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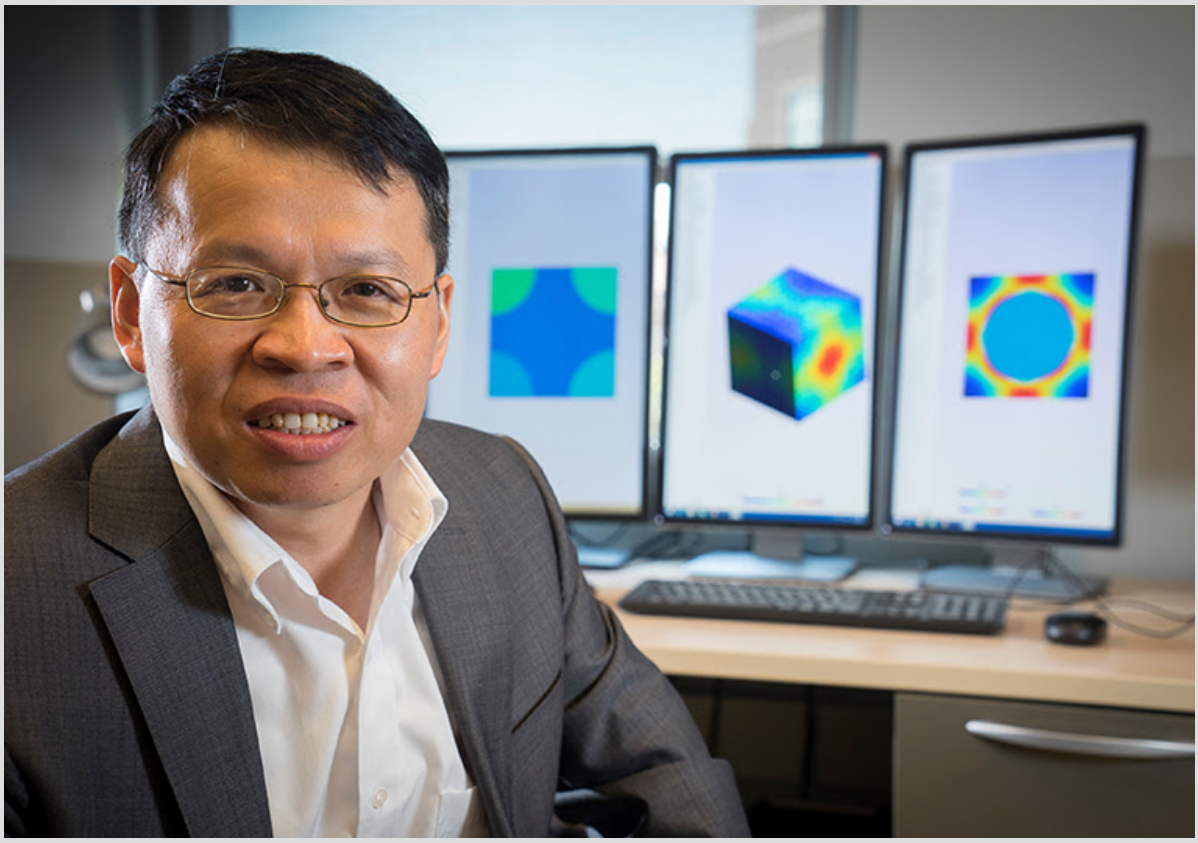
AnalySwift receives nearly $800,000 NASA contract to improve simulation of next-generation composites



Wenbin Yu, a professor in Purdue University's School of Aeronautics and Astronautics, will be the primary investigator on a project with commercial software provider AnalySwift LLC and the University of Texas at Arlington to create DATC, or Design tool for Advanced Tailorable Composites. NASA has awarded AnalySwift LLC a two-year, $799,954 Phase II STTR contract for the research. (Photo provided by Wenbin Yu) Download image

Company to develop and release DATC, a design tool for engineers at NASA and in other industries to design, analyze lightweight structures

WEST LAFAYETTE, Ind. – NASA has awarded a $799,954 Phase II STTR contract to AnalySwift LLC, a Purdue University-affiliated commercial software provider. The company will develop DATC, or Design tool for Advanced Tailorable Composites, and launch it at the end of the two-year contract.

Allan Wood, AnalySwift president and CEO, said advancements in simulation capabilities have not always kept pace with those in manufacturing techniques. He said DATC will significantly improve NASA's capabilities to design and analyze aerospace structures made from advanced tailorable composites.

"DATC will be used to design next-generation aerospace structures, such as hybrid/blended wing bodies, space launch vehicles, space habitats and payload attach fittings," Wood said. "These structures made from advanced tailorable composites will be lightweight and have enhanced performance."

Traditional composites consist of straight fibers in a matrix, which make predicting their properties more straightforward, Wood said. Advanced tailorable composites are not limited to straight fibers.

"These materials include tow-steered composites, in which fibers are steered along curvilinear paths instead of traditional straight paths, and variable thickness composites in which layers, often called plies, vary in thickness or drop off altogether. The materials can be reinforced with either continuous or short fibers," Wood said.

"This customization can facilitate drastic reductions in structural weights and/or improvements in the load-bearing capacity, though the increased complexity renders it much more difficult to accurately predict their properties."

AnalySwift will integrate several tools to create DATC.

"DATC will be based on mechanics of structure genome, or MSG, and its companion code SwiftComp, which was developed at Purdue University," Wood said. "It also will include third-party structural solver tools, a general-purpose optimizer and a machine learning package. These tools will be integrated into a unified and intuitive design framework."

Wood said without a simulation tool for advanced tailorable composites, engineers must rely only on costly and time-consuming physical experiments instead of supplementing them with virtual testing and design.

"This often leads components to be overbuilt and over budget," Wood said.

Wenbin Yu, a professor in Purdue's School of Aeronautics and Astronautics, is the principal investigator on the development of DATC. Su Tian of AnalySwift and professor Xin Liu of the University of Texas at Arlington are co-investigators.

"This project will use the mechanics of structure genome and the companion code SwiftComp, recently developed at Purdue, to provide efficient yet accurate solutions for advanced tailorable composites," Yu said.

Wood said AnalySwift expects to complete DATC when the Phase II project ends in December 2024.

"We plan to release DATC to NASA engineers and others interested in this product," Wood said. "Engineers can use DATC to create innovative, lightweight solutions for systems critical for national security, the environment, transportation, the economy and more. Besides NASA, other related government agencies and industries will be benefit from using DATC to design better engineering systems with reduced experiments and further adjustments, which lowers engineering time and cost."

In 2022 AnalySwift received two Phase I STTR contracts from NASA, a one-year contract for $120,000 and a 13-month contract for $156,000. The company licenses Purdue University intellectual property through the Purdue Research Foundation Office of Technology Commercialization. This work was also supported by Elevate Ventures and the Indiana Economic Development Corporation.

About AnalySwift

AnalySwift LLC is a provider of composite simulation software, which enables an unprecedented combination of efficiency and accuracy, including multiphysics structural and micromechanics modeling. Drawing on cutting-edge university technology, AnalySwift's powerful solutions save orders of magnitude in computing time without a loss of accuracy so users can consider more design options and arrive at the best solution more quickly. The technologies deliver the accuracy of detailed 3D FEA at the efficiency of simple engineering models. SwiftComp was developed at Purdue University and licensed from the Purdue Research Foundation. Contact AnalySwift atinfo@analyswift.com.

About Purdue University

Purdue University is a top public research institution developing practical solutions to today's toughest challenges. Ranked in each of the last five years as one of the 10 Most Innovative universities in the United States by U.S. News & World Report, Purdue delivers world-changing research and out-of-this-world discovery. Committed to hands-on and online, real-world learning, Purdue offers a transformative education to all. Committed to affordability and accessibility, Purdue has frozen tuition and most fees at 2012-13 levels, enabling more students than ever to graduate debt-free. See how Purdue never stops in the persistent pursuit of the next giant leap at https://stories.purdue.edu.

About Purdue Research Foundation Office of Technology Commercialization

The Purdue Research Foundation Office of Technology Commercialization operates one of the most comprehensive technology transfer programs among leading research universities in the U.S. Services provided by this office support the economic development initiatives of Purdue University and benefit the university's academic activities through commercializing, licensing and protecting Purdue intellectual property. In fiscal year 2022, the office reported 157 deals finalized with 237 technologies signed, 379 disclosures received and 169 issued U.S. patents. The office is managed by the Purdue Research Foundation, which received the 2019 Innovation and Economic Prosperity Universities Award for Place from the Association of Public and Land-grant Universities. In 2020, IPWatchdog Institute ranked Purdue third nationally in startup creation and in the top 20 for patents. The Purdue Research Foundation is a private, nonprofit foundation created to advance the mission of Purdue University. Contact otcip@prf.org for more information.

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