Press Release

Dec. 9, 2021

Contact:
Valerie Sheehan
1-703-684-6777 x107
pr@vtol.org

Marilyn Smith Selected for Vertical Flight Society's Prestigious 2022 Nikolsky Lectureship: "Computational Vertical Lift Aeromechanics and Its Future in the Twenty-First Century"

Fairfax, VA — The Vertical Flight Society, the world's leading professional society dedicated to advancing vertical flight, announced today that Prof. Marilyn J. Smith has been selected for the prestigious 2022 Alexander A. Nikolsky Honorary Lectureship. The Lectureship is awarded to "an individual who has a highly distinguished career in vertical flight aircraft research and development and is skilled at communicating technical knowledge and experience."

Smith is the Professor and Director of the Vertical Lift Research Center of Excellence (VLRCOE) at the Georgia Institute of Technology in Atlanta, Georgia. This, the 42nd Annual Nikolsky Lecture, will be entitled, "Computational Vertical Lift Aeromechanics and Its Future in the Twenty-First Century," which Smith will deliver in an hour-long presentation and VFS will publish as an authoritative peer-reviewed article.

Smith was nominated as an authority on computational aeromechanics with a specialty in rotorcraft applications. She is currently a full professor in Georgia Tech's Daniel Guggenheim School of Aerospace Engineering, where she leads the US Army/Navy/NASA VLRCOE and a NASA University Leadership Initiative (ULI) on advanced air mobility (AAM). Her contributions include a sustained effort in computational and theoretical research in aerodynamics associated with highly separated and dynamic systems, primarily directed toward but not exclusively for vertical take-off and landing (VTOL) aircraft. Her research focuses on complex problems where the physics are not well understood and/or when validation data for computational processes are scarce.

Prior to joining Georgia Tech, Smith worked as a flight test engineer and assistant scientist at the Lockheed-Georgia Company (now Lockheed Martin) and McDonnell Douglas Helicopter Company (now Boeing) while pursuing both her MS and PhD degrees, which she completed in 1994. Her doctoral research resulted in a Navier-Stokes solver exploring loosely and tightly coupled approaches with the Hodges-Dowell nonlinear beam theory to study an aeroelastic rotor in hover. This 1994 effort was a precursor to the coupled computational fluid dynamics (CFD) / computational structural dynamics (CSD) aeroelastic analysis performed routinely today.

Over two decades ago, Smith conceptualized the application of high-fidelity CFD unstructured mesh solvers (using NASA's FUN3D) on complex rotorcraft configurations attaining aerodynamic and

performance predictions with the same accuracy as structured solvers. Over the next decade, she proved her hypothesis by leading her graduate student team to develop extensions of FUN3D to overset, moving methodologies, culminating in the first successful unstructured aeroelastic analysis of overset rotor blades. This research formed the core for the overset multiple reference frame modules in FUN3D. FUN3D was chosen as one of NASA's two rotating frame solvers. Today, FUN3D is one of NASA's primary CFD products and is used by the US government and industry for a plethora of computational overset configurations, including propellers, rotorcraft and wind energy.

Because of her extensive experience in industry, Smith has a unique outlook. She understands the time and hardware constraints associated with engineering computations in aeromechanics. In the area of efficient-yet-accurate industry-level solver development, she envisioned a new paradigm involving a hierarchical "carefree" dual-solver hybrid coupled-aeromechanics framework that can permit rapid design and analysis. She developed a transformative concept known as "non-contiguous" grids that permits placing of CFD near-body meshes only where needed.

Smith is an accomplished and award-winning author who continues to collaborate and develop new understanding around the complex flow phenomena seen in rotorcraft. Her efforts in vertical lift go well beyond her research. She has taught and continues to teach students in graduate and undergraduate courses directly in rotorcraft aeromechanics or highly relevant to them.

Prof. Smith will present her Nikolsky Lecture at the Vertical Flight Society's 78th Annual Forum & Technology Display on Tuesday, May 10, 2022, at the Fort Worth Convention Center in Fort Worth, Texas. She will then be honored at the Forum 78 Annual Grand Awards Ceremony with the presentation of the Alexander A. Nikolsky medallion and certificate. Her detailed written treatise expanding the lecture will be featured in the *Journal of the AHS*, the world's only scientific journal dedicated to vertical flight. Information on Prof. Alexander A. Nikolsky and prior Nikolsky Lectures is available at www.vtol.org/nikolsky.

The Vertical Flight Society — founded in 1943 as the American Helicopter Society — is the global professional society for engineers, scientists and others working on vertical flight technology. VFS brings together industry, academia and governments to tackle the toughest challenges in vertical flight. For more than 75 years, VFS has led technology, safety, advocacy, and other important initiatives, and has been the primary forum for interchange of information on vertical flight technology.

The Vertical Flight Society
2700 Prosperity Avenue, Suite 275, Fairfax, VA 22031, USA
1-703-684-6777 • fax: 1-703-739-9279
pr@vtol.org • www.vtol.org