



Greater Huntsville Section

## AIAA Young Professional Symposium Agenda

### Location:

Dynetics Solutions Complex  
1004 Explorer Blvd NW  
Huntsville, AL 35806

\*indicates presenting author

### Day 1 (Oct. 20, 2016)

#### **7:00 – 8:00 AM**

*Registration, Coffee/Snacks, and Networking*

#### **8:00-9:00 AM**

- *Conference Welcome and Keynote*
  - Dr. Steve Pierce, CTO, US Army-SMDC

#### **9:00-11:40 AM Technical Presentations**

- **Space Exploration and Environments (9:00 – 10:20)**  
Session chair: Edwin Ethridge, Space Resources Extraction Technology, Inc.
  - **9:00 – 9:20: Towards Von Neumann Probes: Architecture and Technologies for Exploration with Replicating Spacecrafts**  
*Kunning G. Xu, University of Alabama in Huntsville*
  - **9:20 – 9:40: Investigations of desiccants and CO2 sorbents for advanced exploration systems**  
*Gregory Cmarik\*, Jacobs ESSSA Group*  
*Jim Knox, NASA Marshall Space Flight Center*
  - **9:40 – 10:00: Arusha Long Range Rover**  
*Leslie Smith\*, NASA Marshall Space Flight Center*  
*Robert Howard, Jr., NASA Johnson Space Center*  
*Marie-Jeanne Steady Ndiaye, Boeing*

**10:00-10:20** Coffee/networking break

- **Modeling and Simulation (10:20-12:00)**  
Session chair: Albanie Bolton, NASA Marshall Space Flight Center
  - **10:20 – 10:40: Space Launch System Base Heating Test: Environments and Base Flow Physics**  
*Manish Mehta, Mark Seaford, NASA Marshall Space Flight Center*  
*Kyle Knox\*, Jacobs ESSSA Group*  
*Aaron Dufrene, CUBRC*
  - **10:40 – 11:00: In-Space Manufacturing Impacts on Logistics Mass and Risk for Long-Endurance Human Spaceflight**  
*Andrew Owens\*, Olivier de Weck, Massachusetts Institute of Technology*
  - **11:00-11:20: Missile End-Game Performance Modeling Using Machine Learning**  
*Kevin Albarado, Dynetics, Inc*
  - **11:20-11:40: Thermal Modeling Challenges of the Iodine Satellite (iSAT)**  
*Stephanie Mauro, NASA Marshall Space Flight Center*



Greater Huntsville Section

- **11:40-12:00: Application of Design of Experiments and Surrogate Modeling within the NASA Advanced Concepts Office, Earth-to- Orbit Design Process**  
*Mathew R. Zwack\*, Patrick D. Dees, Jacobs ESSSA Group*  
*James B. Holt, NASA Marshall Space Flight Center*

**12:00 PM-1:00 PM**

- **Lunch (Keynote)**
  - Dr. Jonn Kim, CEO, Geeks and Nerds Corp.

**1:00 -3:40 PM**

- **Materials and Structures**  
Session chairs: Dawn Phillips, NASA Marshall Space Flight Center  
Bruce Willis, NASA Marshall Space Flight Center
  - **1:00 – 1:20: 3D Printing in Zero G Technology Demonstration Mission: Summary of On-Orbit Operations, Materials Testing, and Future Work**  
*Tracie Prater\*, Quincy Bean, Niki Werkheiser, Frank Ledbetter, NASA Marshall Space Flight Center*
  - **1:20 – 1:40: Additive Construction with Mobile Emplacement: An Automated Technology to Impact Deep Space Architecture and Improve Life on Earth**  
*Mallory Johnston\*, John Fikes, NASA Marshall Space Flight Center*  
*Jennifer Edmunson, Michael Fiske, Jacobs ESSSA Group*
  - **1:40 – 2:00: 3-D Printed Pressure Vessel Design for Maximum Volume to Weight Optimization**  
*Brandon J. Straight, University of Alabama in Huntsville*
  - **2:00-2:20: Full Build Thermal Modeling of the Selective Laser Melting Process**  
*Tom J. Stockman\*, Judith Schneider, University of Alabama Huntsville*
  - **2:20 – 2:40: Experimental Frequency Response Functions on Helicopter Drivetrains**  
*Matt Statham, Aviation Missile Research and Development Engineering Directorate (AMRDEC)*
- **Guidance Navigation and Control**  
Session chairs: Mark Phillips, NASA Marshall Space Flight Center  
John Hanson, NASA Marshall Space Flight Center
  - **2:40 – 3:00: : Flex Dynamics Avoidance Control of the NEA Scout Solar Sail Spacecraft's Reaction Control System**  
*Brandon Stiltner\*, Jacobs ESSSA Group*  
*Andrew Heaton, NASA Marshall Space Flight Center*  
*Benjamin Diedrich, Dynamic Concepts, Inc, Jacobs ESSSA Group*  
*Christopher Becker, NASA Marshall Space Flight Center*  
*Juan Orphee, Jacobs ESSSA Group*
  - **3:00-3:20: Augmenting Conceptual Design Trajectory Tradespace Exploration with Graph Theory**  
*Patrick D. Dees\*, Mathew R. Zwack, Jacobs ESSSA Group*  
*Stephen Edwards, Michael Steffens, NASA Marshall Space Flight Center*
  - **3:20-3:40 Time Domain Stability Margin Assessment Method**  
*Keith Clements, ERC, Jacobs ESSSA Group*



Greater Huntsville Section

**3:40-4:00 PM**

- *Afternoon coffee break and networking time*

**4:00-5:00 PM**

- *Panel discussion on Space Entrepreneurship*
  - Lead Panelist: Chris Beaman, The Foundry
  - Panelist: Mark Becnel, RadioBro
  - Panelist: Dr. Edwin Ethridge, NASA-MSFC (ret),, Space Resources Extraction Technology, Inc.
  - Panelist: Tim Pickens, Pickens Innovations
  - Panelist: Anthony Brinkley, Zero Point Frontiers



Greater Huntsville Section

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### Day 2 (Oct. 21, 2016)

#### **7:00 -8:00 AM**

*Registration, Coffee/Snacks, and Networking*

#### **8:00-9:00 AM**

- *Keynote*
  - Fmr. Astronaut N. Jan Davis, Jacobs-ESSA Group

#### **9:00-11:40 AM**

- **Track 1: Aerodynamics and Acoustics**
  - Session chairs: Kris Strobe, Aviation Missile Research and Development Engineering Directorate  
David O'Brien, Aviation Missile Research and Development Engineering Directorate
  - **9:00 – 9:20: An Improved RBF Mesh Deformation Approach for Fluid-Structure Interaction Problems**  
*Mohamed M. Selim\*, Roy P. Koomullil, David R. McDaniel, University of Alabama in Birmingham*
  - **9:20 – 9:40: Application and Validation of a Physics-Base Flight Simulator for Optimized Airfoil Testing**  
*Michael Dunning, University of Alabama in Huntsville*
  - **9:40 – 10:00: Flow Quality Characterization of a New Nozzle for a Mach 2 Wind Tunnel**  
*Adam J. Harris\*, Phillip A. Kreth, John D. Schmisser, University of Tennessee Space Institute*
  - **10:00 – 10:20: Advances in Aircraft Instrumentation Leveraging Small Spacecraft Design**  
*Mark Becnel, RadioBro Corporation*
  - **10:20 – 10:40: Shock Wave/Turbulent Boundary Interactions on a Cylinder**  
*Stefen A. Lindörfer\*, Christopher S. Combs, Phillip A. Kreth, and John D. Schmisser, University of Tennessee Space Institute*
  - **10:40 – 11:00: Visual Diagnostics of the Dynamics of Transitional Shock Wave Boundary Layer Interactions**  
*E. Lara Lash\*, Christopher S. Combs, Phillip A. Kreth, John D. Schmisser, University of Tennessee Space Institute*
  - **11:00 – 11:20: Optical Atmospheric Turbulence Characterization using sUAS Dual Beacon Differential Image Motion Monitor and Differential Temperature Measurements**  
*Alex Clark\*, Kratos Defense*  
*Daniel Whitney, University of Alabama in Huntsville*



Greater Huntsville Section

- **Track 2: Propulsion Systems and Architectures**

Session chairs: Tim Pickens, Pickens Innovations

Robin Osborne, ERC, Inc./Jacobs ESSSA

- **9:00 – 9:20: Hydraulic Flow Simulators on the Two Axis Inertial Load Simulator**  
*Adam Dziubanek, NASA Marshall Space Flight Center*
- **9:20 – 9:40: Pore Size Distribution Characterization of Porous Hybrid**  
*Joe Buckley\*, George Nelson, University of Alabama in Huntsville*
- **9:40 – 10:00: NPO Energomash and the Road to the RD180 and RD181 Engines**  
*Adam Kimberlin, NASA Marshall Space Flight Center*
- **10:00 – 10:20: Effects of Radiation Heating on Additively Printed Hybrid Fuel Grain Oxidizer-to-Fuel Ratio Shift**  
*Stephen A. Whitmore, Stephen L. Merkley\*, Utah State University*
- **10:20 – 10:40: Computational Fluid Dynamics Aided Analysis with 6 Degree of Freedom Dynamic Solver of Suborbital Single Stage Rocket Flight**  
*Christopher R. Simpson\*, Charles O'Neill, University of Alabama*
- **Special Topics:**
  - **10:40-11:00: Promoting Professional Organizations through STEM Education**  
*Dustin Poisson, InventEd, Raytheon, AIAA*
  - **11:00-11:20: Research into Complex Systems Theory, Cognitive Engineering, and Human Mental Models in the Future of Engineering and Sociotechnical Systems**  
*Elizabeth Patterson, University of Alabama in Huntsville (ISEEM)/Bastion Technologies Inc.*

**11:30 AM-1:00 PM**

- **Lunch (Keynote)**
  - Todd May, Director, NASA-MSFC

**1:00-3:40 PM**

- *Proposal writing with Dr. Frank Curran, MZNBLUE Corp., NASA GRC (ret.)*

**3:40-4:00 PM**

- *Afternoon coffee break, snacks and networking time*

**4:00-5:00 PM**

- *Panel discussion on Systems Engineering*
  - Lead Panelist: Dr. Dale Thomas, UAH
  - Panelist: Dr. Michael Griffin, Schafer Corp.
  - Panelist: Dr. Lisa Watson-Morgan, NASA-MSFC
  - Panelist: Julie Moquin, Lockheed Martin Corp.
  - Panelist: Thomas Channell, US Army-AMRDEC