Mechanical Engineering Distinguished Speaker Colloquium

Monday Jan. 27, 2020

AME Building – Room 106 (address 2003 Levy Ave. – close to the MagLab)

4:00 – 5:00 PM - Refreshments prior to talk

CFD is Dead, Long Live CFD!

And other stories of multi-physics computational modeling

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ABSTRACT

Computational fluid dynamics (CFD) was born in the 1950s with the invention of computers, and has evolved over the past 60+ years into an analysis tool that has permeated virtually all fields of science and engineering. Today, CFD is in its 5th Generation of development, and researchers and practitioners face some unique challenges and opportunities. On one hand, there is a dearth of research funding for fundamental CFD methodology research, but on the other hand, there is high demand for talented researchers who can solve hard problems. To frame the discussion, some of this history will be reviewed, after which current state of the art in multi-scale multi-physics modeling will be discussed from the perspective of a practical application: specifically, ocean remote and in-situ sensing. Finally, some discussion will be offered concerning future topics of research that include: integration of CFD with AI/ML; integrated CFD, experiments, and uncertainty quantification; and general thoughts about dual-use technology.

BIOGRAPHY

Eric Paterson is the Rolls-Royce Commonwealth Professor and Head of the Kevin T. Crofton Department of Aerospace and Ocean Engineering at Virginia Tech. He is also serving as the interim Executive Director of the Hume Center for National Security and Technology, which leads Virginia Tech's research, education, and outreach programs focused on the challenges of cybersecurity, autonomy, and resilience for the national security community. His research is in the general area of computational mechanics, and over the past 30 years he has worked on numerous diverse applications, including; naval hydrodynamics, remote and in-situ sensing, wind turbines, ocean renewable energy, deployable space structures, implantable cardiovascular devices, and biomimetic trace detectors.

In the spirit of Virginia Tech's motto *Ut Prosim* ("That I May Serve"), Dr. Paterson serves the profession as Editor-in-Chief of SNAME's Journal of Ship Research, member of the Board of Trustees for the AIAA Foundation, Chair of the Aerospace Department Chairs Association, and as a member of several university and industry advisory boards and conference organizing committees.