

47th AIAA Fluid Dynamics Conference 2017

Held at the AIAA Aviation Forum 2017

Denver, Colorado, USA
5 - 9 June 2017

Volume 1 of 3

ISBN: 978-1-5108-4376-9

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers. Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at 34922 Uwytkug'Xcmg{'Ftkxg.'Uwky'422, Reston, VA 20191, USA.

TABLE OF CONTENTS

VOLUME 1

FD-01: BOUNDARY LAYER CONTROL

Effect of Upstream Flow Deformation Using Plasma Actuators on Crossflow Transition Induced by Unsteady Vortical Free-Stream Disturbances (AIAA 2017-3114)	1
<i>Philipp Dörr, Markus Kloker, Ardeshir Hanifi</i>	
DNS of Compressible Turbulent Boundary Layers at Varying Subsonic Mach Numbers (AIAA 2017-3116)	17
<i>Christoph Wenzel, Björn Selent, Markus Kloker, Ulrich Rist</i>	
Aerodynamic Investigation of the Conformal Vortex Generator (AIAA 2017-3117)	27
<i>Geoffrey A. Kibble, Jamey D. Jacob, Aaron Alexander, Brian R. Elbing, Peter Ireland, James A. Black</i>	
Slip Length Based Boundary Condition for Modeling Drag Reduction Devices (AIAA 2017-3118)	41
<i>Benedetto Mele, Renato Tognaccini</i>	

FD-02: SHOCK BOUNDARY INTERACTIONS I

Pulse-Burst PIV of the Supersonic Wake of a Wall-Mounted Hemisphere (AIAA 2017-3119)	55
<i>Steven J. Beresh, John Henfling, Russell Spillers</i>	
Boundary-layer Separation Detection for a Cone at High Angle of Attack in Mach 4.5 Flow with Pressure-Sensitive Paint (AIAA 2017-3120)	78
<i>Carson L. Running, Michael J. Thompson, Thomas J. Juliano, Hirota Sakaue</i>	
A Joint Study on the Starting Limits of a Generic Supersonic Inlet (AIAA 2017-3121)	98
<i>Erich Schuelein, Manuel Schenk, Benedikt Buchmann</i>	
Aerothermodynamics of a Hypersonic Inflatable Aerodynamic Decelerator (HIAD) with Flexible TPS (AIAA 2017-3122)	123
<i>Brian R. Hollis</i>	
Study of the Dynamics of Transitional Shock Wave-Boundary Layer Interactions using Optical Diagnostics (AIAA 2017-3123)	150
<i>E. Lara Lash, Christopher S. Combs, Phillip A. Kreth, John D. Schmisser</i>	
Hypersonic Shock Wave Transitional Boundary Layer Interactions - A Review (AIAA 2017-3124)	172
<i>Doyle D. Knight, Mahsa Mortazavi</i>	

FD-03: UNSTEADY FLUID DYNAMICS AND UNSTEADY AERODYNAMICS I

Study of Fluid-Structure Interactions on a Tunable Store in Complex Cavity Flow (AIAA 2017-3125)	198
<i>Katya M. Casper, Justin L. Wagner, Steven J. Beresh, Russell Spillers, John Henfling</i>	
Preliminary Investigation of Cavity Sidewall Effects on Resonance Dynamics Using Time-Resolved Particle Image Velocimetry and Pressure Sensitive Paint (AIAA 2017-3126)	214
<i>Justin L. Wagner, Katya M. Casper, Steven J. Beresh, Edward P. Demauro, Russell Spillers, John Henfling, Seth M. Spitzer, Kyle P. Lynch</i>	
Unsteady Force and Flow Measurements for Plunging Finite Wings (AIAA 2017-3127)	227
<i>Nicola Chierighin, David Cleaver, Ismet Gursul</i>	
Experimental Investigation of the Structure of Turbulent Swirling Jets (AIAA 2017-3128)	252
<i>Eric DeMillard, Jonathan W. Naughton</i>	
POD Analysis in the Wake of Wall-Mounted Cylinders (AIAA 2017-3129)	264
<i>Henrique Fanini Leite, Leandra I. Abreu, Ana Cristina Avelar, André V. Cavalieri</i>	

FD-04: SPECIAL SESSION: HIFIRE-5B FLIGHT TEST RESULTS

HIFiRE-5b Flight Overview (AIAA 2017-3131)	284
<i>Roger L. Kimmel, David Adamczak</i>	
Laminar and Turbulent Flow Calculations for the HIFiRE-5b Flight Test (AIAA 2017-3132)	304
<i>Kevin M. Porter, Jonathan Poggie, Roger L. Kimmel</i>	
Correlation of HIFiRE-5b Flight Data With Computed Pressure and Heat Transfer for Attitude Determination (AIAA 2017-3133)	317
<i>Joseph S. Jewell, Roger L. Kimmel, Jonathan Poggie, Kevin Porter, Thomas J. Juliano, David W. Adamczak</i>	
HIFiRE-5b Heat Flux and Boundary-Layer Transition (AIAA 2017-3134)	324
<i>Thomas J. Juliano, Jonathan Poggie, Kevin Porter, Roger L. Kimmel, Joseph S. Jewell, David Adamczak</i>	
Ground Test Measurements of Boundary-Layer Instabilities and Transition for HIFiRE-5 at Flight-Relevant Attitudes (AIAA 2017-3135)	344
<i>Matthew P. Borg, Roger L. Kimmel</i>	
PSE Analysis of Crossflow Instability on HIFiRE 5b Flight Test (AIAA 2017-3136)	368
<i>Matthew W. Tufts, Ryan C. Gosse, Roger L. Kimmel</i>	

FD-07: EXPERIMENTAL STUDIES OR NUMERICAL SIMULATIONS I

Experimental Measurements of Turbulent Junction Flow Using High Speed Stereo PIV and IR Thermography (AIAA 2017-3303)	382
<i>Syed S. Elahi, Eric A. Lange, Stephen P. Lynch</i>	
Higher Order Dynamic Mode Decomposition Applied to Post-process a Limited Amount of Noisy PIV Data (AIAA 2017-3304)	398
<i>Soledad Le Clainche Martinez, Francisco Sastre, José M. Vega, Angel Velazquez</i>	
The Variation in Co and Counter-Rotating Upstream-Downstream Vortex Interactions (AIAA 2017-3305)	412
<i>Kyle J. Forster, Tracie Barber, Sammy Diasinos, Graham Doig</i>	
Unsteady Nature of Vortex Pair in Formation Flight (AIAA 2017-3306)	425
<i>Chen Chen, Zhijin Wang, Ismet Gursul</i>	
A Numerical Investigation of Vortex Dynamics About a Streamlined Cylinder At Various Aspect Ratios (AIAA 2017-3307)	449
<i>Michael Siemon, Dudley S. Nichols</i>	
Numerical Simulation of Plasma Flows and Radio-Frequency Blackout in Atmospheric Reentry Demonstrator Mission (AIAA 2017-3308)	463
<i>Minseok Jung, Hisashi Kihara, Ken-ichi Abe, Yusuke Takahashi</i>	

FD-08: FLUIDIC/JET BASED FLOW CONTROL

Identifying Dynamic Modes of Separated Flow Subject to ZNMF-Based Control from Surface Pressure Measurements (AIAA 2017-3309)	474
<i>Eric A. Deem, Louis N. Cattafesta, Hao Zhang, Clarence W. Rowley, Maziar Hemati, Francois Cadieux, Rajat Mittal</i>	
Large Eddy Simulation of Flow Interactions of Segmented Synthetic Jets on an Airfoil (AIAA 2017-3310)	493
<i>Eugene McGlynn, Steven Tran, Onkar Sahni</i>	
Application of a Biot-Savart Solver to Predict Axis Switching Phenomenon in Finite-Span Vortices Expelled from a Synthetic Jet (AIAA 2017-3311)	509
<i>Joseph C. Straccia, John A. Farnsworth</i>	
Computational Modeling and Analysis of Sweeping Jet Fluidic Oscillators (AIAA 2017-3312)	523
<i>Jung Hee Seo, Rajat Mittal</i>	
Application of Sweeping Jet Actuators on the NASA Hump Model and Comparison with CFDVAL2004 Experiments (AIAA 2017-3313)	535
<i>Mehdi Koklu</i>	
Phase-Synchronized Fluidic Oscillator Pair (AIAA 2017-3314)	554
<i>Mehmet N. Tomac, James W. Gregory</i>	

FD-09: SEPARATION CONTROL

Response of the Separated Flow Over an Airfoil to a Short-Time Actuator Burst (AIAA 2017-3315)	569
<i>Xuanhong An, David R. Williams, Andre F. da Silva, Tim Colonius, Jeff Eldredge</i>	
Effect of Synthetic Jet Modulation Schemes on the Response of a Separation Bubble (AIAA 2017-3316)	582
<i>Jung Hee Seo, Francois Cadieux, Rajat Mittal, Eric A. Deem, Louis N. Cattafesta</i>	
Experimental Study on Detailed Structure of Separation Bubble in Controlled Flow by DBD Plasma Actuator Around Airfoil (AIAA 2017-3317)	594
<i>Yuma Miyakawa, Satoshi Sekimoto, Makoto Sato, Taku Nonomura, Akira Oyama, Kozo Fujii, Shinichiro Ito</i>	
Flow Control Using Passive Vortex Generators (AIAA 2017-3318)	606
<i>Suyash Tandon, Siddhesh Shinde, Kevin J. Maki, Eric Johnsen</i>	

FD-10: UNSTEADY FLUID DYNAMICS AND UNSTEADY AERODYNAMICS II

Interactions of a Trailing Vortex with a Downstream NACA0012 Wing (AIAA 2017-3319)	618
<i>Daniel J. Garmann, Miguel R. Visbal</i>	
Effects of Vertical Position and Orientation on a Vortical-Gust/Airfoil Interaction at a Transitional Reynolds Number (AIAA 2017-3320)	642
<i>Caleb J. Barnes, Miguel R. Visbal</i>	
Numerical Simulation of Wing Section Undergoing Plunging Motions at High Angles of Attack (AIAA 2017-3321)	661
<i>Andreas Gross, Jesse C. Little, Hermann F. Fasel</i>	
Numerical Simulation of Flow Past a Circular and a Square Cylinder at High Reynolds Number (AIAA 2017-3322)	688
<i>Ling Zhang, Tim Wray, Ramesh K. Agarwal</i>	

FD-13/TFM-04: BOUNDARY LAYER STABILITY AND TRANSITION

Global Linear Stability Analysis of High Speed Flows on Compression Ramps (AIAA 2017-3455)	706
<i>Sidharth Gs, Anubhav Dwivedi, Graham V. Candler, Joseph W. Nichols</i>	

The Effect of Sponge Layers on Global Stability Analysis of Blasius Boundary Layer Flow (AIAA 2017-3456)	720
<i>Wei Ran, Armin Zare, Joseph W. Nichols, Mihailo R. Jovanovic</i>	
A New Laminar Kinetic Energy Model for RANS Simulations of Bypass Transition (AIAA 2017-3457)	732
<i>Loïc Jecker, Olivier Vermeersch, Hugues Deniau, Gregoire Casalis, Emma Croner</i>	
Wall Forcing of the Secondary Crossflow Instability (AIAA 2017-3458)	742
<i>Evelien van Bokhorst, Christopher J. Atkin</i>	
Nonlinear Evolution and Secondary Instability of Steady Gortler Vortices Induced by Free-stream Vortical Disturbances (AIAA 2017-3459)	754
<i>Dongdong Xu, Yongming Zhang, Xuesong Wu</i>	

FD-14: NEW MODELS FOR HIGH-SPEED FLOWS

A Morphing Continuum Approach to Supersonic Flow Over a Compression Ramp (AIAA 2017-3460)	788
<i>Mohamad I. Cheikh, James M. Chen</i>	
Extension of Morphing Continuum Theory to Numerical Simulations of Transonic Flow Over a Bump (AIAA 2017-3461)	801
<i>Louis B. Wonnell, James M. Chen</i>	
Numerical Investigation of the Effect of the Sweep Angle of a Cylindrical Blunt Fin on the Shock Wave/Laminar Boundary Layer Interaction in a Hypersonic Flow (AIAA 2017-3462)	813
<i>Mahsa Mortazavi, Doyle D. Knight</i>	
Experimental Investigation of Görtler Vortices in Hypersonic Ramp Flows Behind Sharp and Blunt Leading Edges (AIAA 2017-3463)	824
<i>Amit Roghelia, Pavel V. Chuvakhov, Herbert Olivier, Ivan Egorov</i>	

VOLUME 2

FD-15: MULTIPHYSICS AND CROSS-DISCIPLINARY FLUID DYNAMICS I

Optical Diagnostic Imaging of Multi-Rocket Plume-Induced Base Flow Environments (AIAA 2017-3465)	838
<i>Manish Mehta, Paul M. Danehy, Jennifer Inman, Darrell E. Gaddy, Aaron Dufrene, Ron Parker</i>	
Development of a Lagrangian Fluid Parcel Tracking Algorithm for Reacting Flows (AIAA 2017-3466)	855
<i>Ryan A. Darragh, Colin A. Towery, Peter E. Hamlington, Alexei Poludnenko</i>	
Interaction of Side-by-Side Piezoelectric Beams in Quiescent Flow and Grid Turbulence (AIAA 2017-3467)	876
<i>Amir Danesh-Yazdi, Niell Elvin, Yiannis Andreopoulos</i>	
Unsteady PSP Measurements on a Cylinder Translating Out from a Supersonic Cavity (AIAA 2017-3468)	890
<i>Daniel Y. Chin, William Sealy, Kenneth O. Granlund, Tatsunori Hayashi, Hirotaka Sakaue</i>	

FD-18: HIGH SPEED LAMINAR-TURBULENT TRANSITION I

Direct Numerical Simulation of Acoustic Noise Generation from the Nozzle Wall of a Hypersonic Wind Tunnel (AIAA 2017-3631)	901
<i>Junji Huang, Lian Duan, Meelan M. Choudhari</i>	
Measurements in the Boeing/AFOSR Mach-6 Quiet Tunnel on Hypersonic Boundary-Layer Transition (AIAA 2017-3632)	916
<i>Brandon C. Chynoweth, Josh Edelman, Kathryn Gray, Gregory McKiernan, Steven P. Schneider</i>	
Analysis of Receptivity to Kinetic Fluctuations in the Reentry-F Flight Experiment (AIAA 2017-3633)	951
<i>Luke Edwards, Anatoli Tumin</i>	
Stabilization of Hypersonic Boundary Layers by Linear and Nonlinear Optimal Perturbations (AIAA 2017-3634)	960
<i>Pedro Paredes, Meelan M. Choudhari, Fei Li</i>	
A Mechanism for Spectral Broadening and Implications for Saturation Amplitude Estimates (AIAA 2017-3635)	976
<i>Armani Batista, Joseph Kuehl</i>	
An Efficient Strategy for Computing Wave-Packets in High-Speed Boundary Layers (AIAA 2017-3636)	986
<i>Oliver M. Browne, Anthony P. Haas, Hermann F. Fasel, Christoph Brehm</i>	
Application of SST $k-\omega$ Transition Model to Flow Past Smooth and Rough Airfoils (AIAA 2017-3637)	1009
<i>Yao Hou, Tim Wray, Ramesh K. Agarwal</i>	

FD-19: EXPERIMENTAL STUDIES OR NUMERICAL SIMULATIONS II

Compressible Turbulent Flow in a Convergent-Divergent Nozzle: An LES Study (AIAA 2017-3638)	1029
<i>Susila K. Mahapatra, J. A. Tennyson, Somnath Ghosh</i>	
Comparison of PIV and CFD Measurements of an Advanced Supersonic Research Concept Model (AIAA 2017-3639)	1035
<i>Ashley M. Jones, Kevin M. Mejia, Charles Ulk, Yoshiki Murahashi, Taku Nagata, Akio Ochi</i>	
Understanding the Effect of Cube Size on the Near Wake Characteristics in a Turbulent Boundary Layer (AIAA 2017-3640)	1044
<i>Siddhesh Shinde, Eric Johnsen, Kevin J. Maki</i>	

DNS of a Spatially Developing Turbulent Mixing Layer from Co-flowing Laminar Boundary Layers (AIAA 2017-3641)	1059
<i>Juan D. Colmenares, Svetlana Poroseva, Yulia T. Peet, Scott M. Murman</i>	

FD-20: LOW-RE FLOWS AND BIO-INSPIRED FLOWS

Three-Dimensional Vortex Development in a Laminar Separation Bubble Formed Over an Airfoil (AIAA 2017-3642)	1075
<i>John Kurelek, Burak A. Tuna, Serhiy V. Yarusevych</i>	
Effects of Surface Morphing on the Wake Structure and Performance of Flapping Plates (AIAA 2017-3643)	1089
<i>Junshi Wang, Chengyu Li, Yan Ren, Haibo Dong</i>	
Quasi-periodic Vortical Signature of an Elastically Mounted Flapping Airfoil (AIAA 2017-3644)	1101
<i>Chandan Bose, Sayan Gupta, Sunetra Sarkar</i>	
Effects of Aspect Ratio and Angle of Attack on Tip Vortex Structures and Aerodynamic Performance for Rotating Flat Plates (AIAA 2017-3645)	1113
<i>Chengyu Li, Haibo Dong, Bo Cheng</i>	
Free-stream Turbulence Effects on Transition Within a Laminar Separation Bubble (AIAA 2017-3646)	1129
<i>Mark S. Istvan, Serhiy V. Yarusevych</i>	
Flow Periodicity Analysis Past a Flapping Airfoil Using Proper Orthogonal Decomposition (AIAA 2017-3647)	1143
<i>Chandan Bose, Sunetra Sarkar</i>	

FD-22: EXPERIMENTAL STUDIES OR NUMERICAL SIMULATIONS III

Investigation of Turbulence Properties in Wall-Bounded Flows with Pressure Gradients and Separation (AIAA 2017-3808)	1156
<i>Luiz Augusto C. Schiavo, Joao Luiz F. Azevedo, William Wolf</i>	
Computation of Compressible Turbulent Jet Flows Using Modified LRR-ω Model (AIAA 2017-3809)	1169
<i>Xihai Xu, Xiaodong Li, Junhui Gao</i>	
Stabilizing Effects of a Perforated Splitter Plate on a Backwards-facing Step (AIAA 2017-3810)	1185
<i>Pedro C. Ormonde, André V. Cavalieri, Roberto G. Annes da Silva, Ana Cristina Avelar</i>	

FD-23: MULTIPHYSICS AND CROSS-DISCIPLINARY FLUID DYNAMICS II

Train of Frozen Boxcars Model for Fluidic Harvesters (AIAA 2017-3811)	1200
<i>Amir Danesh-Yazdi, Oleg Goushcha, Niell Elvin, Yiannis Andreopoulos</i>	
Investigation of Impact of Multiple Drops on Thin Liquid Film (AIAA 2017-3812)	1210
<i>Yisen Guo, Yongsheng Lian</i>	
An Experimental Study on Small UAV Propellers with Serrated Trailing Edges (AIAA 2017-3813)	1222
<i>Zhe Ning, Richard W. Wlezién, Hui Hu</i>	
A Monolithic Fluid Structure Interaction Algorithm Applied to Red Blood Cells in a Capillary (AIAA 2017-3814)	1239
<i>Ayse Cetin, Mehmet Sahin</i>	
Enhanced Flow Boiling in Manifold Microchannels Through Integrating Three-dimensional Flow and Hierarchical Surface (AIAA 2017-3815)	1252
<i>Sheng Wang, Hsiu-Hung Chen, Chung-Lung Chen</i>	

FD-24: SPECIAL SESSION: RESEARCH FRONTIERS IN BIO-INSPIRED PROPULSION I

Aeromechanics of Hovering Flight in Perturbed Flows: Insights from Computational Models and Animal Experiments (AIAA 2017-3816)	1266
<i>Chao Zhang, Rajat Mittal, Tyson Hedrick</i>	
On the Passive Pitching Mechanism in Turning Flapping Flights Using a Torsional Spring Model (AIAA 2017-3817)	1285
<i>Qiang Zhong, Geng Liu, Yan Ren, Haibo Dong</i>	
On the Sound Production and Radiation of Bio-inspired Propulsors (AIAA 2017-3818)	1298
<i>Biao Geng, Xudong Zheng, Qian Xue, Geng Liu, Haibo Dong</i>	

FD-25: APPLICATIONS OF FLUID MECHANICS

Numerical Simulations and Performance Analysis of a Magnetically-driven Bearingless Micro-pump (AIAA 2017-3963)	1309
<i>Gabriel B. Goodwin, Jesse R. Maxwell</i>	
Investigation of the Optimal Design of a Linear Aerospike Nozzle for Microsatellite Thrust Vector Control (AIAA 2017-3964)	1321
<i>Ariel Alcantara, Chen Dong, Hoi Ting Jennifer Cheung, Yen-Lin Han</i>	
Bluff Body Flow Control Using Random Forcing (AIAA 2017-3965)	1333
<i>Anwar Ahmed, Richard North, Hayden Moore</i>	

Application of a New DES Model Based on Wray-Agarwal Turbulence Model for Simulation of Wall-Bounded Flows with Separation (AIAA 2017-3966)	1344
<i>Xu Han, Tim Wray, Ramesh K. Agarwal</i>	
The Effects of Mach Number Control Precision on Airfoil Pressure Measurement in a Transonic Wind Tunnel (AIAA 2017-3967)	1367
<i>Yixing Zhang, Chao Gao, Zhengke Zhang, Li Feng</i>	
Design and Optimization of the Tandem Arranged Cascade in a Transonic Compressor (AIAA 2017-3968)	1376
<i>Haitong Wang, Yangang Wang, Lai Wei</i>	

FD-26: EXPERIMENTAL STUDIES OR NUMERICAL SIMULATIONS IV

Flow Structure in the Near Wake of an Axisymmetric Supersonic Base Flow Using Tomographic PIV (AIAA 2017-3969)	1384
<i>Branden M. Kirchner, Gregory S. Elliott, J Craig Dutton</i>	
Investigation of the Low-Frequency Breathing Motion in Two Turbulent Separation Bubbles (AIAA 2017-3970)	1397
<i>Arnaud LeFloch, Abdelouahab Mohammed-Taifour, Julien Weiss</i>	
Effects of a Swirling Flow Motion on the Supersonic Near Wake Flow Behind Blunt-Based Afterbodies (AIAA 2017-3971)	1408
<i>Stephan Weidner, Robert Hruschka, Christian Rey, Friedrich Leopold, Bettina Frohnafel, Friedrich Seiler</i>	
Flow Structure Identification in the Near Wake of an Axisymmetric Supersonic Base Flow Using MEEMD (AIAA 2017-3972)	1422
<i>Matthew Koll, James Favale, Branden M. Kirchner, Gregory S. Elliott, J Craig Dutton</i>	
Relating Surface Pressure to Lagrangian Wake Topology Around a Circular Cylinder in Cross Flow (AIAA 2017-3973)	1438
<i>Matthew Rockwood, Seth Brooks, Melissa A. Green</i>	
Effects of Background Stratification on the Compressible Rayleigh Taylor Instability (AIAA 2017-3974)	1452
<i>Scott Wieland, Scott Reckinger, Peter E. Hamlington, Daniel Livescu</i>	
Simulation of Hypersonic Shock Wave Laminar Boundary Layer Interaction on Hollow Cylinder Flare, Part II (AIAA 2017-3975)	1467
<i>Nadia Kianvashrad, Doyle D. Knight</i>	

FD-27: SPECIAL TOPICS IN FLUID DYNAMICS

Theory and Validation of a 2D Finite-Volume Integral Boundary Layer Method Intended for Icing Applications (AIAA 2017-3976)	1487
<i>Charlotte Bayeux, Emmanuel Radenac, Philippe Villedieu</i>	
Modeling on Electrowetting-On-Dielectric (EWOD) (AIAA 2017-3977)	1514
<i>Haolun Xu, Brian Hernan, Chung-Lung Chen, Run Yan</i>	
Direct Numerical Simulation of Flows over an NACA-0012 Airfoil at Low and Moderate Reynolds Numbers (AIAA 2017-3978)	1529
<i>Ponnampalam Balakumar</i>	
Machine Learning Models of Errors in Large Eddy Simulation Predictions of Surface Pressure Fluctuations (AIAA 2017-3979)	1548
<i>Matthew F. Barone, Julia Ling, Kemy Chowdhary, Warren Davis, Jeffrey Fike, Shawn Martin</i>	

FD-28: SPECIAL SESSION: RESEARCH FRONTIERS IN BIO-INSPIRED PROPULSION II

Propulsive Performance of Pitching Panels with Bio-Inspired Passive Directional Flexibility (AIAA 2017-3980)	1568
<i>Ruijie Zhu, Junshi Wang, Gregory Lewis, Joe Zhu, Haibo Dong, Hilary Bart-Smith, Dylan Wainwright, George V. Lauder</i>	
Enhancing the Efficiency of Bio-Inspired Propulsion via Intermittent Swimming Gaits (AIAA 2017-3981)	1581
<i>Keith Moored, Emre Akoz, Geng Liu, Pan Han, Haibo Dong</i>	

FD-29: STALL AND WAKE CONTROL

Control of Dynamic Stall Over a Pitching Finite-Aspect-Ratio Wing (AIAA 2017-4118)	1592
<i>Miguel R. Visbal, Daniel J. Garmann</i>	
High-Frequency Forcing to Delay Dynamic Stall at Relevant Reynolds Number (AIAA 2017-4119)	1611
<i>Stuart I. Benton, Miguel R. Visbal</i>	
Experimental and Computational Investigation of Passive Surface Flow Control for Aerodynamic Efficiency (AIAA 2017-4120)	1632
<i>Souma Chowdhury, Victor Maldonado, Divya Ramesh Vani, Matthew Salazar, Ramin Soujoudi</i>	
Mini-Spoilers for Afterbody Base Drag Reduction (AIAA 2017-4121)	1651
<i>Dinitha S. Bulathsinghala, Zhijin Wang, Ismet Gursul</i>	

VOLUME 3

Control of Multiple Vortices over a Double Delta Wing (AIAA 2017-4122)	1678
<i>Xizhe Zhang, Zhijin Wang, Ismet Gursul</i>	

FD-30: SUPERSONIC AND HYPERSONICS FLOWS

Study of 2-D Shock-Wave / Turbulent Boundary Layer Interaction (AIAA 2017-4123)	1705
<i>Patrice S. Touré, Erich Schuelein</i>	
Shock-Boundary Layer Interaction Control Using Innovative Micro-Vortex Generators in Supersonic Intake (AIAA 2017-4124)	1724
<i>G. Humrutha, Mrinal Kaushik, K. P. Sinhamahapatra</i>	
Three-Dimensional Simulations of Hypersonic Double Wedge Flow Experiments (AIAA 2017-4125)	1732
<i>John D. Reinert, G. S. Sidharth, Graham V. Candler, Jeffrey R. Komives</i>	

FD-31: SPECIAL SESSION: NASA'S REVOLUTIONARY COMPUTATIONAL AEROSCIENCES

Boundary Condition Study for the Juncture Flow Experiment in the NASA Langley 14x22-Foot Subsonic Wind Tunnel (AIAA 2017-4126)	1748
<i>Christopher L. Rumsey, Jan-Renee Carlson, Judith A. Hannon, Luther N. Jenkins, Scott M. Bartram, Thomas H. Pulliam, Henry C. Lee</i>	
CFD Analysis in Advance of the NASA Juncture Flow Experiment (AIAA 2017-4127)	1777
<i>Henry C. Lee, Thomas H. Pulliam, Dan Neuhart, Michael A. Kegerise</i>	
Benchmark Smooth Body Flow Separation Experiments (AIAA 2017-4128)	1809
<i>Daniel J. Simmons, Flint O. Thomas, Thomas C. Corke</i>	
Stereoscopic PIV Measurements of a Turbulent Compressible Mixing Layer for CFD Validation (AIAA 2017-4129)	1827
<i>Kevin Kim, Gyu Sub Lee, Blake E. Johnson, Gregory S. Elliott, J Craig Dutton</i>	

FD-32: THREE-DIMENSIONAL BOUNDARY-LAYER INSTABILITY

Crossflow Transition on a Pitched Cone at Mach 8 (AIAA 2017-4299)	1842
<i>Josh Edelman, Katya M. Casper, John Henfling, Russell Spillers, Steven P. Schneider</i>	
Computations of Crossflow Instability in Hypersonic Boundary Layers (AIAA 2017-4300)	1865
<i>Meelan M. Choudhari, Fei Li, Pedro Paredes, Lian Duan</i>	
Boundary Layer Stability Analysis of HIFiRE-5b Flight Geometry (AIAA 2017-4301)	1883
<i>Alexander Moyes, Travis S. Kocian, Daniel Mullen, Helen L. Reed</i>	
Stationary Crossflow Breakdown Due to Interaction Between Secondary Instabilities (AIAA 2017-4302)	1900
<i>Fei Li, Meelan M. Choudhari, Lian Duan</i>	
A DMD-Based Automatic Transition Prediction Method for Flows over Airfoils (AIAA 2017-4303)	1914
<i>Meng-Meng Wu, Zhong-Hua Han, Shao-Nan Wang, Wen-Ping Song, Esteban Ferrer</i>	

FD-34: HIGH SPEED FLOW CONTROL

Fluidic Control of an Aggressive Offset Diffuser for a Supersonic Inlet (AIAA 2017-4304)	1926
<i>Travis J. Burrows, Bojan Vukasinovic, Ari Glezer</i>	
Impacts of Energy Deposition on Flow Characteristics Over an Inlet (AIAA 2017-4305)	1941
<i>Hoang Son Pham, Manabu Myokan, Takahiro Tamba, Akira Iwakawa, Akihiro Sasoh</i>	
Research on the Flow Characteristics of DBD Plasma Actuation Based on High Speed Schlieren (AIAA 2017-4306)	1958
<i>Li Feng, Chao Gao, Zhe Lv, Bin Wu, Yixing Zhang</i>	
Effect of Thermal Actuator on Vortex Characteristics in Supersonic Shear Layer (AIAA 2017-4307)	1968
<i>Jingchang Shi, Hong Yan, Gege Bai, Ke Lin</i>	
Resonance Enhanced Microactuator (REM) Nozzles for Supersonic Flow Mixing (AIAA 2017-4308)	1985
<i>John T. Solomon, Chitra Nayak, Michael Jones, David Alexander, Kyran Caines</i>	
Switching Dynamics of a Fluid Diverter Valve Using Ultrasonic Excitation for Active Flow Control (AIAA 2017-4309)	1998
<i>Michael Mair, Marko Bacic, Peter Ireland</i>	
Numerical Simulations of Plasma Discharges in Supersonic Flows (AIAA 2017-4310)	2013
<i>Alexander Nekris, Patrick Gnemmi, Christian Mundt</i>	

FD-35: SHOCK BOUNDARY INTERACTIONS IIS

Limiting Cases for Cylinder-Induced Shock Wave/Boundary Layer Interactions (AIAA 2017-4311)	2028
<i>Stefen A. Lindörfer, Christopher S. Combs, Phillip A. Kreth, Ryan B. Bond, John D. Schmisser</i>	
Sensitivity Analysis for the Control of Oblique Shock Wave/laminar Boundary Layer Interactions at Mach 5.92 (AIAA 2017-4312)	2048
<i>Nathaniel J. Hildebrand, Anubhav Dwivedi, Joseph W. Nichols, Graham V. Candler, Mihailo R. Jovanovic</i>	

Investigation of the Effects of Ablation-Induced Roughness on Supersonic Flows (AIAA 2017-4313)	2062
<i>Brian D. Kocher, Christopher S. Combs, Phillip A. Kreth, John D. Schmisser, Scott J. Peltier</i>	
Sharp-Fin Induced Shock Wave/Turbulent Boundary Layer Interactions in an Axisymmetric Configuration (AIAA 2017-4314)	2075
<i>Joshua Pickles, Balachandra R. Mettu, Pramod Subbareddy, Venkateswaran Narayanaswamy</i>	
Simulation of Transitional Shockwave/Boundary-Layer Interaction Using Advanced RANS-based Modeling (AIAA 2017-4315)	2095
<i>Bradley Tester, James G. Coder, Christopher S. Combs, John D. Schmisser</i>	

FD-37: SUBSONIC BOUNDARY-LAYERS RECEPTIVITY AND INSTABILITY

Time Resolved Stereo Particle Image Velocimetry Measurements of the Instabilities Downstream of a Backward-Facing Step in a Swept-Wing Boundary Layer (AIAA 2017-4415)	2109
<i>Jenna L. Eppink, Chungsheng Yao</i>	
Measurements of Distributed Roughness Receptivity (AIAA 2017-4416)	2132
<i>Madeline N. McMillan, Alexandre R. Berger, Edward B. White</i>	
Mechanics of Distributed Roughness Shielding for Suppression of Roughness Induced Boundary Layer Transition (AIAA 2017-4417)	2145
<i>Saikishan Suryanarayanan, David B. Goldstein, Alexandre R. Berger, Edward B. White, Garry L. Brown</i>	
Streaky Turbulence Growth Before Tollmien-Schlichting Waves in Transition (AIAA 2017-4418)	2162
<i>Joan G. Moore</i>	
Numerical Investigation of the Interaction of Active Flow Control and Klebanoff Modes (AIAA 2017-4419)	2173
<i>Shirzad Hosseinverdi, Hermann F. Fasel</i>	

FD-38: EXPERIMENTAL STUDIES OR NUMERICAL SIMULATIONS V

Three-Dimensional Finite-Time Lyapunov Exponent Field in the Wake of an Oscillating Trapezoidal Pitching Panel (AIAA 2017-4420)	2190
<i>Rajeev Kumar, Justin T. King, Melissa A. Green, Ayodeji Bode-Oke, Geng Liu, Haibo Dong</i>	
Experimental Study on the Effects of Trailing Edge Geometry on the Wake Structure of a Trapezoidal Pitching Panel (AIAA 2017-4421)	2204
<i>Justin T. King, Rajeev Kumar, Melissa A. Green</i>	
Air Side Heat Transfer Enhancement with Self Agitators (AIAA 2017-4422)	2213
<i>Zheng Li, Chung-Lung Chen, Yangyang Chen, Xianchen Xu, Kuojiang Li, Zhaoqing Ke, Keyu Zhou, Hsiu-Hung Chen, Guoliang Huang</i>	
Near- and Far-Field Properties of High-Temperature Turbulent Buoyant Jets (AIAA 2017-4423)	2221
<i>Nicholas T. Wimer, Caelan Lapointe, Torrey R. Hayden, Jason D. Christopher, Alexei Poludnenko, Gregory B. Rieker, Peter E. Hamlington</i>	
Characterization of the Output from a Catalytic Combustor Using Wavelength Modulation Spectroscopy (AIAA 2017-4424)	2231
<i>Torrey R. Hayden, Nicholas T. Wimer, Caelan Lapointe, Jason D. Christopher, Amanda Makowiecki, Peter E. Hamlington, Gregory B. Rieker</i>	
An Overset-Mesh Approach for Large-Eddy Simulation of High-Reynolds Number Airfoil Flow (AIAA 2017-4425)	2241
<i>Donald P. Rizzetta, Miguel R. Visbal</i>	

FD-39: SURFACE FEATURES IN HIGH-SPEED TRANSITION

Study of the Effect of Two-dimensional Wall Non-uniformities on High-speed Boundary Layers (AIAA 2017-4511)	2261
<i>Adrian Sescu, Jeremy Sawaya, Vasileios Sassis, Miguel R. Visbal</i>	
Tomographic PIV Measurement of Hypersonic Boundary Layer Transition Past a Micro-ramp (AIAA 2017-4512)	2281
<i>Qingqing Ye, Ferry Schrijer, Fulvio Scarano</i>	
Study of Trip-Induced Hypersonic Boundary Layer Transition (AIAA 2017-4513)	2292
<i>Prakash Shrestha, Joseph W. Nichols, Mihailo R. Jovanovic, Graham V. Candler</i>	
Direct Numerical Simulation of Hypersonic Flow over a Blunt Cone with Axisymmetric Isolated Roughness (AIAA 2017-4514)	2313
<i>Christopher L. Haley, Xiaolin Zhong</i>	
Transition Induced by a Streamwise Array of Roughnesses on a Supersonic Flat Plate (AIAA 2017-4515)	2340
<i>Amanda Chou, Michael A. Keiser</i>	

FD-40: HIGH SPEED LAMINAR-TURBULENT TRANSITION II

An Investigation of Sound Radiation by Supersonic Unstable Modes in Hypersonic Boundary Layers (AIAA 2017-4516)	2360
<i>Carleton P. Knisely, Xiaolin Zhong</i>	
Transition Induced by a Wave Train in a Supersonic Boundary Layer over a Compression Ramp (AIAA 2017-4517)	2401
<i>Andrey V. Novikov</i>	

Linear Stability Analysis of a Hypersonic Boundary Layer in Equilibrium and Non-Equilibrium (AIAA 2017-4518)	2420
<i>Fernando Miró Miró, Fabio Pinna</i>	
Passive Control of Hypersonic Non-equilibrium Boundary Layers Using Regular Porous Coating (AIAA 2017-4519)	2433
<i>Xiaowen Wang</i>	
A Numerical Jacobian Based Linearized Compressible Navier-Stokes Solver For Hypersonic Boundary-Layer Stability (AIAA 2017-4520)	2454
<i>Anthony P. Haas, Oliver M. Browne, Hermann F. Fasel, Christoph Brehm</i>	
Steady and Quasi-steady Laminar-turbulent Transition Prediction for Airfoils at Subsonic and Transonic Conditions (AIAA 2017-4521)	2473
<i>Ferran Martí, Feng Liu</i>	
Author Index	