

The 7th International Symposium “Bifurcations and Instabilities in Fluid Dynamics”

July 11 – 14, 2017 The Woodlands, TX, USA



Program



Department of Physics

Sam Houston State University

2017

Monday , July 10

6:00 pm – 9:00 pm Arrival and Registration

at Marriott Hotel

Tuesday , July 11

8:30 am – 9:00 am *Registration & Coffee*

at Marriott Hotel

9:00 am – 9:30 am **Opening Session**

(Welcome words, brief presentation of the Sam Houston State University, Texas and The Woodlands, our work schedule)

Chair: Alexander Mikishev (Sam Houston State U, USA)

9:30 am - 10:20 am **Plenary lecture # 1:**

Edriss Titi (Texas A&M and The Weizmann Institute of Science, USA/Israel)

“Stabilizing unstable flows by coarse mesh observables and actuators – a pavement to data assimilation”

Chair: Barry Friedman (Sam Houston State U, USA)

10:20 am - 10:30 am Group photo

10:30 am - 10:50 am *Coffee break*

Session A1-1 Films and Drops (#1)

Chair: A. Oron (Technion, Israel)

10:50 am – 11:10 am

Eugene Benilov (U Limerick, Ireland)

Eugene Benilov, “Stability of thin liquid curtains”

11:10 am – 11:30 am

Pei-Hsun Tsai (National Taiwan University, Taiwan)

Pei-Hsun Tsai and An-Bang Wang, “Observations of new double splashing for drop impact onto liquid film”

11:30 am – 11:50 am Marina Chugunova (Claremont Graduate U, USA)
Marina Chugunova and Roman Taranets, “Finite-time blow-up of solutions in thin-film equations”

11:50 am – 12:10 pm Di Kang (Claremont Graduate U, USA)
Di Kang, Marina Chugunova, and Ali Nadim, “Marangoni effects on a thin liquid film coating a sphere”

12:10 pm – 12:30 pm Nicolas Cellier (LOCIE, France)
Nicolas Cellier, Christian Ruyer-Quil, Nadia Caney, Philippe Bandelier, and Benoit Stutz, “Thermal falling films, a tale of wave and heat”

Session A1-2 MHD-minisymposium (#1)

Chair: O. Zikanov (U Michigan at Dearborn, USA)

Co-chair: R. Stepanov (ICMM, Perm, Russia)

10:50 am – 11:10 am Oleg Zikanov (U Michigan at Dearborn, USA)
O. Zikanov, Xuan Zhang, and Y. Listratov, “Instabilities in extreme magnetoconvection”

11:10 am – 11:30 am Xuan Zhang (U Michigan at Dearborn, USA)
Xuan Zhang and Oleg Zikanov, “Mixed convection in a downward flow in a vertical duct in the presence of strong magnetic field”

11:30 am – 11:50 am Loic Cappanera (Rice University, Houston, USA)
L. Cappanera, J.L. Guermond, W. Herreman, and C. Nore, “Momentum based approximation of incompressible multiphase flows and application to metal pad roll instability”

11:50 am – 12:10 pm George Mamatsashvili (HZDR, Germany)
George Mamatsashvili and Frank Stefani, “Nonmodal and nonlinear dynamics of helical magnetorotational instability”

12:10 pm – 12:30 pm Julian Mauricio Granados (IU de Envigado, Colombia)
Julian M. Granados, Carlos A. Bustamante, Henry Power, and Whady F. Florez, “Influence of magnetic fields on simultaneous stationary solutions of two-dimensional flows at low magnetic Reynolds numbers”

12:30 pm – 2:00 pm

Lunch (restaurants, cafes, bars near the Hotel)

2:00 pm – 2:50 pm **Plenary lecture #2:**
Ranga Narayanan (University of Florida, USA)
“Interfacial instability of phase change”

Chair: Alex Oron (Technion, Israel)

Session A2-1 Films and Drops (#2)

Chair: J. Vega (Universidad Politecnica, Madrid, Spain)

2:50 pm – 3:10 pm Dippin S. Pillai (U Florida, USA)
Dipin S. Pillai and Ranga Narayanan, “Evaporative suppression of Rayleigh-Taylor instability in pure and binary mixtures”

3:10 pm – 3:30 pm Matvey Morozov (Technion, Israel)
Amihai Horesh, Matvey Morozov and Ofer Manor, “Acoustic drainage”

3:30 pm – 3:50 pm Dippin S. Pillai (U Florida, USA)
Dipin S. Pillai and Ranga Narayanan, “Evaporative suppression of Rayleigh-Taylor instability in pure and binary mixtures”

3:50 pm – 4:10 pm Matvey Morozov (Technion, Israel)
Matvey Morozov, Amihai Horesh and Ofer Manor, “Propogating surface acoustic waves can drive coating flows”

Session A2-2 MHD-minisymposium (#2)

Chair: O. Zikanov (U Michigan at Dearborn, USA)

Co-chair: R. Stepanov (ICMM, Perm, Russia)

2:50 pm – 3:10 pm Rodion Stepanov (ICMM, Perm, Russia)
Rodion Stepanov and Franck Plunian, “Kinematic dynamo in a Fourier tetrahedron”

3:10 pm – 3:30 pm Fred Feudel (University Potsdam, Germany)
Fred Feudel and Laurette Tuckerman, “Bifurcations of convection driven dynamos in spherical shells”

3:30 pm – 3:50 pm Ajay Kumar Yadav (NIT Karnataka, India)

Allen Chaco, Aashish Kumari and Ajay Kumar Yadav, “Numerical study on the stability of magnetic nanofluid based natural circulation loop”

4:10 pm – 4:30 pm *Coffee break*

Session A3-1 *Liquid bridges*

Chair: E. Benilov, U Limerick, Ireland

4:30 pm – 4:50 pm Eugene Benilov (University of Limerick, Ireland)
Eugene Benilov, “Can vibration stabilize an otherwise unstable liquid bridge?”

4:50 pm – 5:10 pm Matthew Haynes (University of Limerick, Ireland)
M.Haynes, S.B.G. O’Brien, and E.S. Benilov, “Asymptotics of a horizontal liquid bridge”

5:10 pm – 5:30 pm Valentina Shevtsova (ULB, Belgium)
V. Yasnou, A. Mialdun, Y. Gaponenko, and V. Shevtsova, “Control of hydrothermal instability in liquid bridge by parallel gas flow”

5:30 pm – 5:50 pm Francesco Romano (TU Wien, Austria)
Francesco Romano and Hendrik C. Kuhlmann, “Instability of the flow in suspended thermocapillary thin films”

5:50 pm – 6:10 pm Duan Li (Institute of Mechanics, China)
Duan Li, Wang Jia and Kang Qi, “Ground experiment on buoyant-thermocapillary convection in large scale liquid bridge”

6:10 pm – 6:30 pm Kang Qi (Institute of Mechanics, China)
Kang Qi, Duan Li, Hu Liang, Wu Di, Wang Jia, and Hu Wenrui, “Thermocapillary convection experiment facility and results of liquid bridge aboard the TG-2 Spacelab”

Session A3-2 *MHD-minisymposium (#3)*

Chair: O. Zikanov (U Michigan at Dearborn, USA)

Co-chair: R. Stepanov (ICMM, Perm, Russia)

4:30 pm – 5:10 pm Sudip Sen (National Institute of Aerospace, USA)

D. Lin, S. Sen, W. Scale, N. Petulante, and M.L. Goldstein, “Effect of inhomogeneous flow on Kelvin-Helmholz turbulence”

5:10 pm – 5:30 pm

Ivan Belyaev (JIHT, Moscow, Russia)

Ivan Belyaev, Ivan Melnikov, Ivan Poddubny, Nikita Rasuvanov and Valentin Sveridov, “Experimental investigation of temperature instabilities accompanying MHD-heattransfer in liquid metal flow”

5:30 pm – 5:50 pm

Yaroslav Listratov (MPEI, Russia)

Yaroslav Listratov, Nikita Rasuvanov, Valentin Sviridov and Oleg Zikanov, “Convection instabilities in a liquid metal pipe flow with strong transverse magnetic field”

5:50 pm – 6:10 pm

Yaroslav Listratov (MPEI, Russia)

Dmitry Ognerubov, Yaroslav Listratov, Valentin Sviridov and Oleg Zikanov, “DNS of mixed convection in a liquid metal horizontal pipe flow with transverse magnetic field”

6:10 pm – 6:30 pm

Rabah Djeghiour (A. Mira University, Algeria)

Rabah Djeghiour, Behir Meziani and Ouerdia Ourrad, “Magnetic field effect on the linear stability of perfect magnetic fluid sloshing in a rectangular tank”

7:00 pm – 8:00 pm

Welcome Reception at Churrascos Restaurant

Wednesday , July 12

8:30 am – 9:00 am Poster presentations

9:00 am – 9:50 am ***Plenary lecture # 3***

Herbert Levine (Rice University, Houston, TX, USA)

Session B1-1 Active Fluids

Chair: Herbert Levine, Rice U, USA

9:50 am - 10:10 am

Avraham Be'er (Ben-Gurion University, Israel)

Avraham Be'er and Gil Ariel, “Physics of swarming bacteria”

10:10 am – 10:30 am

Igor Aranson (Penn State U, USA)

Igor S. Aranson, Andrey Sokolov, Leonardo Dominguez Rubio, and John F. Brady, “Expansion and instability of concentrated bacterial droplets”

10:30 am – 10:50 am

Yilin Wu (Chinese University of Hong Kong, Hong Kong/China)

Chong Chen, Song Liu, Xia-Qing Shi, Huges Chate and Yilin Wu, “Weak synchronization and large-scale collective oscillation in dense bacterial suspensions”

10:50 am – 11:10 am

Evgeniy Khain (Oakland University, USA)

Evgeniy Khain and Lev Tsimiring, “Pressure in active fluids: a growing monolayer”

Session B1-2 Technological applications and rotating flows (#1)

Chair: Alexander Gelfgat, Tel-Aviv University, Israel

9:50 am – 10:10 am

Shingo Motoki (Osaka U, Japan)

Shingo Motoki, Genta Kawahara, and Masaki Shimizu, “Maximal heat transfer between two parallel plates”

10:10 am – 10:30 am

Ilya Barmak (Tel-Aviv University, Israel)

I. Barmak, A. Gelfgat, A. Ulmann, and N. Brauner, “Non-modal stability analysis of stratified two-phase channel flows”

10:30 am – 10:50 am

Davide Montagnani (Politecnico di Milano, Italy)

Davide Montagnani and Franco Auteri, “Multiple solutions in swirling jet flows”

10:50 am – 11:10 am

Han-Ming Li (Chongqing University, China)

Han-Ming Li and Wan-Yuan Shi, “Effect of pool rotation on thermocapillary convection instabilities in annular pool of medium Prandtl liquid”

11:10 am - 11:40 am

Coffee break

Session B2-1 EHD-minisymposium (#1)

Chair: Vladimir Ajaev, SMU, USA

11:40 am – 12:00 pm

Vladimir Ajaev (SMU, Dallas, USA)

Mahnprit S. Jutley and Vladimir S. Ajaev, “Stability of electrolyte films on substrates with spatially periodic charge density”

12:00 pm – 12:20 pm

Kerem Uguz (Bogazici U, Turkey)

Sercan Altundemir, Pinar Eribol and A. Kerem Uguz, “Evolution of the electrohydrodynamic instability in a microchannel experiment”

12:20 pm – 12:40 pm

Anil Koklu (SMU, Dallas, USA)

Anil Koklu and Ahmet Sabuncu, “Electrothermally driven nonlinear vortex patterns on electrode array at physiological conductivities”

12:40 pm – 1:00 pm

Kerem Uguz (Bogazici U, Turkey)

S. Canberk Ozan and A. Kerem Uguz, “Effect of electrical Marangoni number on electrohydrodynamic instability”

Session B2-2a Technological applications and rotating flows (#2)

Chair: Alexander Gelfgat, Tel-Aviv University, Israel

11:40 am – 12:00 pm

Tomohiro Nimura (Tokyo U of Science, Japan)

Tomohiro Nimura and Takahiro Tsukahara, “Viscoelastic effect on roll cells in rotating plane Couette flow”

12:00 pm – 12:20 am

Luis Armando Torres-Cisneros (CINVESTAV-IPN, Mexico)

L.A. Torres-Cisneros, G. Perez-Angeli, R. Bartali, G.M. Rodriguez-Linan, and Y. Nahmad-Molinari,
“Runout and power dissipated in monodisperse granular dense flows”

Session B2-2b Computational Methods (#1)

Chair: Yuri Feldman, Ben-Gurion University, Israel

Co-chair: Junkun Ma, Sam Houston State U, USA

12:20 pm- 12:40 pm

Yuri Feldman (Ben-Gurion U, Israel)

Shahar Idan and Yuri Feldman, “ “Smart” passive thermal insulation of confined natural convection heat transfer: an application to hollow construction blocks”

12:40 pm – 1 pm

Meheboob Alam (J. Neru CASR, Bangalore, India)

Meheboob Alam and Nandu Gopan, “Pattern formation in Taylor-Couette flow via MD simulations”

1 pm – 1:20 pm

Gemunu Gunaratne (U Houston, USA)

Gemunu Gunaratne , “Koopman mode analyses of fluid flows”

1:20 pm – 2:30 pm

Lunch

(restaurants, cafes, bars near the Hotel)

2:30 pm – 3:20 pm

Plenary lecture #4:

Moshe Matalon (U Illinois at Urbana-Champaign, USA)

“Nonlinear consequences of the Darrieus-Landau instability in premixed combustion”

Chair: Pinhas Z. Bar-Yoseph (Technion , Israel)

Session B3-1a EHD-minisymposium (#2)

Chair: Vladimir Ajaev, SMU,USA

3:20 pm – 3:40 pm Igor Teplyakov (JIHT RAS, Russia)
Igor Teplyakov, Dmitriy Vinogradov, Irina Klementyeva and Yury Ivochkin, “Experimental and numerical investigation of the instability of the electrovortex flow in hemispherical container”

3:40 pm – 4:00 pm Alexander Wray (U Strathclyde, UK)
Alexander Wray, Demetrios T. Papageorgiou, Richard V. Craster, Khellil Sefiane, and Omar K. Matar, “Electrostatic control of the evaporation of nanoparticle-laden drops”

Session B3-1b Parametric excitation and control (#1)

Chair: Alex Nepomnyashchy, Technion, Israel

Co-chair: Alex Mikishev, Sam Houston State U, USA

4:00 pm – 4:20 pm Alex Oron (Technion, Israel)

Elad Serman-Cohen, Michael Bestehorn, and Alex Oron, “Rayleigh-Taylor instability in thin liquid films subjected to harmonic vibration”

4:20 pm – 4:40 pm Jose M. Vega (Universidad Politecnica di Madrid, Spain)

Jose M. Perez-Garcia, Fernando Varas and Jose M. Vega, “Parametric excitation of surface waves in horizontal containers under mixed horizontal/vertical vibrations”

Session B3-2 Computational Methods (#2)

Chair: Yuri Feldman, Ben-Gurion University, Israel

Co-chair: Junkun Ma, Sam Houston State U, USA

3:20 pm – 3:40 pm A. Monnier (U Bretagne-Sud, France)
A.Monnier, J. M. Cadou, G. Girault and Y. Guevel, “Immersed boundary method and asymptotic numerical method for steady simulation of incompressible viscous flow around moving obstacle”

3:40 pm – 4:00 pm Nikesh Yadav (Warsaw U of Technology, Poland)
Nikesh Yadav, S.W. Gepnet and J. Szumbariski, “Effect of low Reynolds number instabilities on the drag and mixing capability”

4:00 pm – 4:20 pm Jean-Lou Pfister (ONERA, France)

J.-L. Pfister, M. Carini and O. Marquet, "Fluid/elastic modes of a flexible plate clamped on a cylinder"

4:20 pm – 4:40 pm

Junkun Ma (Sam Houston State U, USA)

Junkun Ma, "Numerical analysis of the convective heat transfer coupled with phase change in the evaporative cooling process"

4:40 pm – 5:00 pm

Coffee break

Session B4-1 Parametric excitation and control (#2)

Chair: Alex Nepomnyashchy, Technion, Israel

Co-chair: Alex Mikishev, Sam Houston State U, USA

5:00 pm – 5:20 pm

Valentina Shevtsova (ULB, Belgium)

V. Shevtsova, V. Yasnou, A. Mialdun, Y. Gaponenko and A.A. Nepomnyashchy, "Instability of a miscible interface under periodic excitations"

5:20 pm – 5:40 pm

Alexander Nepomnyashchy (Technion, Israel)

Alexander B. Mikishev and Alexander A. Nepomnyashchy, "Parametrically excited long-scale Marangoni convection in a liquid layer covered by insoluble surfactant"

5:40 pm – 6:00 pm

Hiroyuki Nishikawa (Nagoya U, Japan)

Hiroyuki Nishikawa and Takashi Watanabe, "Chaos analysis of transition flow in a natural convection loop"

6:00 pm – 6:20 pm

Nikolai Kozlov (ICMM, Russia)

Nikolai Kozlov, Alexey Mizev, Andrey Shmyrov, Mariya Denisova and Konstantin Kostarev, "Double diffusion convection in a Hele-Shaw cell with vibrations"

6:20 pm – 6:40 pm

Alex Oron (Technion, Israel)

William Batson, Yehuda Agnon, and Alex Oron, "Thermocapillary modulation of self-rewetting films"

6:40 pm – 7:00 pm

Nikolai Kozlov (ICMM, Russia)

Nikolai Kozlov, "Steady flow in an annulus with varying number of deflectors at rotational vibration"

Session B4-2 Computational Methods (#3)

Chair: Yuri Feldman, Ben-Gurion University, Israel

Co-chair: Junkun Ma, Sam Houston State U, USA

5:00 pm – 5:20 pm

Alex Gelfgat (Tel-Aviv U, Israel)

Alex Gelfgat, "Linear stability of the lid-driven flow in a cube"

5:20 pm – 5:40 pm

P. De Palma (Politecnico di Bari, Italy)

C. Mancini, M. Farano, J.-C. Robinet, P. De Palma, and S. Cherubini, "Global stability analysis of 3-dimensional round jet diffusion flames"

5:40 pm – 6:00 pm

M. Farano (Politecnico di Bari, Italy)

M. Farano, P. De Palma, J.-C. Robinet, S. Cherubini and T.M. Schneider, "The emergence of hairpin vortices from exact coherent states in plane Poiseuille flow"

6:00 pm – 6:20 pm

Jose M. Vega (Universidad Politecnica, Spain)

Jose Miguel Perez, Soledad Le Clainche and Jose M. Vega, "Analysis of spatio-temporal structures in the three-dimensional cylinder wake"

6:20 pm – 6:40 pm

Johann Moulin (ONERA, France)

Johann Moulin and Olivier Marquet, "Prediction of thin plate flutter instability in turbulent flows based on linear stability analysis"

6:40 pm – 7:00 pm

S. Pradhan (IIS, Bangalore, India)

S. Pradhan, "DSMC simulations of high Mach number Taylor-Couette flow"

7:30 pm – 9:00 pm

We go to Ireland! Presentation of the next BIFD – 2019

Discussion “ Theory of Hydrodynamic Stability – past and future ...(?)”

Venue: Irish Pub “The Goose’s Acre” (Website: thegousesacre.com) (unofficial event)

Thursday , July 13

8:00 am – 6:00 pm

Day trip to NASA Johnson Space Center

Buses depart from the Marriott Hotel

(Lunch at the Space Center)

7:00 pm – 9:00 pm

BIFD banquet at the Marriott Hotel

Friday , July 14

9:00 – 9:50 ***Plenary lecture # 5:***

Vladimir Shtern (Ghent U, Belgium)

“Mechanisms of jet instabilities”

Chair: Alexander Gelfgat (Tel-Aviv U, Israel)

9:50 - 10:20

Coffee break

Session C1-1 Transition to turbulence

Chair: Vladimir Shtern, Ghent University, Belgium

10:20 am – 10:40 am

Genta Kawahara (Osaka University, Japan)

Takahiro Kanazawa, Masaki Shimizu and Genta Kawahara, “The sustaining mechanism of turbulent bands in plane channel flow”

10:40 am – 11:00 am

Bruno Souza Carmo (U Sao Paolo, Brazil)

Joao Anderson Isler, Rafael dos Santos Gioria, Bruno Souza Carmo, “A study of transient growth behavior in a constricted channel”

11:00 am – 11:20 am Anthony Rouquier (U Coventry, UK)
Anthony Rouquier, Chris Pringle and Alban Potherat, “Numerical study of the transition to turbulence in particulate pipe flows”

11:20 am – 11:40 pm V. Kumaran (IIS, Bangalore, India)
V. Kumaran, “Stability of fluid through soft-walled tubes and channels”

Session C1-2 Shear flows

Chair: Christian Ruyer-Quil, LOCIE, France

10:20 am – 10:40 am Luca Biancofiore (Bilkent U, Turkey)
L. Biancofiore, E. Heifetz, J. Hoepffner, and F. Gallaire, “The role of the surface tension in planar shear flows”

10:40 am – 11:00 am Luca Biancofiore (Bilkent U, Turkey)
Orkan M. Umurhan and Luca Biancofiore, “Quasi-geostrophic effects on the stability of the Rayleigh model subject to a uniform shear”

11:00 am – 11:20 am Kazuo Matsuura (Ehime University, Japan)
Kazuo Matsuura, “Disturbance growth during hairpin vortex generation in a laminar-boundary-layer flow”

11:20 am – 11:40 am Yu-Quan Liu (China U of Petroleum, China)
Yu-Quan Liu, “Instabilities of Couette-Poiseuille flow for shear-thinning fluids under crossflow”

11:40 pm – 12:00 pm *Coffee break*

Session C2 Theoretical aspects

Chair: Barry Friedman, Sam Houston State U, USA

12:00 pm – 12:20 pm Dmitriy Arkhipov (Novosibirsk University, Russia)
Dmitriy Arkhipov and Oleg Tsveldub, “Choosing basis functions of weighted residual method for modeling the joint flow of liquid film and turbulent gas”

12:20 pm – 12:40 pm Nick Evstigneev (Institute for System Analysis, Moscow, Russia)
Nick Evstigneev, “Numerical bifurcation analysis laminar-turbulent transition for 3D
Kolmogorov-type flow”

12:40 pm – 1:00 pm Olurotimi S. Ojoniyi (Tai Solarin U , Nigeria)
Olurotimi S. Ojoniyi and Abdulahi N. Njah, “Dynamics of hidden attractors in simplified novel 5-
D hyperchaotic Lorenz-like systems”

1:00 pm – 1:30 pm Discussions of the posters; closure of the BIFD-2017

1:30 – 3:00 pm *Lunch* (restaurants, cafes, bars near the Hotel)

Posters

MHD – 1 Ivan Belyaev, Denis Chernysh, Nikita Luchinkin, Natalia Pyatnickaya and Nikita Rasuvanov, “Influence of channel inclination on MHD-heattransfer of liquid metal flow”

FD-1 Lamia Bourdache and Amar Djema, “Free surface flow of two superposed fluids: stability analysis and modelling”

PE-1 Stanislav Subbotin, Victor Kozlov, and Rustam Sabirov, “Steady flows in oscillating elastic spheroidal cavity. Dependency on the dimensionless frequency”

TA-1 Benjamin Herrmann-Priesnitz, Williams R. Calderon Muñoz, Gerardo Diaz, and Rodrigo Soto, “Hydrodynamic stability of flow in a swirl flow channel”

TA-2 Erick Muiño-Garcia and Jose Marin-Antuna, “A study about the steady-state regime on rotating compressible fluids and its application on a diffraction problem”

ShF-1 Luis Fernando Arredondo Rodrigues and Esperanza R. Morales, “Design of an experimental device the evaluation of hydrodynamic profiles”

ShF-2 Doohyun Park and Kyung-Soo Yang, “On the secondary instability in planar shear flow past a circular cylinder”

ShF-3 T.P. Lyubimova and E.V. Kolesov, “Kelvin-Helmholtz instability at the interface of Newtonian viscous fluid and visco-plastic fluid moving parallel to each other in porous medium”.

ShF-4 T.P. Lyubimova and I.D. Muratov, "Thermal convection in an inclined porous layer heated from below"

ShF-5 T.P. Lyubimova and I.S. Fayzrakhmanova, "Gravity modulation effect on the onset of the Soret-induced convection in porous medium"

TrTUB-1 Sanjay Singh, Alban Potherat and Chris Pringle, "Experimental study of transition to turbulence in particulate pipe flow"