CONTENTS

ICNMM2011-58021 ................................................................. 1
Lattice Boltzmann Investigations on Drag Reduction in Microchannel Flow With
Bionic Surfaces  
Jing Cui, Weizhong Li, and Yang Liu

ICNMM2011-58089 ................................................................. 11
Electrohydrodynamic and Shear-Stress Interfacial Instability of Two Streaming Viscous
Liquid Inside a Microchannel for Normal Electric Fields  
Haiwang Li, Teck Neng Wong, and Nam-Trung Nguyen

ICNMM2011-58118 ................................................................. 19
Viscous Dissipation and Variable Properties Effect on Two Dimensional Conjugate
Heat Transfer of Nanofluids in Microchannels  
A. Ramiar and A. A. Ranjbar

ICNMM2011-58119 ................................................................. 29
Tunable Morphology of Monodisperse Polymer Particles With Microfluidics  
Baoguo Wang, David A. Weitz, and Ho Cheung Shum

ICNMM2011-58120 ................................................................. 35
Exergy Analysis of Nanofluids in Microchannel  
Pawan K. Singh, Nouman Zahoor Ahmed, Sarit K. Das, and Youssef Shatilla

ICNMM2011-58222 ................................................................. 45
Magnetic Nanoparticle Based Nanofluid Actuation With Dynamic Magnetic Fields  
Alp Bilgin, Evrim Kurtoglu, Hadi Cagdas Erk, Muhsincan Sesen, Havva Funda Yagci Acar,
and Ali Kosar

ICNMM2011-58249 ................................................................. 53
Hydrodynamic Focused Passive Separation Under Continuous Flow  
Jad Kanbar and David Clague

MICRO-HEAT EXCHANGERS
ICNMM2011-58020 ................................................................. 63
Geometrical Dimension Optimizations for “V”-Shaped Micro-Grooves for Enhancing
Heat Transfer Purpose in Micro-Channels  
Yang Liu, Weizhong Li, and Jing Cui

ICNMM2011-58051 ................................................................. 71
Influence of Deposits by Crystallization Fouling in Microchannels on the Heat Transfer
Performance of Micro Heat Exchangers  
Jürgen Bucko, Walther Benzinger, Roland Dittmeyer, Moriz Mayer, Wolfgang Augustin,
and Stephan Scholl
<table>
<thead>
<tr>
<th>ICNMM2011-58177</th>
<th>Influence of Rarefaction Effects on the Nusselt Number During Regenerative Heat Exchange</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICNMM2011-58179</td>
<td>Numerical Study of Microchannel Heat Sinks With Non-Uniform Heat Flux Conditions</td>
</tr>
<tr>
<td>ICNMM2011-58210</td>
<td>Entropy Generation in Microchannels With Two-Phase Flow</td>
</tr>
<tr>
<td>ICNMM2011-58257</td>
<td>Experimental Study on Air Cooling via a Multiport Mesochannel Cross-Flow Heat Exchanger</td>
</tr>
</tbody>
</table>

**MICROMIXERS**

| ICNMM2011-58004 | Experimental Investigation of a Scaled-Up Passive Curved Channel Micromixer With Slanted Grooves |
| ICNMM2011-58013 | Micromixer: Alternative Passive Solution With Injection Amplificator System                |
| ICNMM2011-58059 | Simulation of Two Designs of Micro-Mixers With Enhanced Advection Mechanisms               |
| ICNMM2011-58065 | A Novel Passive Micromixer Based on Asymmetric Split-and-Recombine With Fan-Shaped Cavity |
| ICNMM2011-58078 | Fabrication of Microchannels by Stereolithography for Optical Use                          |
| ICNMM2011-58128 | Numerical Study of Micromixers for Stopped Flow                                           |
| ICNMM2011-58160 | Experimental Investigation of Inertial Mixing in Droplets                                 |

---
Fast Mixing in Microchannels by Input Modulation: A Numerical and Experimental Study
  C. S. Iorio, C. Perfetti, and F. Dubois

Active Micromixers Based on Polarization Instability and Acoustic Streaming
  Nam-Trung Nguyen, Trung-Dung Luong, and Oliver Jäniq

Simulations of Flow and Mass Transfer in a Passive Micromixer
  Hamid Farangis Zadeh and Arash Marahel

Mixing Characteristics of a Two-Phase Flow (Gas-Liquid) in a Microchannel Mixer
  Tarek Abdel-Salam and Srikanth Pidugu

Development and Analytical Treatment of 3D Passive Mixromixer for Enhanced Microfluidics Reactions
  Suresh Gosavi, Aniket Tekawade, Dhananjay Bodas, Sukrathu Barve, Laurent Robert, and Chantal Khan-Malek

Analytical Optimization of Heat Exchanger Dimensions of a Joule-Thomson Microcooler
  Adhika Widyaparaga, Masashi Kuwamoto, Eiji Noda, Naoya Sakoda, Masamichi Kohno, and Yasuyuki Takata

Molecular Dynamics Simulation of Water Transporting Through Nanotube Driven by Concentration Difference
  Ning Zhang, Weizhong Li, and Jing Cui

The Study of Rarefied Gas Flow Through Microfilters With Different Openings Using MONIR-DSMC
  Masoud Darbandi, Abolfazl Karchani, and Gerry Schneider

Molecular Dynamics Simulation of Nano Channel as Nanopumps
  Masoud Darbandi, Hossein Reza Abbasi, Rasoul Khaledi-Alidusti, Moslem Sabouri, and Gerry E. Schneider

The Effects of Geometry and Knudsen Numbers on Micro- and Nanochannel Flows
  J. H. Kim, A. J. H. Frijns, S. V. Nedea, and A. A. van Steenhoven
<table>
<thead>
<tr>
<th>ICNMM2011-58067</th>
<th>Effects of Surfactant on the Motion of a Large Bubble in a Capillary Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gokalp Gursel, Ufuk Olgac, and Metin Muradoglu</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58106</th>
<th>CFD Analysis on Taylor Slug Flow Through 3D Vertical Mini-Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemant B. Mehta, Mehul P. Bambhana, Jyotirmay Banerjee, and Jay B. Desai</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58195</th>
<th>Hydrodynamics and Heat Transfer in a Liquid Film Flowing Over a Spinning Disk With Specific Wall Topography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tatiana Gambaryan-Roisman and Peter Stephan</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58252</th>
<th>Effect of Channel Geometry on Two-Phase Flow Structure in Fuel Cell Gas Channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cody D. Rath and Satish G. Kandlikar</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58033</th>
<th>Computational Investigation of Microdroplet Formation in a Crossflow Membrane Emulsification Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manabendra Pathak</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58070</th>
<th>On the Validity of Two-Dimensional Heat Transfer Simulation of Moving Droplets Between Parallel Plates</th>
</tr>
</thead>
<tbody>
<tr>
<td>V. Talimi, Y. S. Muzychka, and S. Kocabiyik</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58071</th>
<th>Thermal Interaction of Laser Beam With Particulate Flow in Mini-Channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohammad Zabetian, Mohammed Said Saidi, Mohammad Hassan Saidi, and Mohammad Behshad Shafii</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>James A. Howard and Patrick A. Walsh</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58081</th>
<th>Effects of Channel Length on Gas-Liquid Two-Phase Flow Phenomena in a Microchannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hideo Ide, Ryuji Kimura, and Masahiro Kawaji</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ICNMM2011-58083</th>
<th>Flow Characteristics of Adiabatic Gas-Liquid Two-Phase Flow in a Horizontal Flat Rectangular Microchannel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hideo Ide, Kentaro Satonaka, and Tohru Fukano</td>
<td></td>
</tr>
</tbody>
</table>
ICNMM2011-58085  .............................................................................................................. 393  
Modeling of Interfacial Component for Two-Phase Frictional Pressure Gradient in Microchannels and Minichannels  
M. M. Awad and Y. S. Muzychka

ICNMM2011-58212  .............................................................................................................. 405  
Magnetically Mediated Formation of Ferrofluid Emulsion  
Nam-Trung Nguyen, Say-Hwa Tan, and Jing Liu

ICNMM2011-58244  .............................................................................................................. 413  
Lattice Boltzmann Simulation of Suspended Solid Particles in Microchannels  
Zahra Hashemi, Omid Abouali, and Reza Kamali

ICNMM2011-58258  .............................................................................................................. 419  
Numerical Study on Bubble Formation in Microchannel Flow-Focusing Device Using the VOF Method  
Shobeir Aliasghar Zadeh and Rolf Raddepiel

ICNMM2011-58265  .............................................................................................................. 431  
Adiabatic Air-Water Two-Phase Flow in Circular Microchannels  
Aritra Sur and Dong Liu

ICNMM2011-58267  .............................................................................................................. 445  
Numerical Simulation of Wetting Performance of Water Droplet on Patterned Surfaces of Hierarchical Micro Structures  
W. N. Zhou and Y. Y. Yan

ICNMM2011-58270  .............................................................................................................. 451  
Co-Current Air-Water Two Phase Flow Patterns in Horizontal and Vertical Circular Tube Under Various Inlet Conditions  
S. Zeguai, S. Chikh, O. Rahli, and L. Tadrist

KEYNOTE PAPERS  
ICNMM2011-58277  .............................................................................................................. 459  
Recent Developments in Vapor Compression Technologies for Small Scale Refrigeration Applications  
Jader R. Barbosa, Jr.

ICNMM2011-58278  .............................................................................................................. 473  
An Electrokinetic Micro Mixer for Lab-on-Chip Applications: Modeling, Validation, and Optimization  
Hendryk Bockelmann, Vincent Heuveline, Peter Ehrhard, and Dominik P. J. Barz

ICNMM2011-58279  .............................................................................................................. 481  
Stability and Enhancement of Boiling in Microchannels  
A. E. Bergles
Flow Boiling in a Microtube: Flow Pattern and Heat Transfer
Giuseppe Zummo

Flow and Heat Transfer Characteristics of Liquid Nitrogen in Mini/Micro-Channels
P. Zhang

MEASUREMENT AND INSTRUMENTATION AT MICROSCALE

3-Omega-T-Type Method for Measuring the Thermophysical Properties of Micro/Nanowires
Xing Zhang and Jianli Wang

New MEMS-Based Micro-Coriolis Density Measurement Technology
Christof Huber and Mike R. Touzin

Optical Measurement of the Relative Motion of a Spherical Particle in a Micro-Capillary
Debjyoti Sen, David S. Nobes, Subir Bhattacharjee, and Sushanta K. Mitra

A Novel Scanning Molecular Tagging Velocimetry Technique for Two Dimensional Microfluidic Applications
Farhan Ahmad and David S. Nobes

PLENARY TRACK

Electrokinetic Microfluidics and Biomedical Lab-on-a-Chip Devices
Dongqing Li

Microchannel Heat Transfer: Early History, Commercial Applications, and Emerging Opportunities
David B. Tuckerman, R. Fabian W. Pease, Zihong Guo, Jenny E. Hu, Ozgur Yildirim, Geoff Deane, and Lowell Wood

Author Index