-Rewetting Fluid In Parabolic Flight Conditions

Cecere, A., De Cristofaro, D., Savino, R., Marengo, M., Solé-Agostinelli, T., Ayel, V., Romestant, C. & Bertin, Y., 29 Sep 2017, *68th International Astronautical Congress (IAC)*. Adelaide, Australia, p. 0-0 1 p.

Thermo-hydraulic characterization of semi-transparent Flat-Plate Pulsating Heat Pipes in variable gravity regimes

Solé-Agostinelli, T., Ayel, V., Vigoureux, F., Romestant, C., Bertin, Y. & Marengo, M., 15 Sep 2017, p. 65-66. 2 p.

Simulation of droplet spreading on micro-CT reconstructed 3D real porous media using the volume-of-fluid method

Aboukhedr, M., Mitroglou, N., Georgoulas, A., Marengo, M. & Vogiatzaki, K., 10 Sep 2017, *Proceedings 28th European Conference on Liquid Atomization and Spray Systems (ILASS) 2017*. Valencia, Spain, p. 1-8 8 p.

Drop Impact onto a Metallic Porous Layer: Effect of Liquid Viscosity and Air Entrapment

Boscaroli, C., Sarker, D., Kang, B., Crua, C. & Marengo, M., 8 Sep 2017, *ILASS-Europe 2017, 28th Conference on Liquid Atomization and Spray Systems*. Valencia, Spain, p. 0-0 1 p.

Experimental and Numerical Study on Sensible Heat Transfer at Droplet/Wall Interactions

Teodori, E., Pontes, P., Moita, A. S., Moreira, A. L. N., Georgoulas, A. & Marengo, M., 6 Sep 2017, *ILASS-Europe 2017, 28th Conference on Liquid Atomization and Spray Systems*. Valencia, Spain, p. 304-311 8 p.

Numerical Investigation of Droplet Impact on Smooth Surfaces with Different Wettability Characteristics: Implementation of a dynamic contact angle treatment in OpenFOAM

Vontas, K., Andredaki, M., Georgoulas, A., Nikas, K-S. & Marengo, M., 6 Sep 2017, *ILASS-Europe 2017, 28th Conference on Liquid Atomization and Spray Systems*. Valencia, Spain, p. 58-65 8 p.

A novel lumped parameter model for Loop Heat Pipes – validation and parametric analysis

Georgoulas, A., Bernagozzi, M., Malavasi, I., Miche, N. & Marengo, M., 4 Sep 2017, p. 0-0. 1 p.

Break-up Mechanisms and Conditions for Vapour Slugs Within Mini-Channels

Andredaki, M., Georgoulas, A., Miche, N. & Marengo, M., 4 Sep 2017, p. 0-0. 1 p.

Curvature effect on droplet impacting onto hydrophobic and superhydrophobic spheres

Khojasteh, D., Bordbar, A., Kamali, R. & Marengo, M., 7 Jul 2017, p. 310-323 14 p.

Characterization of a Space Pulsating Heat Pipe on board REXUS 22 Sounding Rocket

Nannipieri, P., Anichini, M., Barsocchi, L., Becatti, G., Buoni, L., Celi, F., Catarsi, A., Di Giorgio, P., Fattibene, P. & Marengo, M., 28 Jun 2017, *35th UIT Heat Transfer Conference (UIT2017)*. Ancona, Italy, p. 0-0 1 p.

Fluid-flow pressure measurements and thermo-fluid characterization of a single loop two-phase passive heat transfer device

Ioana Ilinca, A., Mangini, D., Mameli, M., Fioriti, D., Filippeschi, S., Araneo, L., Roth, N. & Marengo, M., 28 Jun 2017, *35th UIT Heat Transfer Conference (UIT2017)*. Ancona, Italy, Vol. 923. p. 0-0 1 p. (Journal of Physics: Conference Series).

Experimental Study of a Sodium Two-Phase Thermosyphon

Mantelli, M. B. H., Uhlmann, T. W., Cisterna, L. H. R., Marengo, M. & Eskilsson, P., 15 Jun 2017, *9th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics*. Iguazu Falls, Brazil, p. 0-0 1 p.

Fluid flow infrared analysis and pressure drop measurements in a single loop pulsating heat pipe

Mangini, D., Ioana Ilinca, A., Mameli, M., Fioriti, D., Filippeschi, S., Araneo, L. & Marengo, M., 15 Jun 2017, *9th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics*. Iguazu Falls, Brazil, p. 0-0 1 p.

Upgraded Pulsating Heat Pipe Only For Space (U-PHOS): results of the 22nd Rexus Sounding Rocket Campaign

Nannipieri, P., Anichini, M., Barsocchi, L., Becatti, G., Buoni, L., Celi, F., Catarsi, A., Di Giorgio, P., Fattibene, P. & Marengo, M., 15 Jun 2017, *9th World Conference on Experimental Heat Transfer, Fluid Mechanics and Thermodynamics*. Iguazu Falls, Brazil, p. 0-0 1 p.

Sensible Heat Transfer during Droplet Cooling: Experimental and Numerical Analysis

Teodori, E., Marengo, M., Moita, A. S., Georgoulas, A., Pontes, P. & Moreira, A. L. N., 9 Jun 2017, 10, 6

Etude d'un caloduc oscillant plat testé avec un fluide remouillant sous champ de gravité variable

Solé-Agostinelli, T., Ayel, V., Cecere, A., Jaulin, F., Romestant, C., Bertin, Y., Savino, R. & Marengo, M., 2 Jun 2017, *25th French Thermal Congress*. Marseille, p. 0-0 1 p.

Numerical Investigation of Break-up Mechanisms and Conditions for Vapour Slugs within Mini-Channels

Andredaki, M., Georgoulas, A. & Marengo, M., 17 May 2017, p. 0-0. 1 p.

The U-PHOS experience within the ESA student REXUS/BEXUS programme: a real space hands-on opportunity

Nannipieri, P., Anichini, M., Barsocchi, L., Becatti, G., Buoni, L., Catarsi, A., Celi, F., Di Giorgio, P., Fattibene, P. & Marengo, M., 28 Apr 2017, *2017 IEEE Global Engineering Education Conference (EDUCON)*. Athens, p. 0-0 1 p.

U-PHOS Project: Development of a Large Diameter Pulsating Heat Pipe Experiment on board REXUS 22

Nannipieri, P., Anichini, M., Barsocchi, L., Becatti, G., Buoni, L., Celi, F., Catarsi, A., Di Giorgio, P., Fattibene, P. & Marengo, M., 9 Mar 2017, 796, 1

An Enhanced VOF Method Coupled with Heat Transfer and Phase Change to Characterise Bubble Detachment in Saturated Pool Boiling

Georgoulas, A., Andredaki, M. & Marengo, M., 24 Feb 2017, 10, 3, p. 1-35 35 p.

Introduction of a new dynamic simulation screening tool to support early-stage building design

Picco, M., Ghisalberti, G., Graziano, G. F. & Marengo, M., 10 Feb 2017, *Building Simulation Applications, BSA 2017 - 3rd IBPSA-Italy Conference*. Bozen-Bolzano, Vol. 2017-February. p. 241-248 8 p. (Building Simulation Applications BSA).

Hybrid Pulsating Heat Pipe for Space Applications with Non-Uniform Heating Patterns: Ground and Microgravity Experiments

Mangini, D., Mameli, M., Fioriti, D., Filippeschi, S., Araneo, L. & Marengo, M., 12 Jan 2017, 126, p. 1029-1043 15 p.

Flat plate pulsating heat pipe with self-rewetting fluids in parabolic flight condition

Cecere, A., De Cristofaro, D., Savino, R., Marengo, M., Sole-Agostinelli, T., Ayel, V., Romestant, C. & Bertin, Y., 1 Jan 2017, *68th International Astronautical Congress, IAC 2017: Unlocking Imagination, Fostering Innovation and Strengthening Security*. Vol. 4. p. 2272-2281 10 p. (Proceedings of the International Astronautical Congress).

Effect of the Condenser Temperature on the Start-up of a Pulsating Heat Pipe

Betancur, L. A., Mangini, D., Mameli, M., Filippeschi, S., Slongo, L. K., Paiva, K. V., Mantelli, M. & Marengo, M., 2017, 8, 1, p. 13-25 13 p.

Effect of extreme wetting scenarios on pool boiling conditions in a quiescent medium

Teodori, E., Valente, P., Malavasi, I., Moita, A. S., Marengo, M. & Moreira, A. L. N., 11 Nov 2016, 115, p. 1424-1437 14 p.

Hybrid Stirling Systems: Development of a Solar/Combustion Thermosyphon Receiver

Mantelli, M. B. H., Uhlmann, T. W., Lindh, J., Eskilson, P., Nilsson, M., Manzoni, M. & Marengo, M., 14 Oct 2016, p. 0-0. 1 p.

Effect of the Ambient Temperature on the Start-Up of a Multi-Evaporator Loop Thermosyphon

Araneo, L., Mangini, D., Mameli, M., Filippeschi, S., Valenti, G. & Marengo, M., 29 Sep 2016, p. 0-0. 1 p.

Fast response building energy simulation in support to low carbon design and retrofit

Picco, M. & Marengo, M., 9 Sep 2016, p. 53-60. 8 p.

Dripping and jetting from pipe wall leakages in cross flow fouling

Applin, N., Miche, N., Mason, D. & Marengo, M., 7 Sep 2016, p. 65-66. 2 p.

Drop impact onto a metallic porous layer: scale effects

Boscariol, C., Sarker, D., Crua, C. & Marengo, M., 7 Sep 2016, *ILASS – Europe 2016, 27th Annual Conference on Liquid Atomization and Spray Systems*. Brighton, UK, p. 0-0 1 p.

Drop impact onto porous surface: scale effects

Boscariol, C., Sarker, D., Crua, C. & Marengo, M., 7 Sep 2016, p. 229-230. 2 p.

Equilibrium contact angle at boiling condition

Villa, F., Marengo, M. & De Coninck, J., 7 Sep 2016, p. 257-258. 2 p.

Impact of hexadecane and water droplets on non-wetting surfaces

Malavasi, I., Veronesi, F., Zani, M., Raimondo, M. & Marengo, M., 7 Sep 2016, p. 87-88. 2 p.

Numerical investigation of droplet spreading on porous and non-porous surfaces

Aboukhedr, M., Gavaises, M., Georgoulas, A., Marengo, M. & Vogiatzaki, K., 7 Sep 2016, p. 261-262. 2 p.

Two component droplet wall-film interactions: impact dynamics on very thin films

Geppert, A., Terzis, A., Lamanna, G., Marengo, M. & Weigand, B., 7 Sep 2016, p. 225-226. 2 p.

Advanced multi-evaporator loop thermosyphon

Mameli, M., Mangini, D., Vanoli, G. F. T., Araneo, L., Filippeschi, S. & Marengo, M., 5 Aug 2016, 112, p. 562-573 12 p.

U-PHOS Project: Development of a Large Diameter Pulsating Heat Pipe Experiment on board REXUS 22

Nannipieri, P., Anichini, M., Barsocchi, L., Becatti, G., Buoni, L., Celi, F., Catarsi, A., Di Giorgio, P., Fattibene, P. & Marengo, M., 6 Jul 2016, *34th UIT Conference*. Ferrara, Italy, p. 0-0 1 p.

Impact of occupancy on energy consumption by an educational facility

Amore, M., Rossoni, M., Marengo, M. & de Wilde, P., 1 Jul 2016, *Conference Proceedings 23rd International Workshop of the European Group for Intelligent Computing in Engineering*. Kraków, Poland, p. 0-0 1 p.

Condenser Temperature Effect on the Transient Behavior of a Pulsating Heat Pipe

Betancur, L. A., Mangini, D., Mameli, M., Filippeschi, S., Filippeschi, L. K., Paiva, K., Mantelli, M. B. H. & Marengo, M., 16 Jun 2016, *Proc. of the 18th IHPC and 12th IHPS*. Jeju-Do, South Korea, p. 0-0 1 p.

Experimental Tests on Sodium Thermosyphons

Uhlmann, T. W., Mantelli, M. B. H., Manzoni, M., Marengo, M. & Eskilson, P., 16 Jun 2016, *Proc. of the 18th IHPC and 12th IHPS*. Jeju-Do, South Korea, p. 0-0 1 p.

Pulsating Heat Pipe for space applications with non-uniform heating patterns: ground and micro-gravity experiments
Mameli, M., Fioriti, D., Filippeschi, S., Araneo, L. & Marengo, M., 16 Jun 2016, *Proc. of the 18th IHPC and 12th IHPS, 2016*. Jeju-Do, South Korea, p. 0-0 1 p.

Visualizations of the flow patterns in a closed loop flat plate PHP with channel diameter above the critical one and tested under microgravity

Ayel, V., Araneo, L., Marzorati, P., Bertin, Y. & Marengo, M., 16 Jun 2016, *Proc. of the 18th IHPC and 12th IHPS*. Jeju-Do, South Korea, p. 0-0 1 p.

Is a Knowledge of Surface Topology and Contact Angles Enough to Define the Drop Impact Outcome?

Malavasi, I., Veronesi, F., Caldarelli, A., Zani, M., Raimondo, M. & Marengo, M., 26 May 2016, 32, 25, p. 6255-6262 8 p.

Contactless prompt tumbling-rebound of drops from a sublimating slope

Antonini, C., Jung, S., Wetzel, A., Heer, E., Schoch, P., Moqaddam, A. M., Chikatamarla, S. S., Karlin, I., Marengo, M. & Poulikakos, D., 25 May 2016, 1, p. 1-11 11 p.

Pool Boiling Versus Surface Wettability Characteristics

Villa, F., Georgoulas, A., Marengo, M., Di Marco, P. & De Coninck, J., 4 Apr 2016, *Proceedings of the World Congress on Momentum, Heat and Mass Transfer (MHMT'16)*. Ottawa, Canada, p. 1-8 8 p.

Compressible simulations of bubble dynamics with central-upwind schemes

Koukouvinis, P., Gavaises, M., Georgoulas, A. & Marengo, M., 31 Mar 2016, 30, 2, p. 129-140 12 p.

Advanced numerical method for a thermally induced slug flow: application to a capillary Closed Loop Pulsating Heat Pipe

Manzoni, M., Mameli, M., de Falco, C., Araneo, L., Filippeschi, S. & Marengo, M., 3 Mar 2016, 82, 7, p. 375-397 23 p.

Non equilibrium lumped parameter model for Pulsating Heat Pipes: validation in normal and hyper-gravity conditions

Manzoni, M., de Falco, C., Araneo, L., Filippeschi, S. & Marengo, M., 27 Feb 2016, 97, p. 473-485 13 p.

Phos project: Lesson learned from experimenting a pulsating heat pipe on board a sounding rocket (REXUS18) and refurbishment strategies

Guidi, G. M., Molina, M., Filippeschi, S., Creatini, F., Belfi, F., Cicero, G., Fioriti, D., Di Prizio, D., Piacquadio, S., Becatti, G., Orlandini, G., Frigerio, A., Fontanesi, S., Nannipieri, P., Rognini, M., Morganti, N., Di Marco, P., Fanucci, L., Baronti, F., Mameli, M. & 1 othersMarengo, M., 1 Jan 2016, *Proceedings of the International Astronautical Congress, IAC*. (Proceedings of the International Astronautical Congress, IAC).

Rapid Exploitation of Building Energy Design Through Compact TRNSYS Modeling

Beltrami, A., Picco, M. & Marengo, M., 1 Jan 2016, 37, p. 60-67 8 p.

Fast Response Building Energy Simulation in support of Low Carbon Design and Retrofit

Picco, M. & Marengo, M., 2016, *Zero Carbon Buildings Today and in the Future 2016*. p. 53-60

Rapid exploitation of building energy design through Trnsys Energy Modelling

Beltrami, A., Picco, M. & Marengo, M., 2016, 37, p. 60-67

Compressible bubble dynamic simulations with central-upwind schemes

Koukouvinis, P., Gavaises, M., Georgoulas, A. & Marengo, M., 31 Dec 2015, 656, 1

Evaluation of friction heating in cavitating high pressure Diesel injector nozzles

Salemi, R., Koukouvinis, P., Strotos, G., McDavid, R., Wang, L., Li, J., Marengo, M. & Gavaises, M., 31 Dec 2015, 656, 1

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TEACHING AND LEARNING

I have almost 20 years of academic career which includes teaching and student experience. Most of my experience was carried out at the Polytechnic of Milan and University of Bergamo, Italy, for the Courses of Building Engineering, Mechanical Engineering, Computing and Business Engineering. I taught 14 modules of Thermal Physics (B.Sc. level) and 7 modules of Energy Saving in Building and Building Energy Certification (M.Sc. level) as module leader and 22 modules of Thermal Physics and Thermal Plants (B.Sc. level) as contract professor. I have orally examined more than 4000 B.Sc. and M.Sc. students. I have an extensive experience in teaching for Professional Development and Training, for example as Director of the "Building Energy Certification" courses, and for the "High Formation of Secondary School Teachers" in Bergamo, Italy. I have supervised to completion the research projects (Final Year Project for M.Sc. students) of more than 100 Master Degree students, 14 Ph.D. students and 11 Early Stage Researchers. As Visiting Professor at the University of Mons-Hainaut, Belgium, I taught 5 post-graduate modules of Thermodynamics of Complex Systems and Advanced Heat Transfer. I designed, proposed and organised several professional and research courses, among which the International Advanced Course on the Interface, Drops and Liquid Sprays Physics (LIDESP), now at the 6th edition. I was member of the panel for the Student Curriculum Development for the Engineering Faculty of Bergamo from 1999 to 2004, for the design and implementation of the courses.

2014 Module of Fluid Dynamics, ME257, Part II, Module leader: Prof. Sergei Sazhin, B.Sc. in Mechanical, Automotive and Aeronautical Engineering, University of Brighton

2014 Module of Advanced Thermodynamics, Ph.D. students, University of Mons, Mons, Belgium. Design, preparation and delivery of a module of 8 hours to 6 students

Major teaching responsibilities in previous years that have not already been included above

I was module leader of the following 21 modules (AY= academic year):

1. Module of Energy Saving in Building and Building Energy Certification, M.Sc. in Building Engineering, University of Bergamo, AY06-07, AY07-08, AY08-09, AY09-10, AY11-12, AY12-13, AY13-14

2. Module of Thermal Physics and Thermal Plants, B.Sc. in Building Engineering, University of Bergamo, AY11-12, AY12-13, AY13-14

3. Module of Thermal Physics, B.Sc. in Computing Engineering, University of Bergamo, AY04-05, AY05-06, AY06-07, AY07-08

4. Module of Thermal Physics, B.Sc. in Business Engineering, University of Bergamo, AY02-03, AY03-04, AY04-05, AY05-06, AY06-07, AY07-08, AY08-09

Innovative units or teaching methods

I designed, proposed and co-organised new professional courses (see below the section "Continuing Professional Development teaching"). To note, the course on FEM Modelling was the first one in Italy to propose theoretical insights together with a practical session at the workstations (using commercial codes), both in the mechanical and thermal field. The courses in "Energy Certification of Buildings" gave the chance to more than 200 professionals to obtain the Building Energy Assessment Certificate to carry out Energy Certification of Building. It was the first one of its kind in Italy in 2007, just few months after the introduction of the Italian energy regulation for buildings.

Collaborative teaching projects with colleagues in other schools or institutions

All of my professional development courses and the lecturing to PhD students have been developed and taught in collaboration with external institutions, such as York University and University of Liverpool (LIDESP), the Building

Construction Association (for the Energy Certification of Buildings Course), Polytechnic of Milan (for the Infrared Thermography Techniques Course). The LIDESP course was delivered in Darmstadt (Germany), Tainan (Taiwan), Brighton (UK), Valencia (Spain). As Visiting Professor at University of Mons-Hainaut, Belgium, I taught 5 modules of "Thermodynamics of Complex Systems" (AY05-06-07, AY09-10-11-12) to Ph.D. and M.Sc. students in Physics.

Major achievements in teaching administration

Apart of being module leader of several modules, I was member of the panel for the Curriculum Development for the Engineering Faculty of Bergamo from 1999 to 2004, member of the Business Engineering School panel for the Curriculum Development from 2004 to 2006 and member of the Building Engineering School panel for the Curriculum Development from 2007 to 2016. Furthermore, I was the dean delegate for the admission of foreign students to the Engineering Courses at the University of Bergamo, from 2003 to 2009.

Continuing Professional Development teaching

2007-2009 Proposer and Director of Professional Courses in "Energy Certification of Buildings" at Scuola Edile, Seriate, Italy, with the accreditation of Lombardy Region, Oct 2007 (60 students), Jan 2008 (90 students), Mar 2008 (90 students), Nov 2009 (50 students), two half-days per week for 10 weeks (80h in total).
2007-2009 Co-founder and co-director of the Advanced Course in "Infrared Thermography Techniques for Industrial and Civil Applications", Polytechnic of Milan, Italy, 3 editions, up to 40 students each course, 3 days, 20 hours
2009-2010 Contract Teaching of Energy Saving, Energetics and Renewable Energies at Craftsman Association, Bergamo, Italy, one edition, 15 students, half a day for 12 weeks
2005-2006 Contract Teaching of Thermal and Fluid Machinery, High Formation of Secondary School Teachers (SILSIS), Bergamo, Italy, one edition, about 90 teachers, 40 hours in total
2002-2005 Co-Proposer, Co-director and secretary of the Professional Courses "From design to FEM modelling of structural components", University of Bergamo, Dalmine, Italy, 30 students each, 4 editions, 3 days, 24 hours
2002-2003 Proposer and trainer of the Professional Course on "Design and writing of European Projects" for the Project NETFORMEC, Industrial Board of Bergamo, Italy, 20 students, 1 full day of training, 7 hours

PhD Final Exam Board Member

1. Behnam Rostami, Experimental Analysis of Droplet Generation in Presence of Newtonian And Non-Newtonian Flows Within Micro-junctions, PhD Course in Mechanics and Advanced Engineering Sciences (DIMSAI), University of Bologna, Italy, 18 December 2017
2. Simeng Chen, An experimental investigation of drop impact phenomena with complex fluids on heated and soft surfaces, University of Liverpool, UK, 5 October 2017
3. Nadia Ndamuso, Parametric Studies of Cavitation Dependence on Hydrocarbon and Biodiesel Fuel Injection flows, City University, London, UK, 27 April 2017
4. PhD Panel, 3 PhD Candidates, Doctoral School in Science and Technology of Innovative Materials, University of Parma, Italy, 17 March 2017
5. Visakh Vaikuntanathan, Experimental and Theoretical Studies of Liquid Drop Impact on Solid Surfaces Comprising Smooth and Texture Portions, India Institute of Science, Bangalore, India, 21 December 2015
6. Muhammad Israr, Temporal and Spatial Characterization of Slug Flow in Pipelines Using a Simultaneous PIV-LIF Technique, Information Resource Centre of Universiti Teknologi Petronas (UTP), Bandar Seri Iskandar, Perak, Malaysia, 29 September 2015
7. Mansour Al Qubeissi, Heating and evaporation of automotive fuel droplets, University of Brighton, Brighton, UK, 31 July 2015
8. Viktor Grishaev, Impact of particle-laden drops on substrates with various wettability, Université Libre De Bruxelles, École Polytechnique De Bruxelles, Bruxelles, Belgium, 9 April 2015
9. PhD Panel, 3 PhD Candidates, Doctoral School in Industrial Engineering, University of Padova, Italy, 15 April 2014
10. Davood Kalantari, Characterization of liquid spray impact onto walls and films, Faculty of Mechanical Engineering, Darmstadt University of Technology, 10 November 2006
11. Kai Heukelbach, Untersuchung zum Einfluss der Düseninnenströmung auf die Stabilität von flächigen Flüssigkeitsstrahlen, Faculty of Mechanical Engineering, Darmstadt University of Technology, 6 April 2003

Microgravity Platforms and Parabolic Flight Campaigns (Principal Investigator)

1. Experimental characterization of a Single Loop Pulsating Heat Pipe with IR analysis, 2017 • Parabolic Flights • 68th ESA Parabolic Flight Campaign • ID: 9582 (performed the 2nd time) in collaboration with University of Pisa and Polytechnic of Milan, M. Marengo, L. Araneo, D. Mangini, M. Bernagozzi, L. Pietrasanta, M. Pozzoni, M. Palermo, L. Jackson
2. Experimental characterization of a Space Pulsating Heat Pipe with IR analysis, 2017 • Parabolic Flights • 67th ESA Parabolic Flight Campaign • ID: 9581 (performed the 1st time) in collaboration with University of Pisa, M. Marengo, D. Mangini, M. Marni, N. Miché, M. Bernagozzi, L. Pietrasanta, M. Pozzoni, A. Catarsi, S. Filippeschi, M. La Foresta
3. Self-Rewetting liquid vein stability - SELf-rewetting fluids for ENERgy management SELENE, 2017 • Parabolic Flights • 66th ESA Parabolic Flight Campaign • ID: 9579 (performed the 1st time) in collaboration with the Free University of Bruxelles (ULB), M. Marengo, N. Miché, M. Bernagozzi, L. Pietrasanta, R. Chambers, M. Palermo, S. Van Vaerenbergh,

P. Queeckers, W. Tzevelecos

4. Thermo-hydraulics characterisation of a single-loop pulsating heat pipe in a variable gravity regime, ESA MAP INWIP, 2017 • Parabolic Flights • 66th ESA Parabolic Flight Campaign • ID: 9580 (performed the 1st time) in collaboration with University of Pisa, Polytechnic of Milan, University of Bergamo, M. Marengo, L. Araneo, D. Mangini, A. Ilinca, M. Mameli, D. Fioriti, S. Filippeschi
5. Thermo-hydraulics characterisation of a pulsating heat pipe in a variable gravity regime, 2013 • Parabolic Flights • 59th ESA Parabolic Flight Campaign • ID: 9419 (performed the 1st time) in collaboration with University of Pisa, Polytechnic of Milan, University of Bergamo, M. Marengo, L. Araneo, M. Mameli, M. Manzoni, L. Marelli
6. Thermo-Hydraulics Characterisation of a Pulsating Heat Pipe in a variable Gravity Regime, 2013 • Parabolic Flights • 58th ESA Parabolic Flight Campaign • ID: 9401 (performed the 1st time) in collaboration with University of Pisa, Polytechnic of Milan, University of Bergamo, M. Marengo, L. Araneo, M. Mameli, S. Filippeschi, R. Testa, L. Marelli

Invited lectures (from 2014)

1. University of Southampton, AFM seminar, Southampton, UK, 13th December 2017
 2. Sussex University, Engineering Division, Brighton, UK, 27th September 2017
 3. University of Toronto, Mechanical Engineering Dept., Toronto, Canada, 26th July 2017
 4. York University, Lassonde School of Engineering, Toronto, Canada, 10th July 2017
 5. Istituto Superior Tecnico, E+ Center for Innovation, Technology and Policy Research - IN+, Lisbon, Portugal, 30th October 2016
 6. University of Strathclyde, Division of Mathematics, Glasgow, UK, 23th February 2016
 7. UK SPACE AGENCY, ELIPS Community Meeting, London, 24th November 2015
 8. Institut für Thermodynamik der Luft- und Raumfahrt, University of Stuttgart, Germany, 20th April 2015
 9. KAIST, Department of Mechanical Engineering, Daejeon, Korea, 28th August 2015
 10. University of York, Lassonde Mechanical Engineering, Toronto, Canada, 28th October 2015
 11. University of Toronto, MIE Distinguished Lectures, Toronto, Canada, 30th October 2015
- POLIEFUN, Polytechnic of Milan, Milan, Italy, 11th September 2014

Plenary lectures at International Conferences

- 20-21 July 2015 M. Marengo, M. Manzoni, D. Mangini, M. Mameli, L. Araneo, S. Filippeschi, Closed Loop Pulsating Heat Pipes at Variable Gravity Levels, 2nd International Conference on Heat Transfer and Fluid Flow (HTFF), Barcelona, Spain
- 20-24 May 2012 M. Marengo, M. Mameli, S. Khandekar, Towards Quantitative Validation of a Closed Loop Pulsating Heat Pipe Numerical Model, 16th International Heat Pipe Conference, INSA, Lyon, France
- 5-7 Sept 2005 M. Marengo, G.E. Cossali, M. Santini, Effects of wall effusivity on secondary droplet atomisation from single and multiple drop impact onto heated surfaces, Proc. of 20th ILASS Europe Conference, Orleans, France
- 5-10 June 2005 M. Marengo, G.E. Cossali, M. Santini, Single and multiple drop impact onto heated surfaces, International Symposium on Heat and Mass Transfer in Spray Systems, Antalya, Turkey
- 17-19 June 2004 Marengo M., S. Zhdanov, L. Chignoli, G.E. Cossali, Micro-Heat-Sinks for Space Applications, Proceedings of the Second International Conference on Microchannels and Minichannels (ICMM2004), Rochester, New York, USA

Postgraduate Research (PGR) Doctorate Student Supervision

Current

1. Cristina Boscaroli, University of Brighton, 1st supervisor, End date: 31.10.2018
2. Luca Pietrasanta, University of Brighton, 1st supervisor, End date: 31.10.2018
3. Dario Fusco, University of Bergamo, 1st supervisor, End date: 30.9.2019
4. Nick Applin, University of Brighton, 2nd supervisor, End date: 30.4.2022

Past

1. Daniele Mangini, Hybrid Thermosyphon/Pulsating Heat Pipe for Ground and Space Applications. A novel two-phase passive heat transfer device, 10.05.2017, University of Bergamo, 1st supervisor
2. Fabio Villa, Effect of Wettability on Phase Change Phenomena, 24.05.2017, University of Bergamo, 1st supervisor
3. Miriam Manzoni, Design of Pulsating Heat Pipes. A novel non-equilibrium lumped parameter model for transient gravity levels, 14.10.2016, University of Bergamo, 1st supervisor
4. Ileana Malavasi, Wettability Effects on Interface Dynamics and Phase-Change, 14.10.2016, University of Bergamo, 1st supervisor
5. Alberto Beltrami, TRNSYS Integrated Modeling Support Tool for a Fast Building-Plant System Design, 14.10.2016, University of Bergamo, 1st supervisor
6. Benoit Bourdon, Influence of the wettability on the pool boiling onset, 17.4.2015, University of Mons, 2nd supervisor
7. Marco Picco, Dynamic Energy Simulation Toward Integrated Design of Non-Residential Buildings. Model description simplifications and their impact on simulation results, 22.05.2014, University of Bergamo, 1st supervisor
8. Annamaria Belleri, Integrated Design Methods for Natural Ventilation, 22.05.2014, University of Bergamo, 1st supervisor
9. Chiara Baldassari, Flow Boiling of Refrigerants Inside a Glass Minichannel, 08.05.2013, University of Bergamo, 1st supervisor
10. Mauro Mameli, Pulsating Heat Pipes: Numerical Modeling and Experimental Assessment, 11.04.2012, University of Bergamo, 1st supervisor

11. Carlo Antonini, Superhydrophobicity as a Strategy Against Icing. Analysis of the water/surface dynamic interaction for icing mitigation, 21.04.2011, University of Bergamo, 1st supervisor
12. Lucia Cattani, L'edificio energeticamente sostenibile: verifiche energetiche, strategie per la raccolta dati e tecniche d'intervento per edifici esistenti, 16.04.2009, University of Bergamo, 1st supervisor
13. Stefano Dall'Olio, Boiling of R134a Inside a Glass Minichannel. A New Approach of Flow Pattern Characterization Based on Flow Visualization, 16.04.2009, University of Bergamo, 1st supervisor
14. Stefano Zinna, Numerical Analysis of a Loop Heat Pipe for the Thermal Control of a Cryo-Cooler on the International Space Station, 22.5.2007, University of Bergamo, 1st supervisor
15. Maurizio Santini, Effect of surface properties on secondary atomization by impact of drops over heated surfaces, 16.3.2005, University of Parma, 2nd supervisor
16. Romain Rioboo, Impact de gouttes sur surfaces solides et sèches, 27.02.2001, Université Pierre et Marie Curie - Université Paris 6, 3rd supervisor

Academic Spin Off

01.02.2010 – 12.07.2012 Founder and Board member of the start-up company ICENOVA srl, Bergamo Board of Trade incubator, Brembate di Sopra, Italy.

ICENOVA srl was a start-up company working in the field of energy.

Main activities of ICENOVA srl company

- Energy audits of industrial plants
- Design of waste heat recovery systems
- Design of heat exchangers
- Financial evaluation of energy systems
- Consulting for energy contracts

Average Turnover 2010-2012: 96k€/yr.

06.11.2007 – 31.12. 2011 Founder and President of the university spin-off UNIHEAT srl, Bagnatica, Italy.

UNIHEAT srl was a university spin-off company working in the field of thermal management, Engineering consultant company in thermal and energy sector. Main activities of UNIHEAT srl company:

- Mold cooling for plastics injection and die casting
- LED thermal control
- Design of heat exchangers
- Design of a polymeric flexible systems for heat dissipation
- Thermal analysis of kitchen ovens and induction plates
- Thermal control of a PV cell for solar concentration

Main customers: B.M. Plastic, Intel, Whirlpool, Candy, ABB, Cree Led, Artemide, Halfen-Dea, CBF Engineering, Fondermat, Warrant Group

Average Turnover 2007-2011: 181k€/yr.

Impact cases

1. 2016 Tatamotors UK TMETC proposed to my research team an INNOVATE UK proposal titled LOOP Heat Pump Circuit (LOOPER). The project assessed the feasibility of integrating a Loop Heat Pipe into a heat pump for a battery electric vehicle (BEV) and determined the potential reductions in energy used to provide cabin heating and cooling. The feasibility study was conducted using an advanced Co-Simulation technique using Computer Aided Engineering software and applying 1D system and 3D CFD vehicle level simulation techniques. The novel 1D model was designed and built by us in Brighton. The project benefited from TMETC's expert knowledge on BEV product development, cabin comfort know-how, vehicle level aerodynamics and system level CAE. Our contribution was essential to deliver novel software to simulate the Loop Heat Pipes for BEVs. This work has further established our recognition in the field of thermal management in the automotive sector, and it is directly linked to the submission of a EU project "Individual Fellowship" THERMBAT by our Research Fellow, Dr. Mangini, and two industrial network initiatives with the Advanced Engineering Centre, (i) a workshop on Thermal Applications with an industrial consortium in May 2018 and (ii) a meeting with Jaguar Land Rover aiming at a INNOVATE UK proposal in 2018. A journal publication will be submitted in January 2018 and two publications have been already presented in UK conferences.

2. 2013 I received a research contract for 75k€ by TENARIS DALMINE SPA, a leading supplier of tubes and related services for the world's energy industry and certain other industrial applications with a global revenue of more than 4.3B\$, in order to understand the possibility of using hydrophobic and super-hydrophobic surfaces to decrease the pressure drops with two- and three-phase flows. The two-year project led to the recognition of very high potentials in terms of energy saving and less material corrosion, even if at the moment the coating durability is not yet suitable for the oil applications. Moreover, two Journal papers have been published using the data obtained through this consultancy (I. Bernagozzi, C. Antonini, F. Villa, M. Marengo, Fabricating superhydrophobic aluminum: an optimized one-step wet synthesis using fluoroalkyl silane, *Colloids and Surfaces A: Physicochemical And Engineering Aspects*, 2013, doi: 10.1016/j.colsurfa.2013.05.042; I. Malavasi, I. Bernagozzi, C. Antonini, M. Marengo, Assessing Durability of Superhydrophobic Surfaces, *Surface Innovations* 3 (1), 49-60, 2015, doi: 10.1680/si.14.00001) with more than 50 citations in two years.

3. 2009 UNIHEAT s.r.l. received a contract by INTEL, an American multinational corporation and technology company and the world's second largest and second highest valued semiconductor chip makers, to develop a polymeric pulsating heat pipe for smartphones. The contract started because Dr. Rajiv Mongia, Director at INTEL, noticed my previous invention

(see Patent N. 4 in the list below). We worked for one year to deliver a design of the system, which brought to a second patent on 12 Nov 2009 (<http://www.google.com/patents/US20110067843>). The project is still in my mind as proven by the recent (even if unsuccessful) submission to EPSRC of the project "Flexible Heat Pipe Technology for Distributed Cooling/Heating and Energy Harvesting" with the University of Liverpool. This concept was the first of its kind in the scientific literature and only in 2017 Samsung was able to develop a working prototype in Korea, confirming the feasibility and excellence of this idea.

4.2009 UNIHEAT s.r.l. received a public grant of 620k€ from the Italian Ministry of Industry for a three-year project with WHIRLPOOL (Bando Industria 2015, Project N. EE_00076) about "Development of integrated systems for innovative domestic appliances with reduce energy consumption". WHIRLPOOL is the world's largest home appliance maker (revenue 21B\$). The premature closure of the company in 2011 caused the end of the project, but we have found interesting, novel solutions for the waste heat recovery in the kitchen, which have been later on used in the market with the trademark "Greenkitchen" (<http://mea.whirlpool.com/discover-whirlpool/sustainability/green-kitchen>). Due to confidentiality reasons, no open publication was produced. WHIRLPOOL recognised this work asking me to participate to their "inventor sessions" after the end of the project.

2007 I was able to raise the interest of Aermacchi S.p.A. (now incorporated in LEONARDO S.p.A, one of the largest European company in in aerospace, defence and security with a revenue of 12B\$) in using superhydrophobic coatings for icing mitigation on the plane wings. This was the beginning of a long-term collaboration, terminated only in 2013, with the project "Accordo Quadro" financed by the Lombardy Region. Overall the collaboration with Aermacchi brought more than 300k€ to the University of Bergamo, with 3 post-docs working on this project and two international collaborations (University of Alberta, Edmonton, and McGill University, Montreal, Canada) and a national collaboration with Polytechnic of Milan. The study discovered the chance to reduce up to 80% of the energy consumption used by the heating system for de-icing, opening an original route for a new ice-mitigation technique. Different journal and conference papers have originated from this project, but it is worth mentioning the paper "Understanding the effect of superhydrophobic coatings on energy reduction in anti-icing systems" by C. Antonini, M. Innocenti, T. Horn, M. Marengo, A. Amirfazli, Cold Regions Science and Technology 67(1), 58-67, which was the most cited paper of this Journal for many years. At the moment, it has already received more than 200 citations (Google Scholar).

Patents

1. European Patent: Metodo e Apparato per lo Stampaggio a Caldo di Prodotti in Materiale Termoplastico, Applicant: B.M. Mobili in Plastica S.p.A., inventors: M. Marengo, A. Barcella, Filing: EP 06425432.9, Date: 17.07.2006
2. European Patent: Valve Mechanism for a thermo-hydraulic system, particularly for high pressure, Applicant: Records S.p.A., inventors: M. Marengo, G.E. Cossali, E. Gotti, Filing: EP 07112325.1-1252, Date: 12.07.2007
3. European Patent: Devices and method for enhanced heat transfer, Applicant: Université de Mons-Hainaut, inventors: R. Rioboo, M. Marengo, S. Dall'olio, M. Voué, J. De Coninck, Filing: EP 07113887.9-1266, Date: 06.08.2007
4. European Patent: Microdissipatore polimerico, in particolare per il condizionamento termico di dispositivi meccanici ed elettronici, Applicant: NANTO s.r.l., inventor: M. Marengo, Filing: RM2007A000593, Date: 15.11.2007
5. Italian Patent: Device and methods for drop generation, Applicant: Università di Bergamo, inventors: M. Santini, M. Marengo, G.E. Cossali, Filing: PCT IT2008/000554, Date: 22.08.2008
6. Italian Patent: Micro-cogenerator supplied by wood biomass, Applicant: ICENOVA s.r.l., inventors: M. Marengo, G. Suardi, D. Rossetti, Filing: GE2011U000029, Date: 15.11.2011
7. European Patent: Wick Structure for Two-phase Heat Transfer Apparatus, Applicant: Université Libre de Brussel, University of Bergamo, inventors: C. Buffone, M. Marengo, Filing: EP14157863.3, Date: 05.03.2014

Appointment to national or international bodies

Jun 2018-present Member of the Space Environment Advisory Committee - UK Space Agency. This body provides advice on the overall UK strategy and priorities for involvement in Aurora, planetary exploration and the microgravity ELIPS programme. Recent examples of SEAC input include the reviews of the Robotic Exploration Strategy, Aurora Science Knowledge Transfer AO and approval of lines for PB-HME. It is one of the ten Advisory Committees of the UKSA.

Oct 2016-present UK scientific representative in the International Heat Pipe Conference Committee. This unique, international group is the exclusive committee of 19 highly distinguished scientists in the field of Heat Pipes. The membership is given by merit and looking at the international stand and it is only by invitation. There is one member for each country which has given a substantial contribution in the field. The membership is permanent. Since 1973 the IHPC members met once per year to analyse the research outlook and to organise the International Heat Pipe Conference and Heat Pipe Symposium (to be held every two or three years). The IHPC&HPS is the most important venue in the field of passive two-phase systems in the world.

Dec 2015- May 2018 Member of the Space Environment Working Group - UK Space Agency. This membership is important, since the 9 members of SEWG are advising the UK Space Agency Director about the National Strategies of the Physical and Life Sciences experiments in Space and Human Exploration. The members are coming from important UK Universities (UCL, Cranfield), Laboratories such as NPL, and primary UK space companies.

July 2014-present Member of the ELIPS-4 project SELENE (SELF-rewetting fluids for thermal ENERGY management in space)

Oct 2013-present Scientific Coordinator of the International Pulsating Heat Pipe Scientific Team for the Thermal Platform on the International Space Station, European Space Agency, The Netherlands. This is an important appointment, since this kind of opportunities are happening once in the whole academic life, due to the very long journey of building up the team, obtaining good results and being finally selected for the ISS. From the first idea (2007) to the actual experiment on the ISS, I and my team will spend 14 years in the preparation, the experimental design, the final delivery from the scientific

team to the ESA Engineering Team and the rocket launch to the ISS. The Scientific Team is made up of 11 partners around the world.

2009 - present Scientific Committee member of European Microfluidics Conference

2009- present Scientific Committee member of WSEAS int. Conf. On Heat Transfer, Thermal Engineering and Environment

2008 – 2013 Member of European Low Gravity Research Association

2006 - present Scientific Committee member of ICLASS International Conferences

2005 - present Member of the Board of the European Institute of Liquid Atomization and Spray Systems

2005- present Scientific Committee member of ILASS Europe Conference

In the professional environment, among other commitments, I was the Scientific manager of the Sustainability and Energy action plan, City Council of Bergamo, Bergamo, Italy, 01.04.2010 – 31.10.2011, and the Commissioner of the assignation board of the international Tender for the Construction of Broadening of Orio al Serio Airport, Bergamo.