

MICRO FLOW AND INTERFACIAL PHENOMENA

2023



Technical Program

The Executive Committee reserves the right to amend the program if necessary.

Monday, June 19

08:15

Welcome

Conference Chairs

Kyoo-Chul Kenneth Park, *Northwestern University, USA*

Yoonjin Won, *University of California, Irvine, USA*

Nenad Miljkovic, *University of Illinois, Urbana-Champaign, USA*

Jonathan Boreyko, *Virginia Tech, Blacksburg, USA*

Plenary Presentation 1

Chair: Nenad Miljkovic, University of Illinois, Urbana-Champaign, USA

08:30 NATURE-INSPIRED SURFACES OF THINGS (SOT)

Zuankai Wang

Hong Kong Polytechnic University, HONG KONG

09:30 Coffee Break

Keynote Presentation 1

Chair: Nenad Miljkovic, University of Illinois, Urbana-Champaign, USA

09:50 INCONVENIENT TRUTHS: THE CHALLENGES IN REALIZING MICROSCALE ADVANTAGES

Srinivas Garimella

Georgia Institute of Technology, USA

Technical Session 1

Multi-Phase

Chair: Justin Weibel, Purdue University, USA

10:20 SCALABLE SYNTHETIC TREES FOR RENEWABLE WATER HARVESTING

Ndidi L. Eyegheleme¹, Weiwei Shi¹, Viverjita Umashankar¹,

Danielle N. Miller¹, Lance H. De Koninck¹, Julia L. O'Brien¹,

Arun K. Kota², and Jonathan B. Boreyko¹

¹*Virginia Tech, USA* and ²*North Carolina State University, USA*

10:40 SURFACTANT MASS TRANSFER TO CONTROL THE BOILING CRISIS

Mario R. Mata and H. J. Cho

University of Nevada, Las Vegas, USA

- 11:00 SCIENTIFIC MACHINE LEARNING FOR EXTRAPOLATING TEMPERATURE INFORMATION**
 Arthur Feeney¹, Youngjoon Suh¹, Jihoon Kim^{1,2}, Akash Dhruv^{1,3}, Shakeel Hassan¹, Jaiyoung Ryu¹, Aparna Chandarmowlishwaran¹, and Yoonjin Won¹
¹University of California, Irvine, USA, ²Korea University, KOREA (ROK), and ³Argonne National Laboratory, USA
- 11:20 MICRO RAMAN THERMOMETRY FOR SPATIALLY RESOLVED HEAT TRANSPORT NEAR THIN FILM EVAPORATION**
 Vijay Kumar, Harrison Szeto, Xichen Liang, and Yangying Zhu
 University of California, Santa Barbara, USA
- 11:50 Lunch**

Keynote Presentation 2

Chair: Kyoo-Chul Kenneth Park, Northwestern University, USA

- 13:00 RESEARCH OPPORTUNITIES IN PHASE CHANGE HEAT TRANSFER FOR HIGH-POWERED ELECTRONIC SYSTEMS**
 Damena Agonafer
 University of Maryland, USA

Technical Session 2 Single-Phase

Chair: Jeremy Cho, University of Nevada, Las Vegas, USA

- 13:30 EXPLORING WATER CAPTURE EFFICIENCY ON HYDROPHILIC AND HYDROPHOBIC SLIPPERY COVALENTLY-ATTACHED LIQUID SURFACES**
 Anthony J. Katselas¹, Isaac Gresham¹, Andrew Nelson², and Chiara Neto¹
¹University of Sydney, AUSTRALIA and
²Australia's Nuclear Science and Technology Organization, AUSTRALIA
- 13:50 DIRECTIONAL SELF-PROPELLED TRANSPORT OF COALESCED DROPLETS ON A SUPERHYDROPHILIC WIRE**
 Leyun Feng¹, Youhua Jiang¹, Wonjae Choi², Neelesh A. Patankar¹, and Kyoo-Chul Park¹
¹Northwestern University, USA and ²Fairleigh Dickinson University, USA

14:10 TEMPERATURE-DEPENDENT COMPONENTS OF POLAR LIQUID SURFACE TENSION

Jiahui Guo, Ruisong Wang, and Dion S. Antao
Texas A&M University, USA

14:30 CAPTURING DROPLETS WITH OIL-IMPREGNATED SURFACES

Venkata Yashasvi Lolla, Ashley Gracie Cornish,
and Jonathan B. Boreyko
Virginia Tech, USA

14:50 Coffee Break

Keynote Presentation 3

Chair: Kyoo-Chul Kenneth Park, Northwestern University, USA

**15:10 STRUCTURAL COMPLEXITY OF LIPID NANOPARTICLES:
IMPLICATIONS FOR EFFICIENT DELIVERY OF RNA TO CELLS**

Cecilia Leal
University of Illinois, Urbana-Champaign, USA

**Technical Session 3
Single and Two-Phase**

Chair: Hyun Jin Kim, University of Alabama, USA

**15:30 EMBEDDED COOLING TECHNOLOGY FOR COMPACT
ELECTRONIC SYSTEMS**

Jarred Wilhite^{1,2} and Chirag Kharangate²
¹*NASA Glenn Research Center, USA and*
²*Case Western Reserve University, USA*

**15:50 NEED FOR SPEED: DIGITALIZING BOILING DYNAMICS USING
DEEP LEARNING-ASSISTED OPTICAL FLOW**

Youngjoon Suh, Shakeel Hassan, Aparna Chandramowlishwaran,
and Yoonjin Won
University of California, Irvine, USA

**16:10 IMAGING-DRIVEN MODELING OF CONDENSATE DROPLET
DYNAMICS ON METALLIC TUBES**

Pouya Kabirzadeh¹, Siavash Khodakarami¹, Yoonjin Won²,
and Nenad Miljkovic¹
¹*University of Illinois, Urbana-Champaign, USA and*
²*University of California, Irvine, USA*

Poster Session 1

16:30 – 18:00

Applications - Bio-Chemical and Bio-Medical Applications

- P1.01 3D UV-CURABLE MOLECULARLY IMPRINTED POLYMER (MIP) MEMBRANE FOR MICROFLUIDIC BIOSENSING APPLICATIONS**
Ayobami E. Oseyemi¹, Alireza Zabihhesari¹, Garrett Kraft²,
and Pouya Rezaei¹
¹York University, CANADA and ²Sixth Wave Innovations Inc., CANADA
- P1.02 INVESTIGATION AND CHARACTERIZATION OF AN 3D-PRINTED OPTICAL MEASUREMENT FLOW CELL FOR PROCESS PROGRESS MONITORING OF LIQUID-LIQUID SYSTEMS**
Inga Burke, Christina Assies, and Norbert Kockmann
TU Dortmund University, GERMANY
- P1.03 SPERM RACETRACK: DESIGN, FABRICATION, AND TESTING OF A NOVEL MICROFLUIDIC DEVICE TO PASSIVELY SORT SPERM INTO GROUPS BASED ON MOTILITY**
Utpal Saha
University of Utah, USA

Applications - Energy Applications

- P1.04 BUILDING INCLUSIVE AND JUST PATHWAYS TO A CLEAN ENERGY ECONOMY THROUGH YOUTH EDUCATION OF CLEAN ENERGY**
Mark Mueller¹, Yakera Ward¹, Sally G. Shettles¹, Hyunjung Ji¹,
Laurel Holmes², Daniel Tait², Amelia Salazar³, and Hyun Jin Kim¹
¹University of Alabama, USA, ²Energy Alabama, USA, and ³Sam Houston State University, USA
- P1.05 SEMI-EMPIRICAL FRAMEWORK TO PREDICT THE SUPERCOOLING OF PHASE CHANGE MATERIALS IN ARIBTRARY CONDITIONS**
Youngsup Song, Drew Lilley, Divya Chalise, Sumanjeet Kaur,
and Ravi S. Prasher
University of California, Berkeley, USA

Applications - Water and Environment Applications cations

- P1.06 EFFECT OF SURFACE CHEMISTRY AND RELATIVE HUMIDITY ON WATER COLLECTION**
Majid T. Linjawi¹, Muhammad Jahidul Hoque¹,
Natwara Kamophiwong^{1,2}, Sedtanan Pornprasertsin^{1,2},
and Nenad Miljkovic¹
*¹University of Illinois, Urbana-Champaign, USA and
²King Mongkut's Institute of Technology Ladkrabang, THAILAND*
- P1.07 MECHANISTIC INSIGHT INTO MICRO-STRUCTURAL EVOLUTION OF POROUS HYGROSCOPIC HYDROGELS VIA MICRO-CT**
Joseph P. Mooney^{1,2}, Carlos D. Díaz Marin¹, Jeff Punch²,
Vanessa Egan², and Gang Chen¹
*¹Massachusetts Institute of Technology, USA and
²University of Limerick, IRELAND*
- P1.08 ENGINEERED SURFACES FOR HIGH-SALINITY THERMAL DESALINATION**
Akanksha K. Menon and Walter P. Parker
Georgia Institute of Technology, USA

Emerging/Innovations - Emerging and Innovative Technologies

- P1.09 FLUORESCENT DETECTION OF BACTERIA USING CELL IMPRINTED POLYMER (CIP) THIN FILMS INTEGRATED INTO MICROFLUIDICS**
Islam Mahmoud¹, Ali Doostmohammadi¹, Garrett Kraft²,
and Pouya Rezai¹
¹York University, CANADA and ²Sixth Wave Innovations Inc., CANADA
- P1.10 LASER-ABLATED BACKWARD TRANSFER TO CREATE PRESCRIBED WETTABILITY PATTERNS ON GLASS**
Anish Pal, Arani Mukhopadhyay, and Constantine M. Megaridis
University of Illinois, Chicago, USA
- P1.11 UNDERSTANDING THE EFFECTS OF EXTREME THERMAL FIELD ON THE MICROSTRUCTURE OF ADDITIVE MANUFACTURED MATERIALS**
Hyunggon Park, Kaitlyn M. Mullin, Vijay Kumar, Olivia A. Wander,
Raphaële J. Clément, Tresa M. Pollock, and Yangying Zhu
University of California, Santa Barbara, USA

- P1.12 3D INVESTIGATION OF DROPLET GENERATION AND COALESCENCE IN CAPILLARY LIQUID-LIQUID FLOWS USING μ -COMPUTED TOMOGRAPHY**
Bastian Oldach, Carolin Müller, Philipp Wintermeyer,
and Norbert Kockmann
TU Dortmund University, GERMANY
- P1.13 C6F14 LINE CHILLDOWN IN HORIZONTAL COPPER TUBES**
Jiayi Zhang¹, Chi Wang¹, Vivek Garimella¹, Miad Yazdani²,
Abbas A Alahyari², David Chao³, and Nenad Miljkovic¹
¹*University of Illinois, Urbana-Champaign, USA,*
²*Raytheon Technologies Research Center, USA, and*
³*NASA Glenn Research Center, USA*
- P1.14 CONFINEMENT AND GEOMETRY EFFECTS ON THE HYDRODYNAMIC SELF-ASSEMBLY OF WATER-IN-OIL DROPS**
Wenyang Jing and Hee-Sun Han
University of Illinois, Urbana-Champaign, USA
- P1.15 CENTRIFUGAL ASSEMBLY OF HELICAL FIBERS AND ROPES**
Shankar P. Kharal¹ and Martin F. Haase²
¹*Auburn University, USA and* ²*Utrecht University, NETHERLANDS*
- P1.16 ENHANCED INTERNAL CONDENSATION OF R1233ZD(E) ON MICRO- AND NANOSTRUCTURED COPPER AND ALUMINUM SURFACES**
Bakhshish Preet Singh¹, Johannes Köhler Mendizábal¹,
Kazi Fazle Rabbi¹, Nithin Vinod Upot¹, Chen-Ming Yang²,
Kashif Nawaz², Anthony Jacobi¹, and Nenad Miljkovic¹
¹*University of Illinois, Urbana-Champaign, USA and*
²*Oak Ridge National Laboratory, USA*
- P1.17 NEUROMORPHIC VISUALIZATION OF LIQUID-VAPOR INTERFACES**
Sang Hyeon Chang, Youngjoon Suh, Nhi Quach, Jooho Park,
and Yoonjin Won
University of California, Irvine, USA
- P1.18 NUMERICAL SIMULATION OF MICROTUBE FLOW BOILING WITH WETTABILITY**
Ranjith Kumar¹, Chia-Wei Lin¹, and Yu-Chen Lin²
¹*National Taipei University of Technology, TAIWAN and*
²*National Chung Cheng University, TAIWAN*

P1.19 PROBABILISTIC MACHINE LEARNING MODELS FOR POOL BOILING ON ENHANCED SURFACES

Sadaf Mehdi, Mohammad Borumand, and Gisuk Hwang
Wichita State University, USA

Fundamentals - Single-Phase Flows

P1.20 DEVELOPMENT OF HIGH-PERFORMANCE HEAT TRANSFER CHANNELS BY ADDITIVE MANUFACTURING

Hakan Uysal^{1,2}, Ahmet A. Gunay³, and Sezer Ozerinc²
¹Aselsan Inc., TURKEY, ²Middle East Technical University, TURKEY, and ³Bilkent University, TURKEY

Fundamentals - Surfaces and Interfaces

P1.21 CONDENSATION ON MICROSTRUCTURED STRIPS WITH DIFFERENT WETTING PROPERTIES

Daniel Fotachov and Egbert Oesterschulze
Technical University of Kaiserslautern, GERMANY

P1.22 DROPLET ORTHOGONAL IMPACT ON NON-UNIFORM WETTABILITY SURFACES

Shashwata Moitra¹, Mohamed Elsharkawy¹, Antonio Russo², Sreya Sarkar¹, Ranjan Ganguly³, Pietro Asinari², and Constantine M. Megaridis¹
¹University of Illinois, Chicago, USA, ²Politecnico di Torino, ITALY, and ³Jadavpur University, INDIA

P1.23 HIGHLY ACCELERATED LIFETIME TESTING OF HYDROPHOBIC COATINGS USING HARSH CONDITION DROPWISE CONDENSATION

Wentao Yang¹, Taran S. Thukral¹, Muhammad J. Hoque¹, Kazi F. Rabbi¹, Longnan Li¹, and Nenad Miljkovic^{1,2}
¹University of Illinois, Urbana-Champaign, USA and ²Kyushu University, JAPAN

P1.24 SLIPPERY SUPERHYDROPHOBIC SURFACES FOR CASSIE-BAXTER TO WENZEL TRANSITION PREVENTION

Jubair A. Shamim¹, Yukinari Takahashi¹, Wei-Lun Hsu¹, Sivasankaran Harish¹, Zhizhong Cheng¹, Muhammad J. Hoque², Junho Choi³, Nenad Miljkovic², and Hirofumi Daiguji¹
¹University of Tokyo, JAPAN, ²University of Illinois, USA, and ³Tokyo City University, JAPAN

P1.25 ULTRA-RESILIENT MULTI-LAYER FLUORINATED DIAMOND LIKE CARBON HYDROPHOBIC FILMS PROMOTE THE STABLE DROPWISE CONDENSATION OF STEAM

Muhammad Jahidul Hoque¹, Longnan Li¹, Jingcheng Ma¹, Hyeongyun Cha¹, Soumyadip Sett¹, Xiao Yan¹, Kazi Fazle Rabbi¹, Jin Yao Ho¹, Siavash Khodakarami¹, Jason Suwala², and Nenad Miljkovic¹

¹University of Illinois, Urbana-Champaign, USA and

²Oerlikon Balzers Coating, USA

18:00 End of Day

Tuesday, June 20

Plenary Presentation 2

Chair: Yoonjin Won, University of California, Irvine, USA

08:00 A UBIQUITOUS PLATFORM FOR SUSTAINABILITY ACROSS INDUSTRY

Kripa Varanasi

Massachusetts Institute of Technology, USA

09:00 Coffee Break

Keynote Presentation 4

Chair: Yoonjin Won, University of California, Irvine, USA

09:20 SURFACE WETTABILITY ENGINEERING: FROM MICROFLUIDICS TO ENERGY APPLICATIONS

Constantine Megaridis

University of Illinois, Chicago, USA

Technical Session 4

Emerging Technologies and Innovations

Chair: Chirag Kharangate, Case Western Reserve University, USA

- 09:50 ADDITIVELY MANUFACTURED 3D BELLOWS MICROFLUIDIC PUMP**
Robert A. Stavins and William P. King
University of Illinois, Urbana-Champaign, USA
- 10:10 MICROCHANNEL FORMATION USING POROUS COPPER ELECTRODEPOSITION FOR MICROFLUIDIC COOLING OF ELECTRONICS**
Sujan Dewanjee¹, Gaurav Singhal¹, Shailesh Joshi², Danny Lohan², Paul Braun¹, and Nenad Miljkovic¹
¹*University of Illinois, Urbana-Champaign, USA and*
²*Toyota Research Institute of North America, USA*
- 10:30 SHAPE OPTIMIZATION AND ADDITIVE MANUFACTURING OF PIN FIN ARRAY IN A COOLING CHANNEL**
Nam P. Nguyen¹, Ji Yeon Kim¹, Elham Maghsoudi², Scott N. Roberts², and Beomjin Kwon¹
¹*Arizona State University, USA and*
²*NASA Jet Propulsion Laboratory, USA*
- 10:50 A REVIEW ON ENHANCING PERFORMANCE OF HYDROGEN ELECTROLYZERS VIA OPTIMIZED BUBBLE DYNAMICS**
Tejaswi Soori, Mark Hamalian, Karey Maynor, Awan Bhati, and Vaibhav Bahadur
University of Texas, Austin, USA
- 11:10 Lunch**

Keynote Presentation 5

Chair: Jonathan Boreyko, Virginia Tech, USA

- 12:30 COLLECTIVE BEHAVIOR OF CROWDED DROPS IN MICROFLUIDIC SYSTEMS**
Sindy Tang
Stanford University, USA

Technical Session 5 Surface and Interfaces

Chair: Beomjin Kwon, Arizona State University, USA

- 12:50 FROST-RESISTANT SURFACES WITH PERIODIC MACRO-TEXTURED LATTICE**
Asma Ul Hosna Meem, Christian Machado, Benjamin Stern,
and Kyoo-Chul Kenneth Park
Northwestern University, USA
- 13:10 PINNING-INDUCED MICRODROPLET SELF-PROPULSION**
Hyeongyun Cha¹, Moon-Kyung Kim², Ho Chan Chang²,
Lenan Zhang¹, and Nenad Miljkovic²
¹*Massachusetts Institute of Technology, USA and*
²*University of Illinois, Urbana-Champaign, USA*
- 13:30 REDUCING AND REVERSING AIRBORNE CONTAMINATION WITH NANOTEXTURE-ENABLED ULTRA-CLEAN STORAGE**
Zhen Liu, Te Faye Yap, Anoop Rajappan, Rachel A. Shveda,
Rawand M. Rasheed, and Daniel J. Preston
Rice University, USA
- 13:50 INVERSE ENGINEERING OF SPATIALLY-VARYING MICROPILLARS FOR HETEROGENEOUS HEAT MAP**
Chuanning Zhao, Jonathan T. Eweis-LaBolle,
Ramin Bostanabad, and Yoonjin Won
University of California, Irvine, USA
- 14:10 Coffee Break**

Keynote Presentation 6

Chair: Jonathan Boreyko, Virginia Tech, USA

- 14:30 PROBING AND TUNING THERMOFLUIDS TRANSPORT USING LIGHT**
Yangying Zhu
University of California, Santa Barbara, USA

Technical Session 6 Biochemical/Biomedical

Chair: Yangying Zhu, University of California, Santa Barbara, USA

- 15:00 TIME-RESOLVED CHARACTERIZATION OF AN ENZYMATIC REACTION IN DROPLETS THROUGH A SERIALIZED MICROFLUIDIC FLUORIMETER**
Matthew DiSalvo¹, Eric W. Esch², Megan A. Catterton³, Paul N. Patrone¹, and Gregory A. Cooksey¹
¹National Institute of Standards and Technology, USA, ²University of Maryland, USA, and ³Johns Hopkins University, USA
- 15:20 AUTOMATED AFFINITY-BASED PURIFICATION PROCESS FOR MICROFLUIDIC DNA-ENCODED CHEMISTRY**
Robin Dinter, Katharina Götte, Leon Justen, and Andreas Brunschweiler
TU Dortmund University, GERMANY
- 15:40 MINIATURIZED SILICON PLATFORM FOR LOCALIZED SAMPLING AND ATTOMOLE LEVEL NEURO-CHEMISTRY MEASUREMENT**
Weihua Shi, Keyin Li, Alex Armstrong, Yu Ding, Chris K. Brenden, Hrishikesh Iyer, Sara Bell, Jonathan V. Sweedler, and Yurii Vlasov
University of Illinois, Urbana-Champaign, USA

Poster Session 2

16:00 – 17:30

Applications - Bio-Chemical and Bio-Medical Applications

- P2.26 AUTOMATED TWO-PHASE REACTION SYSTEM FOR MICROFLUIDIC DNA-ENCODED CHEMISTRY**
Robin Dinter, Suzanne Willems, Mahdi Hachem, Michael Mittelstädt, Yana Streltsova, Andreas Brunschweiler, and Norbert Kockmann
TU Dortmund University, GERMANY
- P2.27 HOURGLASS SHAPED PARTICLE FOCUSING DUE TO THE SECOND NORMAL STRESS DIFFERENCE IN VISCOELASTIC MICROFLUIDICS**
Jian Zhou and Ian Papautsky
University of Illinois, Chicago, USA
- P2.28 SELF-MIXING AT LIQUID-LIQUID INTERFACE**
Faisal Maqbool¹, Guan-Yu Lu¹, Wei-Hsin Tien², Ching-Wen Lo¹, and Ya-Yu Chiang¹
¹National Chung Hsing University, TAIWAN and ²National Taiwan University of Science and Technology, TAIWAN

Applications - Energy Applications

P2.29 CAPILLARY TRANSPORT OF WATER IN A MICROGROOVE WITH A WIDTH GRADIENT

Shumpei Okamoto¹, Yaerim Lee¹, Alperen A. Günay²,
and Junichiro Shiomi¹

¹University of Tokyo, JAPAN and ²Bilkent University, TURKEY

Applications - Water and Environment Applications

P2.30 A LOW-COST DC ELECTRO-MICROFLUIDIC SENSOR FOR EXTRACTION AND DETECTION OF MICROPLASTICS IN SALTY WATER

Haider Warraich, Alireza Zabihhesari, Shooka Karimpur,
and Pouya Rezai

York University, CANADA

P2.31 THERMOFLUID SCIENCES FOR ELEMENTARY SCHOOL STUDENTS VIA FLOW VISUALIZATION USING SMARTPHONES AND TABLETS

Frances Buntain, Colby Putman, Jale Ercan Dursun, Celestia Morgan,
Jee K. Suh, and Hyun Jin Kim

University of Alabama, USA

P2.32 SIGNIFICANT ENHANCEMENT OF SORPTION KINETICS VIA BOILING ASSISTED CHANNEL TEMPLATING IN ATMOSPHERIC WATER HARVESTING DEVICES FOR EXTREME ARID CONDITIONS

Bachir El Fil, Xiangyu Li, Carlos D. Diaz, Cody L. Jacobucci,
and Lenan Zhang

Massachusetts Institute of Technology, USA

Emerging/Innovations - Emerging and Innovative Technologies

P2.33 CAPILLARY ADHESION ENABLES ENHANCED PARTICLE CAPTURE IN ADDITIVELY MANUFACTURED MULTIPLEXED INERTIAL COALESCENCE FILTERS

Rawand M. Rasheed, John M. Lentz, Damian Gonzalez,
Irfan M. Zobayed, Anoop Rajappan, and Daniel J. Preston

Rice University, USA

P2.34 INTERFACIAL FLOW PHENOMENA OF MICROSCALE ELECTROSTATIC OIL SEPARATION

Vivek S. Garimella, Tarek Gebrael, Alex D. Patel, Donghyeon Yoo,
Muhammad J. Hoque, Sugun T. Inampudi, Stefan Elbel,
and Nenad Miljkovic

University of Illinois, Urbana-Champaign, USA

P2.35 VISUALIZATION OF WATER TRANSPORT IN CONFINED 4-WALLED GRAPHENE NANOCANNELS VIA FLUORESCENT QUANTOM DOTS

Nhi V. Quach¹, Peiwen Ma¹, Jinkyoun Yoo², Sungwoo Nam¹, and Yoonjin Won¹

¹University of California, Irvine, USA and

²Los Alamos National Laboratory, USA

P2.36 WOOD TEMPLATE-SUPPORTED PHASE CHANGE MATERIAL COMPOSITES FOR DURABLE AND FORM-STABLE THERMAL ENERGY STORAGE IN BUILDINGS

Shuang Cui^{1,2}

¹University of Texas, Dallas, USA and

²National Renewable Energy Laboratory, USA

Fundamentals - Multi-Phase Flow

P2.37 3D PRINTING AND DIELECTROPHORESIS FOR DROPLET CONTROL: TOWARDS A NEW ERA OF 3D PRINTED DROPLET MICROFLUIDICS

Utpal Saha

University of Utah, USA

P2.38 EFFECT OF DROPLET RETENTION ON FLOW DYNAMICS OF EMULSIONS IN POROUS MEDIA

Abenezzer Abere and Patricia Weisensee

Washington University, St. Louis, USA

P2.39 DURABILITY OF STRUCTURED SURFACES FOR REFRIGERANT-SIDE HEAT TRANSFER ENHANCEMENT IN METAL TUBES

Tarandeep Singh Thukral¹, Nithin Vinod Upot¹,

Mohammed Jalal Inanlu¹, Ghassan Arissi¹, Advay Sudarshan¹, and Nenad Miljkovic^{1,2}

¹University of Illinois, Urbana-Champaign, USA and

²Kyushu University, JAPAN

P2.40 EFFECT OF TUBE CURVATURE ON LIQUID NITROGEN FLOW-BOILING HEAT TRANSFER

Joshua Feldman¹, Wolfgang Stautner², Nithin V. Upot¹,

Spencer Robieson¹, Arjun Shah¹, Kiruba S. Haran¹, and Nenad Miljkovic¹

¹University of Illinois, Urbana-Champaign, USA and

²General Electric Company Research, USA

P2.41 INVESTIGATING THE MECHANISMS DRIVING FLOW BOILING HEAT TRANSFER ENHANCEMENT ON SCALABLE MICRO- AND NANOSTRUCTURED METAL SURFACES

Mohammad Jalal Inanlu¹, and Nenad Miljkovic^{1,2}

¹*University of Illinois, Urbana-Champaign, USA and*

²*Kyushu University, JAPAN*

P2.42 NUMERICAL MODELLING OF CONTACT ANGLE ON THERMOSYPHON

Chia-Wei Lin, Ranjith Kumar, and Hua-Yi Hsu

National Taipei University of Technology, TAIWAN

P2.43 POOL BOILING OF LOW GLOBAL WARMING POTENTIAL REFRIGERANTS ON PLAIN AND SURFACE STRUCTURED TUBES

Wuchen Fu, Yiyang Chen, and Nenad Miljkovic

University of Illinois, Urbana-Champaign, USA

P2.44 SMART IMAGE SENSOR FOR LIQUID-LIQUID SYSTEMS

Inga Burke, Ahmed S. Youssef, Karthik Mannil, Katharina Schmidt, and Norbert Kockmann

TU Dortmund University, GERMANY

Fundamentals - Surfaces and Interfaces

P2.45 3D INVESTIGATION OF THE WALL EFFECT IMPOSED TO POROUS BEDS BY PLANE AND CYLINDRICAL BOUNDARIES

Bastian Oldach, Mathias Schmitz, Maximilian Tiefes,

Konrad E.R. Boettcher, and Norbert Kockmann

TU Dortmund University, GERMANY

P2.46 DIRECT MEASUREMENT OF SOLID-LIQUID INTERFACIAL ENERGY USING A MENISCUS

Jingcheng Ma^{1,2}, Ishrat Zarin¹, and Nenad Miljkovic¹

¹*University of Illinois, Urbana-Champaign, USA and*

²*University of Chicago, USA*

P2.47 FRICTIONAL RESISTANCE TO SPREADING/RECEDING OF DROPLETS

Sreya Sarkar, Arani Mukhopadhyay, Anish Pal, and Constantine Megaridis

University of Illinois, Chicago, USA

P2.48 PASSIVELY-ENABLED SURFACE ENERGY DIFFERENTIAL ON A CHEMICALLY AND TOPOGRAPHICALLY HOMOGENOUS SURFACE

James Carpenter, Kevin Zhao, Hyunchul Kim, Arend van der Zande, and Nenad Miljkovic

University of Illinois, Urbana-Champaign, USA

P2.49 THE EFFECTS OF SURFACE CHEMISTRY, PRESSURE, TEMPERATURE, AND GAS COMPOSITION ON THE MAXIMUM SPEED OF WETTING

Chance Brewer, Lucas Pitts, Lucca Assuncao, Edward Woodruff, and Shawn A. Putnam
University of Central Florida, USA

P2.50 UNIDIRECTIONAL FREEZING OF POLYMER SOLUTION DROPLETS

Shankar Kharal and Jean-Francois Louf
Auburn University, USA

17:30 End of Day

18:00 Award Ceremony / MicroFIP 2023 Announcement and Banquet
-20:00

Wednesday, June 21

Plenary Presentation 3

Chair: Jonathan Boreyko, Virginia Tech, USA

08:30 THERMOWETTING INSTABILITY OF VAPOR AND LIQUID FILMS DURING PHASE CHANGE HEAT TRANSFER

Neelesh Patankar
Northwestern University, USA

09:30 Coffee Break

Technical Session 7 Surface and Interfaces

Chair: Daniel Preston, Rice University, USA

09:50 TUNABLE ROBUST HYBRID SURFACES WITH PASSIVE ANTI-FOULING BEHAVIOR

Christian Machado¹, Tom Y. Zhao¹, Suman Bhandari¹, Leyun Feng¹, Kornel F. Ehmann¹, Jian Cao¹, Neelesh A. Patankar¹, Meltem Urgun-Demirtas², Harold Kung¹, and Kyoo-Chul Kenneth Park¹
¹Northwestern University, USA and ²Argonne National Laboratory, USA

10:10 PHASE-SEPARATION CONDENSATION ON MICROCHANNELS-ELEVATED MICROMEMBRANE

Li Shan, Zongqi Guo, Deepak Monga, Dylan Boylan, and Xianming Dai
University of Texas, Dallas, USA

10:30 UNDERSTANDING THE ROLE OF SURFACE CHEMISTRY IN CONDENSATION ON CHEMICAL PATTERNS

Dylan R. Boylan, Deepak Monga, Li Shan, Zongqi Guo,
and Xianming Dai
University of Texas, Dallas, USA

10:50 MICRO-SCALE THIN-FILM EVAPORATION DYNAMICS ON A SUPERHYDROPHILIC TEXTURED SUBSTRATE

Arani Mukhopadhyay¹, Anish Pal¹, Graham Kaufman², Craig Zuhlke²,
George Gogos², and Constantine M. Megaridis¹
¹*University of Illinois, Chicago, USA and*
²*University of Nebraska, Lincoln, USA*

11:10 Lunch

Technical Session 8

Energy and Water Applications

Chair: Yangying Zhu, University of California, Santa Barbara, USA

12:20 THERMALLY DRIVEN PHASE TRANSITIONS FOR ENERGY APPLICATIONS

Akanksha K. Menon, Erik Barbosa, and Jordan D. Kocher
Georgia Institute of Technology, USA

12:40 STRUCTURE-PROPERTY RELATIONSHIPS OF HYDROGEL-SALT COMPOSITES FOR EXTREME SORPTION PERFORMANCE

Carlos D. Díaz-Marín, Gustav Graeber, Yang Zhong, Leon C. Gaugler,
Miles A. Roper, Kezia E. Hector, Xinyue Liu, Bachir El Fil,
and Gang Chen
Massachusetts Institute of Technology, USA

13:00 CONTINUOUS PASSIVE SOLAR DESALINATION VIA THIN-FILM CONDENSATION IN MICROPOROUS MEMBRANE

Patrick I. Babb¹, Farzad S. Ahmadi^{1,2}, Forrest Brent¹, Ruby Gans¹,
Mabel Aceves Lopez¹, Jiuxu Song¹, Qixian Wang¹, Brandon Zou¹,
Xiangying Zuo¹, Amanda Strom¹, Jaya M. Nolt¹, Tyler Susko¹,
Kirk Fields¹, and Yangying Zhu¹
¹*University of California, Santa Barbara, USA and*
²*McDaniel College, USA*

13:20 CONVECTION-LIMITED WATER TRANSPORT THROUGH HYDROGELS FOR ATMOSPHERIC WATER CAPTURE

Yiwei Gao¹, Santiago Ricoy¹, Addison Cobb¹, Ryan Phung¹,
Areianna Lewis¹, Aaron Sahn¹, Nathan Ortiz², Sameer Rao²,
and H. Jeremy Cho¹

¹University of Nevada, Las Vegas, USA and ²University of Utah, USA

13:40 Government Panel Discussion

Sumanta Acharya

National Science Foundation (NSF), USA

Peter de Bock

Advanced Research Projects Agency-Energy (ARPA-E), USA

Yogendra Joshi

Defense Advanced Research Projects Agency (DARPA), USA

Mark Spector

Office of Naval Research (ONR), USA

14:50 Closing Remarks / Conference Adjourns