



MICRO AND NANO FLOWS

CONFERENCE PROGRAM

MNF2K23

**MICRO and NANO FLOWS
CONFERENCE**

Padova 18-20 September 2023

University of Padova
Department of Management and Engineering
@Palazzo della Salute
Via San Francesco 90, 35121 Padova

<https://www.micronanoflows.com/mnf2023>



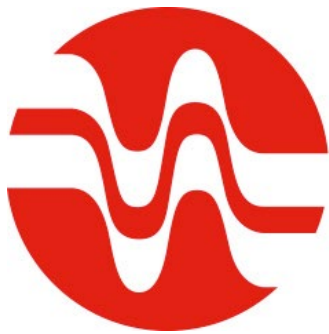
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In collaboration with

DII Department of Industrial Engineering, University of Padova

ICEA Civil, Environmental and Architectural Engineering, University of Padova

PROGRAMME AT A GLANCE

Time (CEST)	Sunday, 17th September 2023
17:00 - 20:30	REGISTRATION
18:00 - 21:00	Welcome Reception
	Monday, 18th September 2023
08:00 - 17:00	Registration desk
09:00 - 09:30	Opening ceremony
09:30 - 10:30	Keynote Speech 1 Chair: Prof. L. Hernández López Speaker: Prof. A. Moita
10:30 - 11:00	Coffee Break
11:30 - 13:00	Parallel Sessions 1
13:00 - 14:00	Lunch
14:00 - 15:00	Keynote Speech 2 Chair: Prof. L. Doretti Speaker: Prof. K. Hooman
15:00 - 15:30	Coffee Break
15:30 - 17:30	Parallel Session 2
	Tuesday, 19th September 2023
08:00 - 17:00	Registration desk
09:00 - 10:00	Keynote Speech 3 Chair: Prof. T. Karayannis. Speaker: Prof. K. Sefiane
10:00 - 11:30	Parallel Session 3
11:30 - 12:00	Coffee Break
12:00 - 13:40	Parallel Session 4
13:30 - 14:30	Lunch
14:30 - 15:30	Keynote Speech 4 Chair: Prof. S. Mancin Speaker: Prof. J. A. Weibel
15:30 - 16:00	Coffee Break
16:00 - 18:00	Parallel Session 5
19:00 - 23:00	Gala Dinner @ MUSME
	Wednesday, 20th September 2023
09:00 - 10:00	Keynote Speech 5 Chair: Dr. F. Coletti Speaker: Prof. S. Balabani
10:00 - 11:30	Parallel Session 6
11:30 - 12:00	Coffee Break
12:00 - 13:30	Parallel Session 7
13:30 - 14:30	Lunch
14:30 - 16:30	Parallel Session 8
16:30 - 17:00	Closing ceremony

The timetable is referred to Italian summer time (CEST)

Conference Chair

Prof. Simone Mancin, DTG, Dept. of Management and Engineering

Co-Chair

Prof. Luca Doretti, ICEA, Civil, Environmental and Architectural Engineering

Prof. Elisa Cimetta, DII Department of Industrial Engineering

Local Organizing Committee

Prof. Claudio Zilio

Prof. Giulia Righetti

Dr. Carolina Mira-Hernández

Eng. Dario Guarda

Eng. Giacomo Favero

Dr. Wagd Ajeeb

Eng. Gianluca Slaviero

Ms. Ernesta Baaba Mensah

Conference Committee

Prof. Tassos Karayiannis (Chair), Brunel University London, UK

Prof. Stavroula Balabani, University College London, UK

Prof. Juergen J. Brandner, Karlsruhe Institute of Technology, Germany

Dr. Francesco Coletti, Brunel University London, UK

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Prof. Gherhardt Ribatski, University of Sao Paulo, Brazil

Prof. Gabriele Angelo Dubini, Politecnico di Milano, Italy

Prof. Koji Takahashi, Kyushu University, Japan

Prof. Bing-Yang Cao Tsinghua University, China

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D. Attinger, Iowa State University, USA

S. Balabani, University College London, UK

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A. Betz, Kansas State University, USA

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S. Jain, Indian Institute of Technology Delhi, India
S. Kandlikar, Rochester Institute of Technology, USA
C. Koenig, Brunel University London, UK
A. Kosar, Sabanci University, Turkey
V. V. Kuznetsov, Kutateladze Institute of Thermophysics, Russia
P. Lawford, University of Sheffield, UK
D. Lockerby, University of Warwick, UK
D. Long, University of Wichita, USA
A. Luke, University of Kassel, Germany
S. Mancin, University of Padova, Italy
R. McGlen, Thermacore, UK
J. Meyer, University of Pretoria, South Africa
D. Mikielwicz, Gdańsk University of Technology, Poland
N. Miljkovic, University of Illinois Urbana-Champaign, USA
M. Miscevic, LAPLACE, Paul Sabatier University, France
G. L. Morini, University of Bologna, Italy
A. A. Mouza, Aristotle University of Thessaloniki, Greece
R. S. Myong, Gyeongsang National University, South Korea
K. Nakabe, Kyoto University, Japan
P. Nithiarasu, University of Wales Swansea, UK
M. S. N. Oliveira, Strathclyde University, UK
B. Palm, Department of Energy Technology, KTH, Sweden
Y. Peles, University of Central Florida, USA
G. Pontrelli, CNR, Italy
A. Pries, Charité Universitätsmedizin Berlin, Germany
A. S. Rattner, Pennsylvania State University, USA
D. A. Reay, Newcastle University, UK
E. V. Rebrov, Queen's University, Belfast, UK
T. Secomb, University of Arizona, USA
K. Sefiane, Edinburgh University, UK
M. F. M. Speetjens, Eindhoven University of Technology, The Netherlands
H. Struchtrup, University of Victoria, Canada
T. Sulchek, Georgia Institute of Technology, USA
B. Sundén, Lund Institute of Technology, Lund University, Sweden
L. Tadrist, University of Provence, IUSTI, France
G. H. Tang, Xi'an Jiaotong University, China
K. Tatsumi, Kyoto University, Japan
D. Valougeorgis, University of Thessaly, Greece
Y. Ventikos, University College London, UK
E. Wang, Massachusetts Institute of Technology, USA
M. Wang, Tsinghua University, China
T. Yamaguchi, Tohoku University, Japan
Y. Yan, University of Nottingham, UK

MNF2023 @ Padova

The University of Padova is delighted to organize the MNF2023, from the 18th to the 20th of September 2023. The conference will be held at the wonderful Palazzo della Salute, located in the downtown area of Padova.

This ancient (XIIIth century) palace will host the entire event from the welcome reception to the fantastic gala dinner which will be organized in the exceptional Vesalio room of the MUSME museum. (<https://www.musme.it/en/>).

Palazzo della Salute is the perfect location from which to start visiting downtown Padova. The historical university building "Bo" of the University of Padova, the main squares: Piazza della Frutta, Piazza delle Erbe and Piazza dei Signori are at walking distance from the conference venue. The most important square, Prato della Valle, the Botanical Garden, the Giardini dell'Arena with the Scrovegni Chapel are just 1 km away from Palazzo della Salute.

Venue address: Palazzo della Salute, Via S. Francesco 90, 35121, Padova

Conference Rooms

- **Elettra:** 150 seats, main conference room, ground floor.
- **Argo:** 70 seats, first floor
- **LIM:** 50 seats, second floor



Social Events

Welcome Reception “Discovering Italian wine and food”

Time: Sunday, 17/Sep/2023: 18:00 – 21:00

Room: Palazzo della Salute, Via S. Francesco 90, 35121 Padova

Gala Dinner

Time: Tuesday, 19/Sep/2023: 19:00 – 23:00

Room: Palazzo della Salute @MUSME, Via S. Francesco 90, 35121 Padova

Conference dress code: Business casual



MONDAY, 18th September, 2023

Opening Ceremony

Time: Monday, 18/Sep/2023: 9:00 – 9:30 · Room: Elettra

Keynote 1 (Chair: L. Hernández López)

Time: Monday, 18/Sep/2023: 09:30 – 10:30 · Room: Elettra

MICRO-TO-MACRO APPROACH FOR (MICRO)COOLING SYSTEMS FOR INDUSTRIAL APPLICATIONS

Prof. A. Moita

Instituto Superior Técnico, University of Lisbon, Portugal

SESSION 1a Nanofluids and Applications Room: Argo

Chair: R. Rhiel

11:30 - 11:50 Y. Ding (University of Birmingham, Birmingham, UK)

RESEARCH ON THERMAL MANAGEMENT OF MICRO-ELECTRONICS BASED ON MICROFLUIDICS

11:50 - 12:10 B. Balakin (Western Norway University of Applied Sciences, Bergen, Norway)

EXPERIMENTAL STUDY OF MAGNETIC CONVECTION IN A LAB-SCALE DIRECT ABSORPTION SOLAR COLLECTOR

12:10 - 12:30 J. P. Vallejo (Centro Univ. de la Defensa en la Escuela Naval Militar, Marín, Spain)

SELECTION OF HYBRID OR MONO NANOFLUIDS FOR ONE-PHASE HEAT EXCHANGERS: COMMON FEATURES IN EXPERIMENTAL RESEARCH

12:30 - 12:50 J.J. Gallardo (Universidad de Cádiz, Cádiz, Spain)

PD-PDMS NANOFLUIDS, A FUTURE ALTERNATIVE TO BE APPLIED IN CONCENTRATION SOLAR PLANTS

12:50 - 13:10 P. Martínez-Merino (University of Cádiz, Cádiz, Spain)

NANOFLUIDS BASED ON TRANSITION METAL DICHALCOGENIDES FOR APPLICATION IN CONCENTRATING SOLAR POWER PLANTS

SESSION 1b MINI-SIMPOSIUM 3 Room: Elettra

Flows on micro- or nano- structured surfaces Chair: S. Cherubini

11:30 - 12:00 Invited Talk S. Cherubini (Politecnico di Bari, Bari, Italy)

THE EFFECT OF SUPERHYDROPHOBIC SURFACES ON TURBULENT TRANSITION

12:00 - 12:20 S.I. Koç (Bilkent University, Ankara, Turkey)

MULTISCALE ANALYSIS AND TEXTURE DESIGN FOR INTERFACES HYDRODYNAMICALLY LUBRICATED BY VARIABLE VISCOSITY AND DENSITY LIQUIDS

12:20 - 12:40 J.C. Robinet (Arts et Métiers, Paris, France)

LINEAR STABILITY OF A CHANNEL FLOW OVER A SUPERHYDROPHOBIC SURFACE

12:40 - 13:00 A. Bottaro (University of Genova, Genova, Italy)

A HOMOGENIZATION-BASED ANALYSIS OF TURBULENT CHANNEL FLOWS OVER TRANSVERSELY ISOTROPIC POROUS BEDS

SESSION 1c Room: LIM

Fluid flow in microchannels and porous media Chair: K. Hooman

11:30 - 11:50 E. Kulkarni (IIT Gandhinagar, Gandhinagar, India)

COMPUTER VISION ENABLED DROPWISE CONDENSATION HEAT TRANSFER MEASUREMENT

11:50 - 12:10 J. Jordan (University of Warwick, Coventry, UK)

SIMULATION OF LOW-SPEED GAS FLOWS AROUND FRACTAL-LIKE MICRO-SCALE PARTICULATE

12:10 - 12:30 O. Manca (Università degli Studi della Campania "Luigi Vanvitelli", Aversa, Italy)

LOCAL THERMAL EQUILIBRIUM ANALYSIS OF THERMALLY DEVELOPING FORCED CONVECTION IN MICRO-CHANNELS WITH POROUS MEDIA AND VISCOUS DISSIPATION

12:30 - 12:50 P. Vocale (University of Parma, Parma, Italy)

RAREFIED FLOWS IN RHOMBIC MICROCHANNELS UNDER H₂ BOUNDARY CONDITIONS

12:50 - 13:10 G. Ren, (Lawrence Berkeley National Laboratory, USA) (ONLINE)

OBSERVATION OF QUANTUM NANOFIBER FLUCTUATIONS ON LIQUID SURFACES USING ELECTRON MICROSCOPY

Keynote 2 (Chair: L. Doretto)

Time: Monday, 18/Sep/2023: 14:00 – 15:00 · Room: Elettra

SLIP FLOW THROUGH MICROCHANNELS OF ARBITRARY CROSS-SECTIONAL SHAPES

Prof. K. Hooman

TU Delft, Delft, The Netherland

SESSION 2a **Nanofluids and Applications** Room: Argo

Chair: B. Balakin

15:30 - 15:50 S. Ferguson Briggs (Imperial College London, London, UK)

STABILITY OF A CORE-ANNULAR FERROFLUID FLOW TO AXISYMMETRIC AND NON-AXISYMMETRIC MODES

15:50 - 16:10 W. Ajeeb (University of Padova, Padova, Italy)

RECENT RESEARCH IN SURFACE COATING FOR ANTI-FOULING

16:10 - 16:30 R. Mulka (Wrocław University of Science and Technology, Wrocław, Poland)

MAGNETIC FIELD INFLUENCE ON THE FERRONANOFLUID LAMINAR PIPE FLOW

16:30 - 16:50 L. Chen (Shanghai Polytechnic University, Shanghai, P.R. China)

POLYVINYL ALCOHOL-BASED NANOFIBERS WITH IMPROVED THERMAL CONDUCTIVITY AND EFFICIENT PHOTOTHERMAL RESPONSE FOR WEARABLE THERMAL MANAGEMENT

16:50 - 17:10 A. Arshad (University of Exeter, Penryn, UK)

NUMERICAL ANALYSIS OF HYBRID NANOFUID-COOLED MICRO FINNED HEAT SINKS FOR ELECTRONICS COOLING

17:10 - 17:30 E. I. Chereches (Technical University "Gheorghe Asachi" of Iasi, Romania) (ONLINE)

ELECTRICAL CONDUCTIVITY EXPERIMENTAL STUDIES ON IONIC LIQUIDS ENHANCED WITH NANOPARTICLES

SESSION 2b MINI SYMPOSIUM Room: Elettra

Experimental techniques in phase change heat transfer Chair: M. Bucci

15:30 - 16:00 Invited Talk M. Bucci (Massachusetts Institute of Technology, Boston, USA)
UNDERSTANDING ACHIEVEMENTS AND LIMITATIONS OF INFRARED THERMOMETRY FOR BOILING HEAT TRANSFER INVESTIGATIONS

16:00 - 16:20 C. Markides (Imperial College London, London, UK)
A SINGLE-DYE MULTISPECTRAL LASER-INDUCED FLUORESCENCE TECHNIQUE FOR THERMOGRAPHIC MEASUREMENTS

16:20 - 16:40 D. Guarda (University of Padova, Vicenza, Italy)
X-RAY COMPUTED TOMOGRAPHY FOR SOLID/LIQUID PHASE CHANGE: CHALLENGES AND OPPORTUNITIES

16:40 - 17:00 V. Petrov (ETH Zurich)
CHARACTERIZING MULTIPHASE FLOWS THROUGH RADIATION-BASED AND FLUID ELECTRICAL PROPERTIES-BASED MEASUREMENT TECHNIQUES

SESSION 2c Mathematical and computational approaches

Room: LIM Chair: S. Poncet

15:30 - 15:50 E. Benilov (University of Limerick, Limerick, Ireland)
NON-ISOTHERMAL EVAPORATION

15:50 - 16:10 H. Kusudo (Osaka University, Osaka, Japan)
THERMAL DISTINCTION IN ADVANCING AND RECEDING CONTACT LINES: INSIGHT FROM MD SIMULATION

16:10 - 16:30 P. Lewin-Jones (University of Warwick, Coventry, UK)
DYNAMIC LEIDENFROST EFFECTS: COMPUTATIONAL MODELLING TO PREDICT TRANSITIONS IN DROP IMPACT

16:30 - 16:50 G.L. Morini (University of Bologna, Bologna, Italy)
NUMERICAL AND EXPERIMENTAL ANALYSIS OF FORCED CONVECTION FOR COMPRESSIBLE MICRO GAS FLOW IN TURBULENT REGIME

16:50 - 17:10 Y. Alhendal (Public Authority for Applied Education and Training (PAAET), Kuwait, Kuwait)
THERMOCAPILLARY BUBBLE MIGRATION IN VERY SMALL-SCALE CONTAINERS IN NORMAL GRAVITY ENVIRONMENT

17:10 - 17:30 J. Albertazzi (Politecnico di Milano, Milano, Italy)
CFD BASED COMPARISON OF STATIC MIXERS IN EMULSIFICATION PROCESSES

TUESDAY, 19th September, 2023

Keynote 3 (Chair: T. Karayiannis)

Time: Tuesday, 19/Sep/2023: 09:00 – 10:00 · Room: Elettra

INVESTIGATION OF SOME FUNDAMENTAL ASPECTS OF POOL AND FLOW BOILING HEAT TRANSFER

Prof. K. Sefiane

Chair of Thermophysical Engineering and Head of Research Institute, The University of Edinburgh, UK

SESSION 3a MINI SYMPOSIUM Room: Argo

Nanofluids: beyond NANOconVEX Chair: Prof. L. Hernández López

10:00 - 10:30 Invited Talk J. Burgos Rodríguez (Universitat Jaume I, Castellón de la Plana, Spain)
PARAFFIN/WATER NANOEMULSIONS WITH REDUCED SUPERCOOLING FOR THERMAL MANAGEMENT SYSTEMS

10:30 - 10:50 S. Poncet (Université de Sherbrooke, Sherbrooke, Canada)
THERMAL CONDUCTIVITY IMPROVEMENT OF ADIPIC ACID AS A PHASE CHANGE MATERIAL BY BOEHMITE-SILICA CORE-SHELL NANOPARTICLES

10:50 - 11:10 A. Korobko (SYNANO, Delft, NL)
COMPARATIVE ANALYSIS OF HEAT TRANSFER ENHANCEMENT IN NUCLEATE POOL BOILING: NANOFLUIDS VS MICRO SURFACE MODIFICATIONS

11:10 - 11:30 S. Hashimoto (Toyota Central R&D Labs., Inc., Nagakute, Japan)
MECHANISM OF THERMAL CONDUCTIVITY ENHANCEMENT IN NANOFLUIDS

SESSION 3b MINI SYMPOSIUM Part 1 of 2 Room: Elettra

Near surface effects in two-phase flows Chair: M. Magnini

10:00 - 10:30 Invited Talk M. Magnini (University of Nottingham, Nottingham, UK)
COUPLED ATOMISTIC-CONTINUUM SIMULATIONS OF SINGLE- AND TWO- PHASE FLOWS

10:30 - 10:50 M. Bucci (MIT, Boston, USA)
DECRYPTING THE MECHANISMS OF WICKING AND EVAPORATION HEAT TRANSFER ON MICRO-PILLARS DURING THE POOL BOILING OF WATER USING HIGH-RESOLUTION INFRARED THERMOMETRY

10:50 - 11:10 C. Tecchio (Université Paris-Saclay, Gif-sur-Yvette, France)
MICROSCALE PHENOMENA IN NUCLEATE BOILING

11:10 - 11:30 S. Khodaparast (University of Leeds, Leeds, UK)
HETEROGENEOUS NUCLEATION AND GROWTH OF DROPLETS ON LIQUID FILMS

SESSION 3c Experimental approaches in single- and two- phase flow

Room: LIM **Chair:** Prof. D. Mikielawicz

10:00 - 10:20 D. Mikielawicz (Gdańsk University of Technology, Gdańsk, Poland)
DIRECT-CONTACT CONDENSATION FROM VAPOUR- INERT GAS MIXTURE IN A SPRAY EJECTOR CONDENSER

10:20 - 10:40 A. Moita (IN+ Instituto Superior Técnico, Lisboa, Portugal)
EVALUATION OF THE USE OF NANOFLUIDS IN A MICROCHANNEL BASED COOLER TO BE INTEGRATED IN A PV PANEL

10:40 - 11:00 E. Santiago Galicia (Saga University, Saga, Japan)
HEAT FLUX ENHANCEMENT BY COPPER MICRO SINTERED FIBER ATTACHED TO THE HEATING SURFACE

11:00 - 11:20 J. Widginton (Brunel University London, London, UK)
FLOW BOILING WITH HFE-7100 IN A SINGLE RECTANGULAR MICROCHANNEL

11:20 - 11:40 G. Favero (University of Padova, Vicenza, Italy)
HYDRAULIC AND HEAT TRANSFER PERFORMANCE OF ADDITIVELY MANUFACTURED COOLING CHANNELS

SESSION 4a Nanofluids and Applications Room: Argo

Chair: O. Manca

12:00 - 12:20 S. Gal (Université de Rennes, Rennes, France)
THERMAL CONDUCTIVITY OF INDUSTRIAL GRAPHENE WATER-BASED NANOFLUIDS

12:20 - 12:40 M. Oliveira (University of Aveiro, Aveiro, Portugal; Intelligent Systems Associate Laboratory (LASI), Aveiro, Portugal) **(ONLINE)**
TAILORING NANOFLUIDS PROPERTIES FOR TRANSFORMERS

12:40 - 13:00 X. Zhao (Shanghai Polytechnic University, Shanghai, China)
PREPARATION AND PROPERTIES OF MXENE/SILICON DIOXIDE/CALCIUM CHLORIDE HEXAHYDRATE COMPOSITE PHASE CHANGE HEAT STORAGE MATERIALS

13:00 - 13:20 I. Carrillo-Berdugo (University of Cadiz, Cadiz, Spain)
ABOUT THE STABILITY OF GRAPHENE OXIDE/POLYDIMETHYLSILOXANE NANOFLUIDS UNDER OPERATION TEMPERATURE IN CONCENTRATING SOLAR POWER PLANTS

SESSION 4b MINI SYMPOSIUM Part 2 of 2 Room: Elettra

Near surface effects in two-phase flows Chair: M. Magnini

12:00 - 12:20 C. Falsetti (Delft University of Technology, Delft, Netherlands)
POOL BOILING OF NOVEC 649 ON CONDITIONED COPPER SURFACES

12:20 - 12:40 A. Garivalis (Università di Pisa, Pisa, Italy)
NEAR SURFACE EFFECTS IN TWO-PHASE FLOWS: POOL BOILING ON MICROSTRUCTURED SURFACES IN NORMAL AND REDUCED GRAVITY

12:40 - 13:00 M. Zupancic (University of Ljubljana, Ljubljana, Slovenia)
IMPORTANCE OF UNDERSTANDING NEAR SURFACE EFFECTS DURING BUBBLE LIFE CYCLE FOR ENHANCED NUCLEATE BOILING HEAT TRANSFER

13:00 - 13:30 **Invited Talk** C. Sorgentone (Sapienza University of Rome, Roma, Italy)
NUMERICAL METHODS FOR DROP INTERACTIONS IN VISCOUS FLOW

SESSION 4c Micro Flow in Biomedical devices Room: LIM

Chair: **S. Mancin**

12:00 - 12:20 G. F. Ergin (Dantec Dynamics, Skovlunde, Denmark)

ESTIMATION OF FLOW DISTURBANCE RADIUS FOR ACARTIA TONSA NAPLIUS USING HIGH SPEED MICRO PARTICLE IMAGE VELOCIMETRY

12:20 - 12:40 D. Mohapatra (Indian Institute of Technology Bombay, Mumbai, India)

EFFECT OF CELL CONCENTRATION AND VISCOSITY ON THE MARGINATION OF WHITE BLOOD CELLS (WBCS) IN A PASSIVE MICROFLUIDIC DEVICE

12:40 - 13:00 R. Mercimek (Sabanci University, Istanbul, Turkey)

A MICROFLUIDIC DEVICE BASED ON BUBBLE GENERATION AS AN ORGAN-ON-CHIP MODEL

13:00 - 13:20 P. Skaltsounis (Institute of Nanoscience and Nanotechnology, NCSR "Demokritos", Aghia Paraskevi, Greece)

A CLOSED-LOOP PCR-PERFORMING MICRODEVICE ON PCB FOR ULTRA-FAST DNA AMPLIFICATION

Keynote 4 (Chair: **S. Mancin**)

Time: Tuesday, 19/Sep/2023: 14:30 – 15:30 · Room: Elettra

TOPOLOGICAL, MULTI-SCALE DESIGN OF THERMAL MANAGEMENT COMPONENTS FOR ADDITIVE MANUFACTURING

Prof. J.A. Weibel

Director of the Cooling Technologies Research Center (CTRC), School of Mechanical Engineering, Purdue University, West Lafayette, IN, USA

SESSION 5a MINI SYMPOSIUM Room: Elettra

Phase field approaches to modeling multiphase micro-flows

Chair: **Prof. R. Mauri**

16:00-16:30 **Invited Talk** R. Mauri (University of Pisa, Pisa, Italy) **(ONLINE)**

PHASE SEPARATION OF A BINARY MIXTURE WITH AN EXTERNAL FORCE FIELD

16:30 - 16:50 C. Marchioli (University of Udine, Udine, Italy)

TURBULENCE-CONTROLLED EVOLUTION OF PARTICLE PATTERNS ON THE INTERFACE OF LARGE DEFORMABLE DROPS

16:50 - 17:10 C. Casciola (Sapienza University of Rome, Roma, Italy) **(ONLINE)**

THE NUCLEATION PROCESS AND ITS COUPLING TO THE MACROSCALE

17:10 - 17:30 R. Nürnberg (Università di Trento, Trento, Italy)

PHASE FIELD SIMULATIONS FOR SOLID-STATE DEWETTING WITH ANISOTROPIC SURFACE ENERGIES

17:30 - 17:50 I. Steinbach (Ruhr-University Bochum, Bochum, Germany)

PHASE-FIELD MODELS IN MATERIALS SCIENCE

SESSION 5b MINI-SYMPOSIUM Room: Argo

Contact line dynamics in heterogeneous environments

Chair: **N. Savva**

16:00 - 16:30 Invited Talk N. Savva (The Cyprus Institute, Nicosia, Cyprus)

ASYMPTOTIC METHODS FOR REDUCED-ORDER MODELLING OF PARTIALLY WETTING DROPLETS

16:30 - 16:50 A. Askounis (University of East Anglia, Norwich, UK)

INCLINATION EFFECT ON THE INTERNAL FLOWS AND EVAPORATION KINETICS OF DROPLETS

16:50 - 17:10 M. Pradas (The Open University, Milton Keynes, UK)

DYNAMICS OF DROPLETS EVAPORATING ON SMOOTH PATTERNS

17:10 - 17:30 P.Y. Vrionis (The Cyprus Institute, Nicosia, Cyprus)

TOWARDS A FLEXIBLE, HIGHLY-SCALABLE, GENERAL-PURPOSE THIN FILM SOLVER

SESSION 5c Heat exchangers and reactors Room: LIM

Chair: **P. Di Marco**

16:00 - 16:20 S. Garimella (Georgia Institute of Technology, Atlanta, United States of America)

THE OTHER SIDE OF MICRO - RATIONAL CONSIDERATIONS FOR IMPLEMENTATION IN MICROSCALE HEAT TRANSFER DEVICES

16:20 - 16:40 G. Censi (Onda S.p.A., Lonigo, IT)

FLOW BOILING OF R32 AND R410A INSIDE BRAZED PLATE HEAT EXCHANGERS WITH DIFFERENT GEOMETRIES

16:40 - 17:00 M. Znaimer (Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany)

NUMERICAL SIMULATION OF THE EFFECT OF MICRO TUBE-IN-TUBE HEAT EXCHANGER GEOMETRY ON HEAT TRANSFER PERFORMANCE

17:00 - 17:20 G. P. Romano (University La Sapienza, Roma, Italy)

ON THE COUPLING BETWEEN HEAT AND MOMENTUM TRANSFER IN A MICRO U BEND

17:20 - 17:40 N. Coombs (University of Warwick, Coventry, UK)

FROM COFFEE RINGS TO UNIFORM DEPOSITS: INSIGHTS FROM 1D MODELLING

17:40 - 18:00 D. Mysore Basavaraja (Imperial College London, London, UK) (ONLINE)

EFFECT OF PRESENCE OF INLET RESTRICTION ON FLUID FLOW AND BOILING INSIDE THE MICROCHANNEL: A NUMERICAL STUDY

18:00 - 18:30 EU Micro-FloTec project meeting Room: Argo

Chair: **Ali Kosar**

WEDNESDAY, 20th September, 2023

Keynote 5 (Chair: F. Coletti)

Time: Wednesday, 20/Sep/2023: 09:00 – 10:00 · Room: Elettra
MICROSCALE FLOWS FOR HEALTHCARE TECHNOLOGIES
Prof. S. Balabani
University College London, London, UK

SESSION 6a Nanofluids and Applications Room: Argo

Chair: A. Moita

10:00 - 10:20 R. Riehl (Institut für Luftund Kältetechnik Dresden, Dresden, Germany)
GALINSTAN-WATER SUSPENSION AS WORKING FLUID FOR OSCILLATING HEAT PIPES

10:20 - 10:40 K. AlMuhaysh (Imperial College London, London, UK)
EFFECTS OF PH LEVEL AND VOLUME CONCENTRATION ON AL₂O₃ - H₂O NANOFLUID STABILITY

10:40 - 11:00 E. B. Elcioglu (Eskişehir Technical University, Eskişehir, Turkey)
COMPARATIVE SIMULATIONS ON NANOFLUIDS: A CASE STUDY BASED ON NATURAL CIRCULATION MINI-LOOPS

11:00 - 11:20 P. Kosinski (University of Bergen, Bergen, Norway) (ONLINE)
EXPLORING THE USE OF STATIONARY NANOFLUIDS IN A DIRECT ABSORPTION SOLAR COLLECTOR SYSTEM

SESSION 6b Boiling and condensation in micro systems

Room: Elettra Chair: S. Bortolin

10:00 - 10:20 G. Righetti (University of Padova, Vicenza, Italy)
CONDENSATION HEAT TRANSFER OF PROPYLENE INSIDE A COMPACT HORIZONTAL MICROFIN TUBE

10:20 - 10:40 M. Pysz (Gdańsk University of Technology, Gdansk, Poland)
PRESSURE DROP AND HEAT TRANSFER OF R1233ZD(E) AT MODERATE AND HIGH REDUCED PRESSURES IN VERTICAL TUBES

10:40 - 11:00 Y. Kita (King's College London, London, UK)
PREDICTION OF QUENCH: APPLICABILITY OF DROPLET MODEL TO SPRAY COOLING

11:00 - 11:20 H.-Y. Kim (Seoul National University, Seoul, Republic of Korea)
CAPILLARY RISE IN OPEN MICROCHANNELS WITH EVAPORATION

11:20 - 11:40 L. Guo (Qilu University of Technology, Jinan, China) (ONLINE)
THE EFFECT OF SURFACE ROUGHNESS UPON NUCLEATE BOILING WITH DIFFERENT SURFACE WETTABILITIES: INSIGHTS FROM MOLECULAR DYNAMICS

SESSION 6c Measuring, sensing and control Room: LIM

Chair: **C. Mira-Hernández**

10:00 - 10:20 C. Mira-Hernández (University of Padova, Vicenza, Italy)
ELECTRICAL IMPEDANCE SOLID FRACTION SENSOR FOR A PANEL FILLED WITH NANOCOMPOSITE PHASE CHANGE MATERIAL

10:20 - 10:40 A. Kovalev (Kutateladze Institute of Thermophysics, Novosibirsk, Russian Federation)
AN INFLUENCE OF SINUSOIDAL PULSATIONS OF THE DISPERSED PHASE FLOW RATE ON THE LIQUID-LIQUID FLOWS IN A MICROCHANNEL WITH T-JUNCTION

10:40 - 11:00 Y-F Chang (Western Norway University of Applied Sciences, Bergen, Norway)
MEASURING MULTIPHASE FLOW IN MINIATURE DEVICES USING PEPT

11:00 - 11:20 H. Deswal (IIT Bombay, Mumbai, India)
MICROFLUIDIC FLOW SENSOR BASED ON CHRONOAMPEROMETRIC MEASUREMENTS IN A MICROCHANNEL

11:20 - 11:40 H. Ishida (Kyushu University, Fukuoka, Japan)
DEVELOPMENT OF AFM MEASUREMENT METHOD FOR SLIP LENGTH CONSIDERING THE EFFECT OF ELECTRIC DOUBLE LAYER FORCE

SESSION 7a MINI-SYMPOSIUM Room: Argo

Biological flows at the microscale: physics and application

Chairs: **S. Balabani, C. Koenig and E. Kaliviotis**

12:00 - 12:30 Invited talk E. Kaliviotis (Cyprus University of Technology, Limassol, Cyprus)
BLOOD FLOWS ON PASSIVE MICROFLUIDICS - ROLE OF BLOOD PHYSIOLOGY AND BIOMECHANICAL PROPERTIES

12:30 - 12:50 A. Stathoulopoulos (University College London, London, UK)
PARTITIONING OF DENSE RBC SUSPENSIONS IN MICROFLUIDIC BIFURCATIONS

12:50 - 13:10 C. Koenig (Brunel University London, Uxbridge, UK)
MICROHEMODYNAMIC IMPACT OF TESTOSTERONE THERAPY IN LATE-ONSET HYPOGONADISM; HYPOTHESIS TESTING USING MICROFLUIDICS

13:10 - 13:30 S. Hallam (University of Birmingham, Birmingham, UK)
A MICROFLUIDIC IN VITRO MODEL OF MICROVASCULAR COLLAPSE

SESSION 7b Mathematical and computational approaches

Room: Elettra Chair: M. Magnini

12:00 - 12:20 J. Liu (University of Warwick, Coventry, UK)
PREDICTING RARE RUPTURE OF NANOSCALE THIN FILMS

12:20 - 12:40 S. Bortolin (University of Padova, Padova, Italy)
STUDY OF THE VAPOR-LIQUID INTERFACE DURING ANNULAR FLOW IN A MINICHANNEL: OPENFOAM NUMERICAL SIMULATIONS VS OPTICAL MEASUREMENTS

12:40 - 13:00 A. Demou (The Cyprus Institute, Nicosia, Cyprus)
AI FOR CAPILLARY-DRIVEN DROPLET DYNAMICS

13:00 - 13:20 B. Chakraborty (University of Brighton, Brighton, UK)
TOWARDS A MULTI-SCALE MODELLING APPROACH FOR BOILING HEAT TRANSFER: EXPLORING THE COMPUTATIONAL COST OF A DIFFUSE INTERFACE METHOD APPROACHING MICRO-SCALES

13:20 - 13:40 H. Oga (Osaka University, Osaka, JP)
**MEASUREMENT OF SOLID-LIQUID FRICTION COEFFICIENT BY USING MOLECULAR DYNAMICS:
ROLE OF TIMESCALE**

SESSION 7c Micro and nano flow fundamentals Room: LIM

Chair: **C. Markides**

12:00 - 12:20 A. Gerrow (University of Birmingham, Birmingham, UK)
**GHOST PARTICLE VELOCIMETRY - AN EASY AND ROBUST TECHNIQUE FOR FLOW
VISUALIZATION IN MICROFLUIDICS**

12:20 - 12:40 J. Moran (George Mason University, Manassas, United States of America)
EFFECT OF SELF-PROPELLED MICROPARTICLES ON HEAT TRANSFER IN LIQUIDS

12:40 - 13:00 H. Teshima (Kyushu University, Fukuoka, Japan)
THERMALLY INDUCED NUCLEATION, GROWTH, AND DISSOLUTION OF SURFACE NANOBUBBLES

13:00 - 13:20 A. El-Rifai (University of Edinburgh, Edinburgh, UK)
**UNRAVELLING THE TWO REGIMES OF INTERFACIAL CONDUCTANCE AT A SOLID/LIQUID
INTERFACE**

13:20 - 13:40 S. Liu (Beihang University, Beijing, China)
A ONE-STEP APPROACH TO GENERATE TRIPLE-LAYERED DROPLET

Session 8a Multi-scale phase change processes Room: Elettra

Chair: **M. Bucci**

14:30 - 14:50 M. Magnini (University of Nottingham, Nottingham, UK)
NUMERICAL SIMULATION OF FLOW BOILING IN A MICRO-PIN FIN EVAPORATOR

14:50 - 15:10 T. Traverso (Imperial College London, London, UK)
**MODELLING TWO-PHASE HEAT TRANSFER IN SMALL-TO-MICRO TUBES USING DATA-DRIVEN
DIMENSIONAL ANALYSIS**

15:10 - 15:30 D. Guarda (University of Padova, Vicenza, Italy)
CFD ANALYSIS OF A PCM-BASED TMS FOR A LI-ION POUCH CELL

15:30 - 15:50 Z. Hu (Shanghai Jiao Tong University, Shanghai, China)
BUBBLE IN ORDERED POROUS ELECTRODES FOR ALKALINE WATER ELECTROLYSIS

15:50 - 16:10 T. Karayiannis (Brunel University London, London UK)
CRITICAL HEAT FLUX CONDITIONS IN FLOW BOILING IN MICROCHANNELS

15:10 - 16:30 W. Alruwaele (University of Hafar Albatin, Hafar Albatin, Saudi Arabia) (ONLINE)
**NUMERICAL STUDY OF MIXED CONVECTION FLOW IN A LID-DRIVEN ENCLOSURE FILLED WATER-
ALUMINIUM OXIDE NANOFLUID**

Session 8b Micro and nano flow fundamentals Room: Argo

Chair: **G. Righetti**

14:30 - 14:50 U. Yadav (Indian Institute of Technology Bombay, Mumbai, India)
**ANALYTICAL ANALYSIS OF ISOTHERMAL PRESSURE-DRIVEN POISEUILLE FLOW USING THE
EXTEND O'BURNETT EQUATIONS**

14:50 - 15:10 S. Perumanath (University of Warwick, Coventry, UK)
CHERRY-PICKING NANOPARTICLES FROM SURFACES USING WATER DROPLETS

15:10 - 15:30 M. Li (Beihang University, Beijing, China)
THE INFLUENCE OF CAVITY SHAPES ON FLOW AND HEAT TRANSFER CHARACTERISTICS OF CURVED MICROCHANNELS

15:30 - 15:50 M. Zurita-Gotor (Universidad Loyola Andalucia, Sevilla, Spain)
MICROSTRUCTURE AND COLLECTIVE DYNAMICS OF EXTERNALLY DRIVEN DEFORMABLE PARTICLE SUSPENSIONS IN STRONG CONFINEMENT CONDITIONS

15:50 - 16:10 S. Datta (University of Edinburgh, Edinburgh, UK)
DISLODGING NANOPARTICLES USING SURFACE ACOUSTIC WAVES

SESSION 8c Fluid Flow in Micro and Nano systems Room: LIM

Chair: F. Coletti

14:30 - 14:50 S. Anand (IIT Ropar, Rupnagar, India)
EFFECT OF CORNER ROUNDEDNESS IN BIOMIMETIC MICROPILLARS FOR THIN-FILM EVAPORATION

14:50 - 15:10 P. Skaltsounis (Institute of Nanoscience and Nanotechnology, NCSR "Demokritos", Aghia Paraskevi, Greece)
CAVITY-BASED INERTIAL MICROFLUIDIC DEVICE FOR THE SEPARATION OF RARE CELLS WITH DIFFERENT SIZE: A COMPUTATIONAL STUDY

15:10 - 15:30 C. Pal (Thermofluidics Research Lab IIT Ropar, Rupnagar, India)
METHODOLOGY FOR MEASUREMENT OF FORCE DURING COALESCENCE INDUCED DROPLET JUMPING ON SUPERHYDROPHOBIC SURFACE

15:30 - 15:50 S. Tomasi Masoni (Università di Pisa, Pisa, Italy)
MIXING AND REACTION EFFICIENCY IN T-, X-, AND ARROW-SHAPED MICROREACTORS

15:50 - 16:10 A. Abdelghany (Tokyo University of Science, Tokyo, Japan)
HIGH-FREQUENCY AC ELECTROKINETIC TRAPPING OF NANOPARTICLES IN A MICROCHANNEL

Closing ceremony

Time: Wednesday, 20/Sep/2023: 16:30 – 17:30 · Room: Elettra

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Final program

and

Book of the Extended Abstract

