38th AIAA/ASME Oklahoma Symposium

Saturday, April 14, 2018

Prince Engineering Center
Oklahoma Christian University

Sponsored by

Oklahoma Section, American Institute of Aeronautics and Astronautics
Central Oklahoma Section, American Society of Mechanical Engineers
Mid-Continent Section, American Society of Mechanical Engineers

Hosted by

The Department of Mechanical Engineering
Dr. P. Wayne Whaley, Chair

College of Engineering & Computer Science
Dr. Byron Newberry, Dean

38TH AIAA ASME OKLAHOMA SYMPOSIUM
SCHEDULE OF EVENTS

8:15-9:00	Registration, Coffee & Donuts		PEC Atrium
9:00-9:10	Welcome		PEC 229
9:15-10:45			
	Session 1:	Materials	PEC 228
	Session 2:	Aero/Design	PEC 231
	Session 3:	Thermal/Fluids I	PEC 233
	Session 4:	Design	HSH 211
	Session 5:	Bio-Engineering	HSH 212
10:45-11:00	Coffee break		PEC Atrium
	Session 6:	Bio-Engineering /Humanitarian	PEC 228
	Session 7:	Modeling & Simulation	PEC 231
	Session 8:	Thermal/Fluids II	PEC 233
	Session 9:	Sensors & Signal Processing	HSH 211
	Session 10:	Materials & Manufacturing	HSH 212
12:30	Luncheon with Keynote Speaker		PEC 229

The Good, the Bad, and the Ugly of DoD Systems Acquisition and Development

Mr. David Winters

Mr. Winters will share several experiences from 48 years in the Aerospace/DoD development world. His experience includes:

- test/flight test engineer Armament Development and Test Center, Eglin AFB
- exchange engineer assigned to 5th AF and the Japanese Self Defense Force flight test center, Gifu AB, Kagamigahara-shi, Japan;
- Director of Weapons/Missiles, Hq USAF Systems Command/USAF RD part-time, Andrews AFB and Pentagon;
- Deputy for Engineering/Chief Engineer of a complex surveillance system and System Program Director Imager Intelligence Systems, Hanscom AFB MA;
- Vice President, C4ISR Systems for GenCorp Aerojet for the SBIRS High and JTAGS systems;
- Director, System Engineering Solutions and Executive Chairman of the Board for Ball Aerospace, Australia,
- Founder/Owner of Winters' Consulting, Technical Management Solutions Group with business units of Northrop Grumman, Lockheed Martin, Alliant Tech Systems, Textron/AAI, Raytheon, Spirit AeroSystems and others as clients.

Asking questions and being teachable were fundamental to success. Some key features of successful/good programs were missing in failed/Bad/Ugly ones.

Session 1: Materials

PEC 228

9:15-9:30 **Modified Re-Entrant Hexagonal and Arrowhead Structures for a Unique Mechanical Property,** Joonmo Koo, Ben Andrews, Amanda Styers, Chulho Yang, Ph.D., and Young Chang, Ph.D.

9:30-9:45 **Effect of Low Intensity Direct Currents on Mechanical Properties of Carbon Fiber Polymer Matrix Composites,** Ravi Akula, Kunal Mishra, and Raman P. Singh

9:45-10:00 **Electro-Mechanical Characterization of a Metamaterials-Inspired Smart Composite,** Vigneshwaran Krishnamurthy, Timothy Emerson, Alessio Lozzi, and James M. Manimala

10:00-10:15 **Mechanical Properties of Porous PDMS Foam,** W. Luo, M.C. Saha, and Y. Liu

10:15-10:30 **Advanced High Blade Area Wind Rotors for Residences and Small Businesses,** Layne Hammer and Paul W. Whaley

10:45-11:00 **Coffee Break**

Session 2: Aero/Design

PEC 231

9:15-9:30 **Study of Hot Surface Ignition Properties of Jet A/Canola Methyl Ester Blends in a Constant Volume Chamber,** B. Duong, R.N. Parthasarathy and S. R. Gollahalli

9:30-9:45 **Mass Properties Measurements of Aircraft Using Modal Analysis**, Robert Rucker

9:45-10:00 **The Effects of Rotor Diameter and Blade Shape on Wind Power for Residences and Small Businesses,** Shannon K. Fultz and Paul W. Whaley

10:00-10:15 **Effects of varying bristled area of biomimetic bristled wings on clap and fling aerodynamics,** M. Ford, V. Kasoju, and A. Santhanakrishnan

10:15-10:30 **Team Soar: Virtual Reality Aircraft Motion Simulator for Custom Aircraft Design Education,** Dr. Dominic Halsmer, P.E., David Ahrens, Nate Frailey, Connor McCain, Jordan Reutter, Matthew Samuelson, and John Voth

10:45-11:00 **Coffee Break**

Session 3: Thermal/Fluids I

PEC 233

9:15-9:30 **Impact of Biodiesel on Soot Particles Morphological Properties Extracted From Co-Flow Diffusion Air-Flame,** Alireza Abdihamzehkolaei and Wilson Merchan-Merchan

9:30-9:45 **Experimental Investigation of Dynamic Zero-Net Liquid Holdup in GLCC© Separator,** Megharaj Praneeth Karpurapu Srinivas Swaroop Kolla, Ram S. Mohan and Ovadia Shoham

9:45-10:00 **Analysis of Gas Carry-Under in GLCC© for Different Fluid Properties under Varying Liquid Levels,** Srinivas Swaroop Kolla, Ram S. Mohan and Ovadia Shoham

10:00-10:15 **Vibrating Bubble Column: Effect of Gas Sparger on Bubble Size Distribution,** Shahrouz Mohagheghian and Brian R. Elbing

10:15-10:30 **Scaling of the Near-Wall Velocity Profile With Polymer Drag Reduction Using Intrinsic Polymer Properties,** Zeeshan Saeed, Yasaman Farsiani and Brian R. Elbing

10:45-11:00 **Coffee Break**

Session 4: Design

HSH 211

9:15-9:30 **Ground Retrievable Anchoring Device,** N. Johnson, T. Turner

9:30-9:45 **WIND: A Competition to Engage Middle School and High Schools in Innovative Wind Energy Technology,** Shannon K. Fultz, Layne Hammer and Paul W. Whaley

9:45-10:00 **Learning How to Develop the Competency to Adapt,** Mary McCarty, Nkegoah Asaba Nguafor, Jackson Autrey, Zahed Siddique and Farrokh Mistree

10:00-10:15 **Hyperloop Design Competition – Team CODEX,** Paul Acheampong, Austin McCulloch, Samuel Moreira, and Daniel Rickard

10:15-10:30 **Gearboxes With Fixed Form Factors and Architectures for a Wide Range of Torques,** Ali Shahbazi Mastan Abad, Gehendra Sharma, Janet K. Allen, Farrokh Mistree

10:45-11:00 **Coffee Break**

Session 5: Bio-Engineering

HSH 212

9:15-9:30 **Radial Actuation in Liquid Crystal Elastomers for Biomedical Applications,** K. Harmon, J. Hausselle, and A. Azoug

9:30-9:45 **Effect of Knee Range of Motion on Kinetic Imbalances,** A. Hutnik, G. Johnson, and J. Hausselle, Ph.D.

9:45-10:00 **Synthesis and Characterization of Shape Memory Polymers for the Embolization of Intracranial Aneurysms,** R. P. Kunkel, D. Robinson, D. W. Laurence, J. Scherrer, J. Wang, B. Bohnstedt, Y. Liu, and C-H. Lee

10:00-10:15 **Development of a Novel Testing Procedure for Investigations of Chordae Mechanical Properties of the Tricuspid Heart Valve,** Colton Ross, Yi Wu, Ph.D., Chung-Hao Lee, Ph.D.

10:15-10:30 **Age-Dependent Variations in Joint Ranges of Motions During Gait,** E. Ekanayake and J. Hausselle, Ph.D.

10:45-11:00 **Coffee Break**

Session 6: Bio-Engineering/Humanitarian

PEC 228

11:00-11:15 **Enhancing Performance of Ceramic Pot Filters,** Morningstar Akinrinlola, Laura Carvajal and Ayanaw Mesganaw

11:15-11:30 **Development of a Multiscale Computational Modeling Framework for the Tricuspid Valve,** D. Laurence, Y. Wu, Ph.D., and C.-H. Lee, Ph.D.

11:30-11:45 **Treatment of Produced Water using Evaporative Desalination Technology,** K.A. Sallam, P. Sarin, and D.Y. Kim

11:45-12:00 **A Computational Framework for Solving the Wicked Problem of Sustainable Rural Development in India,** Abhishek Yadav, Janet K. Allen, Farrokh Mistree

12:00-12:15 **Field Testing of Miniature Wind Turbines,** Debra Wood, Parker LaMascus

12:30 **Luncheon (PEC Atrium)** **Keynote Speaker (PEC 229)**

Session 7: Modeling & Simulation

PEC 231

11:00-11:15 **Sub-Filter Scale Nonlinear Interaction Modeling for LES Using Deep Neural Networks,** Romit Maulik, MS, Omer San, PhD and Prakash Vedula, PhD

11:15-11:30 **An Optimized Discrete Filtering Framework for Large Eddy Simulations,** Sk. Mashfiqur Rahman, and Omer San, PhD

11:30-11:45 **Cold-Gas Performance: A Comparison of Analytical Methods and Computational Fluid Dynamics,** Pierre F. Ghali

11:45-12:00 **Recrystallization Modelling and Robust Concept Exploration Using Inverse Goal–Oriented Decision Based Design Method,** Mohan, Pranav, Nellippallil, Anand B., Allen, Janet K., Mistree, Farrokh

12:00-12:15 **Multiple Surrogate Modeling for Multi-Stage Hot Rod Rolling System Design**, Reza Alizadeh, Janet K. Allen, Farrokh Mistree

12:30 **Luncheon (PEC Atrium)** **Keynote Speaker (PEC 229)**

Session 8: Thermal/Fluids II

PEC 233

11:00-11:15 **Zero-Net Liquid Holdup in GLCC© Under Flowing Conditions – A Mechanistic Model and Its Validation,** Megharaj Praneeth Karpurapu Srinivas Swaroop Kolla, Ram S. Mohan and Ovadia Shoham

11:15-11:30 **Evolution of Gas Volume Fraction in Lower Section of GLCC© in Control Configuration,** Srinivas Swaroop Kolla, Ram S. Mohan, and Ovadia Shoham

11:30-11:45 **Mixing and Entrainment of Chocked Gaseous Jets,** A.M. Sheridan, K.A. Sallam, and M. Henneke, P.E.

11:45-12:00 **Streamlined Temperature-Altering Response Cooler,** S. Higginbotham, C. McGraw, T. Monnier, and A. Short

12:00-12:15 **Dependence of the Hydration Time on Particle Size for a Drag Reducing Polymer Powder,** Jeb Wallace, Shelby Webb, Yasaman Farsiani and Brian Elbing

12:30 **Luncheon (PEC Atrium)** **Keynote Speaker (PEC 229)**

Session 9: Sensors & Signal Processing

HSH 211

11:00-11:15 **Low-Cost DIC Sensitivity to Speckle Patterns,** T. Estrada, and A. Azoug

11:15-11:30 **Utilizing the RMS of the Cepstrum as an Early Indicator of Bearing Damage,** Austin Wondra and Paul W. Whaley

11:30-11:45 **A Statistical Feature Based Approach to Assess the Performance Degradation of Rotary Lip Seal,** Madhumitha Ramachandran, and Zahed Siddique

11:45-12:00 **Infrasonic Recordings during a Tornado,** Jared C. Hartzler, Christopher E. Petrin and Brian R. Elbing

12:00-12:15 **Dynamic Characterization of Inertant and Quasi-Inertant Structures,** Karthik Madhamshetty, and James M. Manimala

12:30 **Luncheon (PEC Atrium)** **Keynote Speaker (PEC 229)**

Session 10: Materials & Manufacturing

HSH 212

11:00-11:15 **Manufacturing of Conductive Polymer Nanocomposite for Strain Ensing Application,** M. Abshirini, M. Charara, Y. Liu, M. Saha, and M. C. Altan

11:15-11:30 **Design of a 3D Printed Rupture Disc,** J. Bishoff, T. Ekblad, F. Maalik, C. Ophus

11:30-11:45 **Optimization of Additive Manufacturing Process for PLA-Steel Polymer Composites,** Phi Voung, Anthony Aguilar, Jimmy Tran, Hitesh D. Vora

11:45-12:00 **Temperature Effects in the Thermal Conductivity of Aligned Morphous Polyethylene – Molecular Dynamics Study,** Rajmohan Muthaiah and Jivtesh Garg

12:00-12:15 **Passive Mechanical Wave Manipulation Using Nonlinear Metamaterials,** Sabiju Valiya Valappil, Catherine Sheehan, and James M. Manimala

12:30 **Luncheon (PEC Atrium)** **Keynote Speaker (PEC 229)**