The Pathways to Engineering Diversity Seminar

Presents


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Abstract

An innovative approach to educate the ‘Engineer of the Future’ includes collaborative and multidisciplinary procedures to solve global challenges. Most successful engineering solutions incorporate experimental and computational methodologies; however, these methods are typically used during different stages of product development and may result in inefficient high-cost designs. Rapid prototyping through modern manufacturing processes (e.g. Additive manufacturing) and high-fidelity computational tools have established a solid foundation for the future of design engineering. Through increased collaboration and an improved research pedagogy, a new educational experience can enhance the growth of young engineers. A combination of conceptual, experimental, and computational fluid dynamics (CFD) into the preliminary design process has the potential to substantially increase the efficiency and turnaround time of emerging technologies. This educational technique is currently underway at North Carolina A&T State University in the capacities of high-speed vehicle design and ocean wave renewable energy. The first program titled ‘Flow Control for Hypersonic Flight Control’ explores a novel computational approach, using plasma-based flow control, to maneuver (i.e., pitch, yaw, and roll) hypersonic waveriders, and a second project titled ‘Ocean Wave Energy Harvesting Through Education and Research’ are pilot programs to support the development this educational and research philosophy. These new programs include new undergraduate/graduate courses, experimental facilities, and computational laboratories to educate well-rounded engineers with knowledge of conceptual, fundamental, and applied research in emerging technical fields.

Bio

Dr. Michael Atkinson is an Assistant Professor of Mechanical Engineering at North Carolina Agricultural and Technical State University (N.C. A&T). He received his B.S. and M.S. in Mechanical Engineering from N.C. A&T in 2002 and 2005, respectively, and a Ph.D. in Aerospace Engineering from the University of Dayton in 2012. He is the undergraduate faculty advisor for aerospace option, mechanical engineering undergraduate students, and teaches courses in propulsion, heat transfer, and hypersonics. His research interests include: computational fluid dynamics (CFD), waveriders, plasma-based flow control, and renewable energy. He has developed a novel approach using plasma-based flow control, for the aerodynamic control (i.e., pitch, yaw, and roll) of hypersonic reentry vehicles at high-angle-of-attack. This work was extended to control and mitigate the adverse effects shock-wave/boundary layer interaction in supersonic inlets. This research was published in Physics of Fluids (2013) and The Journal of Spacecraft and Rockets (2012). In 2018, he established the Ocean Wave Renewable Energy Program and N.C. A&T. Prior to joining N.C. A&T State University, his professional career has spanned over 14 years in industry and government research laboratories (GE Aviation, AFRL, NAVAIR). His research and design experience includes high-fidelity computations of complex aerospace configurations, high-speed nozzles, and supersonic inlets for next generation military aircraft. He has developed innovative approaches to incorporate CFD into the engineering design process and received three bronze star awards at G.E. Aviation (2014-2016) for his innovation and service. Recently, he received the ‘Best Oral Presentation Award’ at the 10th International Meeting on Advances in Thermofluids (November 2018).