

# **Advancing Aerospace Education**

Papers Presented at the AIAA SciTech Forum and Exposition  
2024

Orlando, Florida, USA  
8 – 12 January 2024

ISBN: 979-8-3313-0425-6

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers. Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at 34922 Uwytkug'Xcmg{'Ftkxg.'Uwyg'422, Reston, VA 20191, USA.

# TABLE OF CONTENTS

## **ADVANCING AEROSPACE EDUCATION I**

Aurelia’s Horizon Program: An Educational Initiative that Combines Outreach, Access to Microgravity, and R&D.....	1
<i>Danielle DeLatte, Evan Hilgemann, Ariel Ekblaw, Sean Auffinger</i>	
Engaging K-12 Students in STEM Through Clemson University’s NASA Micro-G NEX T Challenge.....	8
<i>Andrew Densieski, Ashley Murphy, Jenna Spangler, David DeCriscio, Laura Redmond</i>	
Inspiring the Next Generation of Aerospace Engineers with Crowd-Built Aircraft .....	36
<i>Daniel Koning, David Gilstrap, Fathima Farham, Bill Crowther</i>	
SLU DOES: SLU Drones for Outreach and Education in STEM - A Framework for Community Engagement.....	55
<i>Sophia Collins, Amanda Kohne, Mary Otten, Jacob Stukas, Srikanth Gururajan</i>	
Integrated Curricular Pedagogy for Cal Poly Pomona Aerospace Capstone Senior Design Projects Produces Success in Design Competitions .....	66
<i>Donald L. Edberg, Steve Dobbs, Navid Nakhjiri, Mark Gonda</i>	
Undergraduate Capstone Design Project: Autonomous Landing of an Uncrewed Multi-Rotor in a Radio-Frequency Denied, Maritime-Shipboard Environment.....	94
<i>Adrien Richez, Donald H. Costello</i>	

## **ADVANCING AEROSPACE EDUCATION II**

Systems Engineering Technology: Closing the MBSE Modeling Gap Through Community College.....	104
<i>Chris M. Crumbly</i>	
The Development and Implementation of a UAS Certificate Program at Vaughn College of Aeronautics and Technology .....	113
<i>Ghania Benbelkacem, Amir Elzawawy, Hossein Rahemi</i>	
Integration of Virtual and Physical Labs for Fluid Dynamics Education .....	125
<i>Sally P. Bane, Aditya Anilkumar, Pratith Shenai, Fadhla Junus, Sean Brophy, Jun Chen, Pavlos Vlachos, Aeson Akhras, George Takahashi</i>	
Enhancing AE Structures Curriculum with Embedded Finite Element Analysis and Hands-On Experiments.....	140
<i>Maria Chierichetti, Edoardo Rubino</i>	

## **ADVANCING AEROSPACE EDUCATION III**

Long-Term Research Project for Mechanical and Aerospace Students: New Accomplishments in the Study of Combustion of Bio-Derived Fuels in Hybrid Propellant Rocket Engine .....	155
<i>Viatcheslav I. Naoumov, Nidal Al-Masoud, Andrew Santopietro, Jaime Torres-Latorre, Nicholas Combs, Pierre Villegas, Kevin Borkowski, Victor Cheung, Michael Dorsey, Justin Braun, Hasan Aburumi, Patrick Brown</i>	

Development and Testing of a Thrust-Per-Dollar-Optimized Gaseous-Methane-Oxygen Rocket Engine for a College Class Project.....	173
<i>Roy S. Ramirez, Huynh Thao, Tom Neafus, Joseph Schubach, Chintan Rank, Griffin Carter, Aditya Anilkumar, Zachary Rancilio</i>	
2023 University of Alabama in Huntsville Student Launch Rocket Program .....	184
<i>Michael Sorrel, Chase Herrin, Matthew Maybee, Tristian Carter, Krista Fenton, Bryson Frank, Benjamine Lambert, Nathan Schmitz, Ethan Walker-Jones, David M. Lineberry, Robert A. Frederick</i>	
Advanced Propulsion Project to Integrate Trajectories, Aerodynamics, Combustion, Solid and Air-Breathing Propulsion .....	206
<i>Robert A. Frederick, Lambert Petrof</i>	
Propulsion Research and Academic Programs at the University of Alabama in Huntsville - Research Laboratories .....	232
<i>Robert A. Frederick, Lawrence D. Thomas</i>	

#### **ADVANCING AEROSPACE EDUCATION IV**

Neutron, a Space Mission Analysis and Spacecraft Conceptual Preliminary Design Tool.....	255
<i>Sherif H. Mohamed, Ahmed El Salam, Mohamed Elkader, Wessam El Naggar</i>	
Project Polaris: An Inter-Collegiate Collaboration Enriching Aerospace Education Through Applied Engineering, Interculturality, and Social Relevance.....	270
<i>Roy S. Ramirez, Chintan Rank, Priscilla Góchez, Mariana Londoño Orozco, Diego Lopez, Marc-Aurele Lallement, Josué D. Morera, Chloé Jiménez, Brigitte K. Gómez, Chloé Pasquier</i>	

#### **Author Index**