VOLUME 7

FLUIDS ENGINEERING

presented at

ASME 2019 INTERNATIONAL MECHANICAL ENGINEERING CONGRESS AND EXPOSITION

NOVEMBER 11-14, 2019
SALT LAKE CITY, UTAH, USA

sponsored by

ASME
FLUIDS ENGINEERING

12TH FORUM ON FLUID MEASUREMENTS AND INSTRUMENTATION

IMECE2019-10461 ........................................................................................................ V007T08A001
Convergence of PIV Measurements at the Inlet of a Turbocharger Compressor
Deb Banerjee, Ahmet Selamet, Rick Dehner, Keith Miazgowicz

IMECE2019-10652 ........................................................................................................ V007T08A002
Magnetic-Based Particle Tracking in a Dense Granular Shear Flow
Xingtian Tao, Huixuan Wu

IMECE2019-11039 ........................................................................................................ V007T08A003
Experimental Characterization of a Novel Piezoelectric Fan
Jingru Benner, Eric Shilyuk, Jarrod Coletta, Mehdi Mortazavi, Anthony D. Santamaria, Shun Su, Tony Nguyen

IMECE2019-11649 ........................................................................................................ V007T08A004
Development of 3-D Printed Optically Clear Rigid Anatomical Vessels for Particle Image Velocimetry Analysis in Cardiovascular Flow
Nicholas Stanley, Ashley Ciero, William Timms, Rodward L. Hewlin Jr.

15TH FORUM ON RECENT DEVELOPMENTS IN MULTIPHASE FLOW

IMECE2019-10876 ........................................................................................................ V007T08A005
Simulation of Viscous Fingering in Microchannels With Hybrid-Patterned Surface Using Lattice Boltzmann Method
Margulan Tursynkhan, Bagdagul Dauyeshova, Desmond Adair, Ernesto Monaco, Luis Rojas-Solorzano

IMECE2019-10921 ........................................................................................................ V007T08A006
Lattice Boltzmann Modelling of Contact Angle and Hysteresis Under Homogeneous and Heterogeneous Dynamic Wetting Regime
Nursultan Zhumatay, Bagdagul Dauyeshova, Desmond Adair, Ernesto Monaco, Luis Rojas-Solorzano

IMECE2019-12236 ........................................................................................................ V007T08A007
Direct Pressure Measurement and Flow Visualization of Cavitation in a Converging-Diverging Nozzle
Benjamin Gallman, B. Terry Beck, Mohammad H. Hosni
17TH SYMPOSIUM ON ELECTRIC, MAGNETIC, AND THERMAL
PHENOMENA IN MICRO AND NANO-SCALE SYSTEMS

IMECE2019-10483.................................................................V007T08A008
Comparing Electrowettability and Surfactants As Tools for Wettability Enhancement
on a Hydrophobic Surface
Manojkumar Lokanathan, Himanshu Sharma, Mostafa Shabaka, Vaibhav Bahadur, Kishore
Mohanty

IMECE2019-10790.................................................................V007T08A009
A Novel Ferrofluid-Based Valve-Less Pump
Trevor Michelson, Joshua Rudnick, Joshua Baxter, Reza Rashidi

19TH INTERNATIONAL SYMPOSIUM ON MEASUREMENT AND
MODELING OF ENVIRONMENTAL FLOWS

IMECE2019-10311........................................................................V007T08A010
Analytical and Numerical Modeling of Soil Cutting and Transportation During Auger
Drilling Operation
Mohamed A. A. Abdeldayem, Mohamed H. Mabrouk, Mootaz Abo-Elnor

IMECE2019-11764........................................................................V007T08A011
Detailed Three-Dimensional Velocity Field Measurements of a Complex Internal
Cooling Flow Within a Gas Turbine Vane
Michael J. Benson, David Helmer, Bret P. Van Poppel, Benjamin Duhaime, David Bindon,
Mattias Cooper, Robert Woodings, Christopher J. Elkins

IMECE2019-11995........................................................................V007T08A012
Wind Energy Harnessing System for Low and High Wind Speeds
Majid Rashidi, Jaikrishnan R. Kadambi, Renjie Ke

25TH SYMPOSIUM ON FUNDAMENTAL ISSUES AND PERSPECTIVES IN
FLUID MECHANICS

IMECE2019-10016........................................................................V007T08A013
Finite Element Method for Fluid Flow in 3D Domains Containing Moving Interfaces
A. K. M. Monayem H. Mazumder

IMECE2019-10079........................................................................V007T08A014
Investigating the Flowfield Physics Within Compressible Turbulent Boundary Layers
Frederick Ferguson, Dehua Feng, Yang Gao

IMECE2019-10351........................................................................V007T08A015
Design of a High Speed Internal Gear Pump to Increase the Power Density of Electro
Hydraulic Actuators (EHA) in Mobile Applications
Tobias Pietrzyk, David Roth, Georg Jacobs, Schmitz Katharina
Assessment of Eddy-Viscosity Turbulence Models on Flow in a Wheelhouse
Kaloki L. Nabutola, Sandra K. S. Boetcher

Drag Reduction of Ground Vehicles Using Air-Injected Wheel Deflectors
Kaloki L. Nabutola, Sandra K. S. Boetcher

Application of a Hybrid RANS-LES Method to Free Shear Layers
P. Catalano

2D and 3D Stability of Cavity Flows in High Mach Number Regimes
Parshwanath S. Doshi, Rajesh Ranjan, Datta V. Gaitonde

Fully Transient Model of a Hydraulic Accumulator
Filipp Kratschun, Andris Rambaks, Katharina Schmitz

Influence of Corner Radius on Flow Past Square Cylinder With Tandem Arrangements
Sajjad Miran, Furqan Ahmad, Waseem Arif, Kamran Nazir

A DNS Study on Roughness-Induced Transition in Oscillating Pipe Flow by Employing Overset Methodology
Ali A. Abdulrasool, Yongho Lee

Analysis of a Stokes Flow Past a Cube (Friction and Diffusion Coefficients for Brownian Dynamics Simulations)
Kazuya Okada, Akira Satoh

Natural Convection in Yield Stress Fluids From a Confined Horizontal Plate
S. A. Patel, A. H. Raja, R. P. Chhabra

Effect of Impingement Surface Velocity on Slot Jet and Slot Jet Reattachment Nozzles' Flow Field
M. Farzad, J. Yagoobi
Secondary Flows in Eccentric-Annular Tubes
Mario Letelier, Dennis A. Siginer, Diego L. Almendra, Juan Stockle

A New Approach to the Numerical Modeling of the Viscoelastic Rayleigh-Benard Convection
Xin Zheng, M'hamed Boutaous, Shihe Xin, Dennis A. Siginer, Fouad Hagani, Ronnie Knikker

Implications of Non-Bingham Rheology
Leonard F. Pease, Judith A. Bamberger, Michael J. Minette

Prediction of Transversal Flow in Non-Circular Tubes With a Higher Order Constitutive Equation
Mario F. Letelier, Dennis A. Siginer, Paola Merino, Juan S. Stockle

Numerical CFD / FSI Study of Teflon and Dacron for Use in the Femoral Artery Graft Procedure
Sukwinder Sandhu, Kevin R. Anderson

CFD Study of Particle and Compressible Flow Interaction for a Twin Wire Arc Spraying System
Raymond Faull, Nicole Wagner, Kevin Anderson

Verification of CFD Prediction Accuracy of Flow Turbulence Induced Vibration Loadings Around a Pipe Bend
Xidong Hu, Shaoxiang Qian, Kota Matsuura, Shunji Kataoka

Hydrodynamic Coefficients for an Extraterrestrial Submarine
Hani AlHasni, Ona Thornquist, Shafquat Islam, Peter Garrison, Iskender Sahin

Experimental Investigation of Water Emulsion Fuel Stability
Gurjap Singh, Elio Lopes, Nicholas Hentges, Albert Ratner

Effect of Phase Change Material on Temperature in a Room Fitted With a Windcatcher
Peter Abdo, B. Phuoc Huynh, Ali Braytee, Rahil Taghipour
<table>
<thead>
<tr>
<th>Conference ID</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>V007T08A036</td>
<td>An Assessment of the Validity of Quasi-Steady Analysis of Pressure Relief Valves</td>
<td>Christopher Doyle, William Dempster, Steven Taggart</td>
</tr>
<tr>
<td>V007T08A037</td>
<td>Design of a Turbopiston Pump Guided by Computational Analysis</td>
<td>Ting Wang, Patrick W. Rousset</td>
</tr>
<tr>
<td>V007T08A038</td>
<td>The Effect of the Embedded Spacers on the Performance of Direct Contact Membrane Distillation System Operating With Different Inlet Feed Temperature</td>
<td>Anas M. Alwatban, Ahmed M. Alshwarekh, Umar F. Alqsaif, Robert Krysko, Abdullah A. Alghafis, Alparslan Oztekin</td>
</tr>
<tr>
<td>V007T08A039</td>
<td>The Effect of Mixing Promotors on Sweeping Gas Membrane Distillation System Performance</td>
<td>Umar F. Alqsaif, Anas M. Alwatban, Ahmed M. Alshwarekh, Robert Krysko, Abdullah A. Alghafis, Alparslan Oztekin</td>
</tr>
<tr>
<td>V007T08A040</td>
<td>Micro-Hydrokinetic Turbine Operating in the Vicinity of a Free Surface: Multiphase Large Eddy Simulations</td>
<td>Bashar Attiya, Muhannad Altimemy, Cosan Daskiran, I-Han Liu, Alparslan Oztekin</td>
</tr>
<tr>
<td>V007T08A041</td>
<td>Gas Fuel Variability Using Buffer Volume in Aeroderivative Gas Turbines</td>
<td>Ravinder Yerram, Balakrishnan Ponnuraj</td>
</tr>
<tr>
<td>V007T08A042</td>
<td>Adaptation of an Existing Impeller Design to Large Bore Requirements: Aerodynamic Considerations</td>
<td>Vishal Jariwala, Louis Larosiliere</td>
</tr>
<tr>
<td>V007T08A043</td>
<td>Enhancing the Performance of Centrifugal Pump by Adding Cylindrical Disks at Inlet Suction</td>
<td>Linda Sadik, Badih Jawad, Munther Y. Hermez, Liping Liu</td>
</tr>
<tr>
<td>V007T08A044</td>
<td>Effects of Spraying Parameters on the Paint Transfer Efficiency in Air Spray</td>
<td>Simin Zhang, Guolei Wang, Xingjie Liu, Xiaotong Hua, Zhiliang Chen, Ken Chen</td>
</tr>
<tr>
<td>V007T08A045</td>
<td>Inclined Injection of Under Expanded Supersonic Gas Jet</td>
<td>A. M. Sheridan, S. Srivastava, M. Henneke, M. S. Raza, K. A. Sallam</td>
</tr>
<tr>
<td>Paper ID</td>
<td>Title</td>
<td>Authors</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>V007T08A046</td>
<td>Improving the Performance of Centrifugal Pumps in Serial and Parallel Configurations Using Digital Twins</td>
<td>Andres L. Carrillo Pena, Jeffer S. Eugenio Barroso, Alberto A. Martinez Vesga, Sebastian Roa Prada, Victor A. Ardila Acuna</td>
</tr>
<tr>
<td>V007T08A047</td>
<td>The Effect of Crosswind Velocity on the Spray Drift of Flat Fan Nozzle</td>
<td>S. Raza, K. A. Sallam, S. L. Post</td>
</tr>
<tr>
<td>V007T08A048</td>
<td>Enhancing the Cell Viability in High Throughput Deterministic Lateral Displacement Separation of Circulating Tumor Cells</td>
<td>Arian Aghilinejad, Christopher Landry, George Cha, Xiaolin Chen</td>
</tr>
<tr>
<td>V007T08A049</td>
<td>Dynamics of Compound Droplet Passing Through a Conical CTC Microfilter</td>
<td>Pengliang Chang, Mohammad Abul Hashem, Xiaolin Chen, Hua Tan</td>
</tr>
<tr>
<td>V007T08A050</td>
<td>Wettability Gradients on Graphene to Drive Bubble Motion</td>
<td>Hongyang Yu, Yu Zhao, Jingjie Sha, Yunfei Chen</td>
</tr>
<tr>
<td>V007T08A051</td>
<td>Influence of Lateral Restraint on Thermocapillary Migration of Wetting Droplets</td>
<td>Kalichetty Srinivasa Sagar, K. G. Dwaraknath, Arvind Pattamatta, T. Sundararajan</td>
</tr>
<tr>
<td>V007T08A052</td>
<td>Pressure Drop in Circular Two-Phase Pipe Flow As Influenced by the Angle of Inclination</td>
<td>Bethany Worl, Samuel Nielson, Xiuling Wang</td>
</tr>
<tr>
<td>V007T08A053</td>
<td>Jet Initiation After Drop Impact on Micropatterned Hydrophilic Surfaces</td>
<td>Anayet Ullah Siddique, Feng Zhao, Mark Weislogel, Hua Tan</td>
</tr>
<tr>
<td>V007T08A054</td>
<td>CFD Analysis of Reversed Installation on Flow Measurements by a Plate Orifice</td>
<td>Dezhi Zheng, Haibo Ma, Armin K. Silaen, Chenn Q. Zhou</td>
</tr>
<tr>
<td>V007T08A055</td>
<td>Vortex Generator Designs to Improve Flow for a Vehicle Side-View Mirror</td>
<td>Zulong Dong, Badih Jawad, Liping Liu, Hossam Metwally</td>
</tr>
<tr>
<td>Title</td>
<td>Title ID</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>A Natural Evolution Based Numerical Optimisation Framework to Develop and Enhance Airfoil-Slat Arrangement</td>
<td>V007T08A056</td>
<td></td>
</tr>
<tr>
<td>Investigation of Conduit Flow Past Corrugated Structures Using Large Eddy Simulations</td>
<td>V007T08A057</td>
<td></td>
</tr>
<tr>
<td>Computational Evaluation of a Novel Aerodynamic Road Vehicle Design and Drag Reduction Using Vortex Generators</td>
<td>V007T08A058</td>
<td></td>
</tr>
<tr>
<td>Modeling and Analysis of Noise Barrier Shape Effects on Highway Automobiles</td>
<td>V007T08A059</td>
<td></td>
</tr>
<tr>
<td>Numerical Verification of the Thermodynamic Determination of the Hydraulic Efficiency of Radial Fans</td>
<td>V007T08A060</td>
<td></td>
</tr>
<tr>
<td>CFD Modeling of the Hydrogen Fast Filling Process for Type 3 Cylinders and Cylinders Lined With Phase Change Material</td>
<td>V007T08A061</td>
<td></td>
</tr>
<tr>
<td>Numerical and Experimental Study of an FSAE Intake Manifold</td>
<td>V007T08A062</td>
<td></td>
</tr>
<tr>
<td>Analysis of a Double Inlet Gerotor Pump: A Dynamic Multi-Phase CFD Approach Accounting for the Fluid Compressibility and Temperature Dependent Properties</td>
<td>V007T08A063</td>
<td></td>
</tr>
<tr>
<td>Numerical Investigation of the Euler Turbomachinery Equation and Analysis of the Impact of the Impeller Design on the Fan Performance by an Optimization Study</td>
<td>V007T08A064</td>
<td></td>
</tr>
<tr>
<td>CFD Analysis of Flow Structures in a Mixing Chamber</td>
<td>V007T08A065</td>
<td></td>
</tr>
</tbody>
</table>
Analysis of Labyrinth Seal Flow Patterns to Improve Bulk Flow Code Predictions
Nathaniel Gibbons, Cori Watson-Kassa, Christopher Goyne, Houston Wood

Three-Dimensional Velocity Field Measurements in Rugged Terrain Using Magnetic Resonance Velocimetry
Daniel Chung

Cavitation Number As a Function of Disk Cavitator Radius: A Numerical Analysis of Natural Supercavitation
Reid Prichard, Wayne Strasser, Thomas Eldredge