



# The 50<sup>th</sup> Midwest Universities Fluid Mechanics Retreat MUFMECH 2023

April 13-15, 2023

Geneva Center, Rochester, Indiana

## PROGRAM



----- Friday, April 14 -----

7:30 – 8:30am **BREAKFAST**

**Session A:** Chair: J. Foss; KOTGOF: A. Naguib

Talk	Time	Authors	School	Title
	8:30	Top Frog		Opening Remarks
1	8:40	A Baruah, A Farrell	MTU	Developments to CODEF: The Gaussian vortex lattice model for wind farm simulations
2	8:54	S Bhat, J Capecelatro	UM	Clustering of polydisperse particles in riser flow
3	9:08	A Borra, A Goza, T Saxton-Fox	UIUC	Space-Phase POD: Revealing small-scale dynamics modulated by intrinsic phase of large-scale dynamics
4	9:22	Z Chen, K Gupta, N Green, S Wereley	PU	Characterization of electrothermal microfluidic tweezers in bio-relevant media
5	9:36	A Dhulipalla, H Hu, H Hu	ISU	Experimental study on effects of inflight icing on multirotor UAV
6	9:50	K Digavalli, C Eluchie, H Hu, H Hu	ISU	A study on energy-efficient anti-/de-icing using pulsed electrothermal heating
7	10:04	A El-Nadi, N Khalifa, H Taha	IIT	Compressible unsteady aerodynamic loads on oscillating airfoils in a subsonic flow

10:17 – 10:40am **COFFEE**

**Session B:** Chair: P. Merati; KOTGOF: S. Dawson

Talk	Time	Authors	School	Title
8	10:40	R Ewoldt, C Saengow	UIUC	Designing complex fluids
9	10:54	M Fenelon, P Schmid, Y Zhang, L Cattafesta III	IIT	Kinematic decomposition of multi-pulse volumetric particle tracking velocimetry data
10	11:08	B Johnson	UIUC	A fountain of good times in an undergraduate fluid mechanics laboratory
11	11:22	Y Jojo-Cunningham, Y Liu	PNW	Resolving the volumetric flow field inside a cylindrical gas stirred water ladle model
12	11:36	T Liu, Z Cai, D Salazar, T Chen	WMU	Determining surface pressure from skin friction
13	11:50	A Malipeddi, J Capecelatro, A Figueroa	UM	A numerical recipe for large-scale simulation of particle-laden biological flows

12:03 – 1:20pm **LUNCH**, Steering Committee Meeting



**Session C:** Chair: T. Conlisk; KOTGOF: R. Ewoldt

Talk	Time	Authors	School	Title
14	1:20	T Mohankumar, J Weisfelder, P Zhang, JH Bahk	UC	All-electric, solid desiccant-based building dehumidification system controlled by solid-state thermoelectric heat pumps
15	1:34	A Mohit, J Capecelatro	UM	Optimizing nozzle designs for turbulent combustion using numerical simulations and machine learning
16	1:48	T Mondal, J West, S Williams	UL	Enhanced dielectrophoretic trapping of particles using a nanofiber mat
17	2:02	D Salazar, P Merati, T Ragupathy, T Liu	WMU	Underwater global luminescent oil-film (GLOF) skin friction measurements
18	2:16	A Oliva, S Morris	ND	Entropy balance of steady, quasi-one-dimensional, internal compressible flow with area change, heat addition, and friction
⚡	2:30	Lightening Talks: Maximum 4 minutes, 3 slides each	ND	Design and testing of an acoustic-to-flow energy conversion device
⚡			UIUC	Transport properties of Redox Flow Battery working fluids
⚡			NW	Flow entrainment and momentum conservation of mitral valvular regurgitation jet flow
⚡			UIUC	Predicting edge fracture in rotational shear flow rheometry
⚡			UM	Oscillatory extensional rheometry

3:00– 5:30pm **R & R, Group Photograph, Table Tennis**

5:30– 6:30pm **DINNER**

**Session D:** *Chair: W. Schultz; KOTGOF: S. Williams*



Talk	Time	Authors	School	Title
19	6:30	N Payne	IIT	Co-flow jet optimization
20	6:44	D Qi, K. Li	WMU	Simulations of helix motion of a flexible fiber in a three dimensional Couette flow in finite Reynolds numbers
21	6:58	A Rajan, J. Allen, K. Bellur	MTU	Reduced-order modeling of liquid-vapor interfacial dynamics using a vortex sheet evolution equation
22	7:12	J Foss	MSU	Greetings from 1973
	7:26	W. Schultz		Discussion including online guests, and presentation of 0.5-century cake.

8:00 – 11:00pm **Evening Social Gathering at Butler Lodge**

----- **Saturday, April 15** -----

7:30 – 8:30am **BREAKFAST**

**Session E:** *Chair: T. Liu; KOTGOF: J. Allen*

Talk	Time	Authors	School	Title
	8:30	Top Frog		Announcements and Remarks
23	8:40	S Pinto, Y Zhang, L Cattafesta, M Aghaeijouybari, JH Seo, R Mittal, C Meneveau	IIT	Characterization of periodic lattice anisotropic porous materials for passive flow control
24	8:54	P Sardana, S. Wereley	PU	Convolutional neural networks for particle diffusometry predictions
25	9:08	M Shahadat, Z. Li, D. Livescu, F. Jaber	MSU	Numerical study of compressibility and velocity parameter effects on spatially developing supersonic turbulent shear layers
26	9:22	U sharma, J. Allen	MTU	Role of thermophoresis on binary phase change materials for thermal energy storage
27	9:36	H Sista, H. Hu	ISU	An experimental investigation on icing physics pertinent to offshore wind turbine icing phenomena
28	9:50	J Sutradhar, B. Fan	MSU	Laminar drag reduction in microchannels with slippery polymer brush surfaces
29	10:04	B Tao, P. Sardana, Z. Chen, S. Wereley	PU	Height prediction in particle images using deep learning

10:17 – 10:40am **COFFEE**

**Session F:** *Chair: B. Johnson; KOTGOF: H. Hu*

Talk	Time	Authors	School	Title
30	10:40	E Torres De Jesús, E. De Jesús, T. Saxton-Fox	UIUC	Interaction and effects between the wake of a small cylinder and coherent structures in a turbulent boundary layer
31	10:54	J Wakefield, S. Subramaniam, J. Capecehatro	UM	Filter dependent measures of particle clustering in HIT
32	11:08	J Wang, H. Hu	ISU	A machine learning prediction and discovery of wind-driven water runback characteristics pertinent to aircraft icing phenomena
33	11:22	H Xie, K. Kalayeh, B.Sack, J. Fowlkes, B. Schultz	UM	A new model of ureteral peristalsis
34	11:36	A Yasin, U. Chakrabarti, K. Bellur, J. Allen	UC	An investigation of Marangoni induced flow in constrained vapor bubble ISS experiments

11:49am – 1:00pm **CLOSING REMARKS, LUNCH**