

15th Dayton Engineering Sciences Symposium

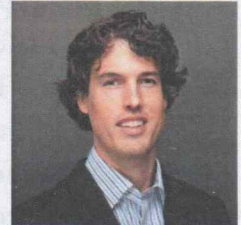


Tuesday, October 29th, 2019
University of Dayton, Kennedy Union

Welcome

On behalf of the Organizing Committee, we are excited to welcome you to the 15th Annual Dayton Engineering Sciences Symposium (DESS). Sponsored by the Dayton Section of the American Society of Mechanical Engineers (ASME), this symposium is intended to facilitate communication between members of the regional technical community and to provide a forum for students, engineers, and scientists to present their work and sharpen their technical presentation skills.

We hope that this event will serve to inspire innovation and encourage increased engagement and cooperation within the Dayton region's professional and student communities. Its success would not have been possible without all of your participation: speakers, session chairs, sponsors, students, faculty, government and industry representatives, organizing committee members, and the ASME Dayton Section Executive Board. We would like to express our sincere appreciation to all, especially to those listed below for their selfless dedication to make DESS 2019 a success.



Timothy Reissman
Symposium Chair



Megan Reissman
Symposium Vice-Chair



Keynote Speaker Eric Schearer, Ph.D.

Talk Title: Developing Fancy Technology for People with Disabilities: Does it Matter?

Eric M. Schearer is an Assistant Professor of Mechanical Engineering and Director of the Center for Human-Machine Systems at Cleveland State University. He received a B.S. in mechanical engineering and a M.B.A. from the University of Notre Dame, a M.S. in robotics from Carnegie Mellon University, and a Ph.D. in mechanical engineering from Northwestern University. He is a member of the Bioscientific Staff at MetroHealth Medical Center and a member of the Cleveland Functional Electrical Stimulation Center. He develops control strategies to restore reaching and grasping movements to people with paralyzed arms via functional electrical stimulation and wearable robotics. He developed a course sequence called "Disability, Empathy, and Technology" which trains engineers to work with people with disabilities. He previously worked as a consultant at Exponent, Inc., and as an officer in the United States Air Force.

THANK YOU TO OUR ORGANIZING COMMITTEE

DESS Committee

Technical Program – Tim Erdmann,
Jeff Monfort , Joy Gockel

Keynote – Tim Reissman

Session Chair Org. – Jeff Monfort

Website and Registration – Tim Leger

UD Conferences – Amanda Allgood

Sponsorship – Sivaram Gogineni ,
Tim Reissman

Public Relations – Megan Reissman

Government Relations – Brent Rankin

Financial Coordinator – Vince Miller

Executive Advisor – Sivaram Gogineni

Academic Representatives

AFIT – Adedeji Badiru

Cedarville University – George Qin

Ohio State University – Datta Gaitonde

Univ. of Cincinnati – Ephraim Gutmark

University of Dayton – Tim Reissman

UDRI – John Leland

Wright State University – Joy Gockel

ASME Dayton Section, Chair – Joe Miller

THANK YOU TO OUR SPONSORS AND PARTNERING ORGANIZATIONS





Room	KU 207 SESSION 1	KU 211 SESSION 2	KU 222 SESSION 3	KU 310 SESSION 4	KU 331 SESSION 5	KU 312 SESSION 6	
Time	9:00AM	9:15AM	9:30AM	9:45AM	9:45AM	9:45AM	
Topic	Manufacturing I Chair: Wesley Eid - WSU * DESS2019-002 * Additive Manufacturing: Porosity in Laser Powder Bed Fusion Sabrina D'Alessandro - WSU Andrew Harvey - WSU Dr. Joy Gokel - WSU	Design and Optimization Chair: Tahseen Alwattar - WSU DESS2019-004 Investigating mechanical response of heterogeneous lattice cell structures involving vertical and horizontal struts using numerical approaches Tahseen Alwattar - WSU Dr. Ahsan Mian - WSU	Biomedical I Chair: Vinayak Vijayan - UD DESS2019-009 Integration of Human Factors, Cognitive Ergonomics, and Artificial Intelligence in the Human-Machine Interface for Additive Manufacturing Sharon Bommer - UD Eric Doran - UD Alededji Badiru - AFIT	Fluids and Heat Transfer I Chair: Jennifer Colborn - UD DESS2019-007 Modeling Nonlinear Heat Transfer for a Pin-on-Disc Sliding System Brian Boardman - AFIT Dr. William Baker - AFIT Dr. Anthony Palazzotto - AFIT * DESS2019-015 * Identifying a Heat Transfer Ratio for Steady State High-Speed Sliding Contact Eiloria Shaw - WSU Dr. William Baker - AFIT Dr. Anthony Palazzotto - AFIT	Aerospace and Space I Chair: Kyle Matissek - AFIT DESS2019-071 A Near-Real Time Near-Optimal Shortest Path Solution for an Unmanned Aerial System (UAS) in a Highly Constrained Environment Kyle Matissek - AFIT Dr. Richard G. Cobb - AFIT Dr. David R. Jacques - AFIT Dr. David J. Graymin - AFRL Lt Col Michael D. Zollars - AFLCM	Energy I Chairs: Shane Kosir - UD DESS2019-035 A Machine Learning Framework for Drop-in Volume Swell Characteristics of Sustainable Aviation Fuel Shane Kosir - UD Joshua Heyne - UD John Graham - UDRI	Energy I Chairs: Shane Kosir - UD DESS2019-073 Machine-Learning Enabled Accurate Prediction of Energy Savings from Thermostat Setpoint Schedule Changes Using Smart WiFi Thermostat Data Justin Eihren - UD Kefan Huang - UD Lu Hao - UD
Topic	DESS2019-020 Role of carbide coarsening in mechanical properties of Nickel Alloy 718 manufactured by laser beam powder bed fusion David Newell - AFIT Dr. Anthony Palazzotto - AFIT Ryan P. O'Hara - AFIT	DESS2019-039 Characterizing the Strength and Rigidity of Tensegrity Aircraft Wings Austin Mills - UD Dr. David Myska - UD Dr. Andrew Murray - UD Dr. James Joo - AFRL Dr. Daniel Woods - AFRL	DESS2019-052 Computational Assessment of Aortic Valve Function and Mechanics Under Hypertension Saurav Kadel - WSU Phillippe Stucosky - WSU	* DESS2019-061 * Wing Performance Changes Due to Trailing Edge Extensions Rachael Supina - UD Michael Mongin - UD Sidaard Gunasekaran - UD Rolf Sondergaard - AFRL	DESS2019-060 Development of Universal Autopilot Translator Nicholas Degroote - UC Evan Barnes - UC Anthony Lamping - UC Dr. Kelly Cohen - UC	DESS2019-062 Automated Residential Energy Audits and Savings Measurements Using a Smart WiFi Thermostat and Data Mining Approach Abdulrahman M. Alnazei - UD Kefan Huang - UD	
Time	9:45AM	9:45AM	9:45AM	9:45AM	9:45AM	9:45AM	

Break



Room	KU 207 SESSION 7 Manufacturing II Chair: Hasanain Abdulhadi WSU	KU 211 SESSION 8 Mechanics and Materials I Chair: Luke Hoover UD	KU 222 SESSION 9 Biomedical II Chair: Kyra Twoly UD	KU 310 SESSION 10 Fluids and Heat Transfer II Chair: Rydge Mulford UD	KU 331 SESSION 11 Aerospace and Space II Chair: Jielong Cai UD	KU 312 SESSION 12 Energy II Chair: Harrison Yang UD
10:15AM	DESS2019-014 Analysis of the Behavior of a 3D Printed Celestial Icosahedron Structure Under Compressive Loading Kevin Greenoe - AFIT Dr. Anthony Palazotto - AFIT	DESS2019-059 An Efficient Iterative Approach for Determining the Post-Necking True Stress-Strain Response of Aerospace Metals Luke Hoover - UD Christopher A. Negri - UD Robert L. Lowe - UD Jeremiah T. Hammer - OSU Jeremy D. Seidt, Amos Gilat - OSU	DESS2019-046 Design of a Trike for Paraplegic Use with FES Anthony Bazler - UD Dr. Andrew Murray - UD Dr. David Myszka - UD Joe Bernicke - UD Bennett Synder - UD	* DESS2019-029 * Profiling Optical Turbulence using Dual Camera Time Lapse Imagery Benjamin Wilson - AFIT Dr. Santiasi Bose-Pillai - AFIT Dr. Jack McCrae - AFIT	DESS2019-051 Effects of Decalage on Distributed Lift Configurations for Aircraft Michael Mongin - UD Andrew Truszkowski - UD Aaron Altman - AFRL	DESS2019-056 An Analysis of Well-Stirred Reactors for Combustion Applications Robert Stachler - UD Dr. Joshua Heyne - UD Dr. Scott Stouffer - UDRI
10:30AM	DESS2019-025 Experimental and computational investigation of the post-yielding behavior of 3D printed polymer lattice structures. Abdulsalam Fadel - WSU Dr. Ahsan Mian - WSU	DESS2019-011 The Helical Sphere - A Near-Vacuum Lighter-than-Air Envelope Ruben Adorno - AFIT Dr. Anthony Palazotto - AFIT	* DESS2019-045 * Development of a Computational Framework for Estimating Knee Joint Contact Forces in Walking and Running Sean Kapp - UD Dr. Joaquin Barrios - UD Dr. Allison Kinney - UD	DESS2019-049 Numerical modeling of turn-down ratio for a dynamic spacecraft radiator functionalized with electrochromic surfaces Dr. Rydge Mulford - UD Nicholas DeBortoli - UD Cahvin Callahan - UD	DESS2019-012 Spacecraft Attitude Determination using Terrestrial Illumination Matching Liberty Shockley - AFIT Major Robert A. Bettinger - AFIT	DESS2019-047 An Investigation into the Potential for Fusel Alcohol Mixtures from Biomass Derived Feedstocks to Improve the Efficiency of Gasoline Blends Lily Behnke - UD Eric Monroe, Ryan W. Davis - SNL Anthe George - SNL
10:45AM	DESS2019-019 Mechanical Properties of Additively Manufactured Periodic Cellular Structures Derek Spear - AFIT Dr. Anthony Palazotto - AFIT	DESS2019-042 Progressive Failure in Bolted Hybrid Composite Joints John Brewer - AFIT Dr. Anthony Palazotto - AFIT John Fele - AFRL Michael Gran - AFRL	DESS2019-058 Smart Cane: A Pilot Study Examining How People Walk with Canes in the Wild Sydney Lundell - UD Ben Berry - UD Dr. Megan Reissman - UD Dr. Timothy Reissman - UD	DESS2019-055 Fundamental Flowfield Production using a Swirl Generator Rig Marcus Acion - WSU Dr. Mitch Wolff - WSU Dr. Mike List - AFRL	DESS2019-018 Effect of Airfoil-Preserved Undulations on Wing Performance Faith Loughnane - UD Sidaard Gunasekaran - UD Rachael Supina - UD Michael Mongin - UD	DESS2019-057 Chemical and Physical Effects on Lean Blowout in a Single-Cup Swirl-Stabilized Combustor Jennifer Colborn - UD Dr. Joshua Heyne - UD Tyler Hendershoot - UDRI Dr. Scott Stouffer - UDRI Edwin Corporan - AFRL
11:00AM	DESS2019-034 Toughened Zirconia as Dental Implant Material Abdullah Al Saad - UTO Prabha Sliker - UTO Devin Dinh Ta - UTO Sarli B Bhaduri - UTO	DESS2019-024 Optimization-Based Laser Shock Pressure Impulse Determination Colin Engebretsen - AFIT Dr. Anthony Palazotto - AFIT Kristina Langer - AFRL	DESS2019-048 Lower body joint kinematics following an anterior cruciate ligament (ACL) reconstruction surgery Vinayak Vijayan - UD Shanpu Fang - UD Dr. Allison Kinney - UD Dr. Megan Reissman - UD		DESS2019-001 Propeller Partial Ground Effect Jielong Cai - UD Sidaard Gunasekaran - UD Anwar Ahmed - AUB Michael OL - FOL	DESS2019-040 Orthogonal Reference Surrogate Fuels for Operability Testing Harrison Yang - UD Robert Stachler - UD Dr. Joshua Heyne - UD
11:15AM			DESS2019-053 Virtual Train Rides Will Challenge Your Standing Balance Leah O'Shea - UD Dr. Megan Reissman - UD			
11:30AM						

Break





		Kennedy Union Ballroom					
		Lunch and Networking (Visit Buffet and be Seated)					
		Welcome & Opening Remarks: Dr. Timothy Reissman, 15 th DESS Chair Prof. Eric Scheerer, Cleveland State University					
		Break					
Time	Room	KU 207 SESSION 13 Manufacturing III Chair: Alex Elsbrock UD DESS2019-022	KU 211 SESSION 14 Mechanics and Materials II Chair: Dr. Joy Gockel WSU DESS2019-013	KU 222 SESSION 15 Biomedical III Chair: Shaupu Fang UD DESS2019-010	KU 310 SESSION 16 Fluids and Heat Transfer III Chair: Samuel Barnhart UD DESS2019-041	KU 331 SESSION 17 Aerospace and Space III Chair: Alexander Collins AFIT DESS2019-028	KU 312 SESSION 18 Energy III Chair: Katherine Opacich UD DESS2019-043
12:00PM							
12:30PM							
1:20PM							
1:30PM		Direct Printing of nanosilver (UTDAg) ink on Kapton Substrate using Jetlab 4xl <i>Aamir Hamad - WSU Dr. Ahsan Mian - WSU</i>	Application of the Theory of Critical Distances to Coupled Defects in Additive Manufacturing <i>Wesley Eidd - WSU Craig Baudendistel - WSU Dr. Joy Gockel - WSU</i>	Using DEJ Systems Model to Develop and Integrate AI-Based Technology for People with Disabilities: A Human Factors Framework <i>Adeleji Badiru - AFIT Sharon Bommer - UD</i>	Design and Analysis of an Additive Manufactured Supersonic Wind Tunnel <i>Scott Chriss - UD Austin Abel - UD Mathew Gazella - AFRL Dr. Sidaard Gunasekaran - UD</i>	Policy and Geopolitical Implications of Launch-on-Demand Capabilities <i>Robert Bettinger - AFIT Liberty Shockley - AFIT</i>	Improving Cooling Energy-Efficiency: A Case Study of Kettering Labs <i>Andrea Mott - UD Patrick Fitzgerald - UD Abhresh Sehvachanabady - UD Amanda Abarado - UD</i>
1:45PM		Instrumented Impact Behavior of ULTEM 9085 Panels Produced by Additive Manufacturing <i>Alex Elsbrock - UD Robert L. Lowe - UD Thomas J. Whitney - UD</i>	Designing New Generations of Body-Centered Cubic (BCC) Lattice Structures Based on Strut Orientation and Length <i>Hasanain Abdulhadi - WSU Dr. Ahsan Mian - WSU</i>	Optimizing a Brain-Machine-Interface to Create Artworks using EEG Technology <i>Ashley Martin - CRFS</i>	Investigation of Scated Down Doppler Lidar for Velocity Measurements in Wind Tunnels <i>Samuel Barnhart - UD Dr. Sidaard Gunasekaran - UD</i>	UCAV at 2019 AUVSI SUAS Competition <i>Austin Wessels - UC Nicholas DeGroot, Nicholas Little - UC Dr. Kelly Cohen - UC</i>	
2:00PM		3D-Printed NinjaTek Cheeah: Influence of Process Parameters on Tensile Properties <i>Brad Hripko - UD London Ayton, Will Parker - UD Dr. Timothy Reissman - UD Dr. Robert Lowe - UD</i>	Developing Scaling Laws to Predict Elastic Mechanical Characteristics and Geometrical Parameters of Modified BCC Lattice Structures <i>Hasanain Abdulhadi - WSU Dr. Ahsan Mian - WSU</i>	Influence of Factors on the Stability of Older Adults Performing an Overhead Reaching Task <i>Kyra Twoly - UD Dr. Kimberly Bigelow - UD</i>	Multi-Mode Rankine Cycle for Power and Thermal Management <i>Nathaniel Payne - WSU Dr. Mitch Wolff - WSU Dr. Rory Roberts - WSU Levi Elston - AFRL</i>	Application of an Event-Driven Logistics Network to Cisunar Space Operations <i>Alexander Collins - AFIT Kirk W. Johnson - AFIT</i>	Analyzing the Ignition Differences Between Conventional Spark Discharges and Nanosecond-Pulsed High-Frequency Discharges <i>Katherine Opacich - UD Dr. Joshua S. Heyne - UD Dr. Timothy Ombrallo - AFRL Robert J. Leibeke - AFRL Dr. Joseph K. Lefkowitz - TU</i>
2:15PM		A Simplified Investigation into Fatigue Viability of Additively Manufactured IN-718 <i>Austin Schoening - WSU Luke Sheridan - AFRL Onome Scott-Emuakpor - AFRL Tommy George - AFRL</i>	Influence of Added Mass on the Kinematics of Over-Ground Walking: Preliminary Results <i>Shaupu Fang - UD Vinayak Vijayan, Allison Kinney - UD Ellen Lucchesi, Peter St. Amant - UD Dr. Megan Reissman - UD Dr. Timothy Reissman - UD</i>	Performance and Proximity Investigations on Small Scale Lensed Turbines <i>Neal Novotny - UD Dr. Sidaard Gunasekaran - UD</i>		Neural-Fitted Integral Reinforcement Learning in Simulink <i>Andrew Ellicott - WSU Dr. Rory Roberts - WSU</i>	
2:30PM							

Adjourn





Ballroom

11:30AM - 12:00PM Poster Session

<p><i>DESS2019-003</i></p> <p>A Sustainable Prototype for Renewable Energy: Optimized Prime-Power Generator Solar Array Replacement</p> <p>Nathan Thomsen - AFIT Lt Col Torrey Wagner - AFIT Lt Col Andrew Hoisington - AFIT Reza Salavani - AFCEC Maj Steven Schuldt - AFIT</p>	<p><i>DESS2019-021</i></p> <p>Developing and Implementing a Viability Framework to Evaluate 3D-Printed Construction</p> <p>Jenee Jagoda - AFIT Steven Schuldt - AFIT</p>	<p><i>DESS2019-023</i></p> <p>Development of a Forward Operating Base Assessment Model Quantifying the Environmental and Economic Performance of Site Infrastructure</p> <p>Jamie Filer - AFIT Steven J. Schuldt - AFIT</p>	<p><i>DESS2019-033</i></p> <p>Insulation Sensitivity Analysis for an Optimized Hybrid Energy System Powering a Fabric Shelter</p> <p>Jay Pearson - AFIT Torrey Wagner - AFIT Steven Schuldt - AFIT</p>
<p><i>DESS2019-065</i></p> <p>Data Mining for Residential Buildings using Smart WiFi Thermostats</p> <p>Kefan Huang - UD Abdulrahman Alanezi - UD</p>	<p><i>DESS2019-064</i></p> <p>A Smart WiFi Thermostat Data-Based Neural Network Model for Controlling Thermal Comfort in Residences Through Estimates of Mean Radiant Temperature</p> <p>Yisheng Lou - UD</p>		

Abbreviations:

- AFCEC = Air Force Civil Engineering Center
- AFIT = Air Force Institute of Technology
- AFLCM = Air Force Life Cycle Management Center
- AFRL = Air Force Research Laboratory
- AUB = Auburn University
- CRHS = Carroll High School
- DRSS = Dayton Regional STEM School
- FOL = Folderol, LLC
- HALL = Hodson Aerospace LLC
- OSU = The Ohio State University
- SNL = Sandia National Laboratories
- UC = University of Cincinnati
- UD = University of Dayton
- UDRI = University of Dayton Research Institute
- UTC = Universal Technology Corp.
- UTO = University of Toledo
- TU = Technion University



