

Weekly Report – April 18, 2025
Cooperative Institute for Satellite Earth System Studies (CISESS)
NOAA/NESDIS/STAR

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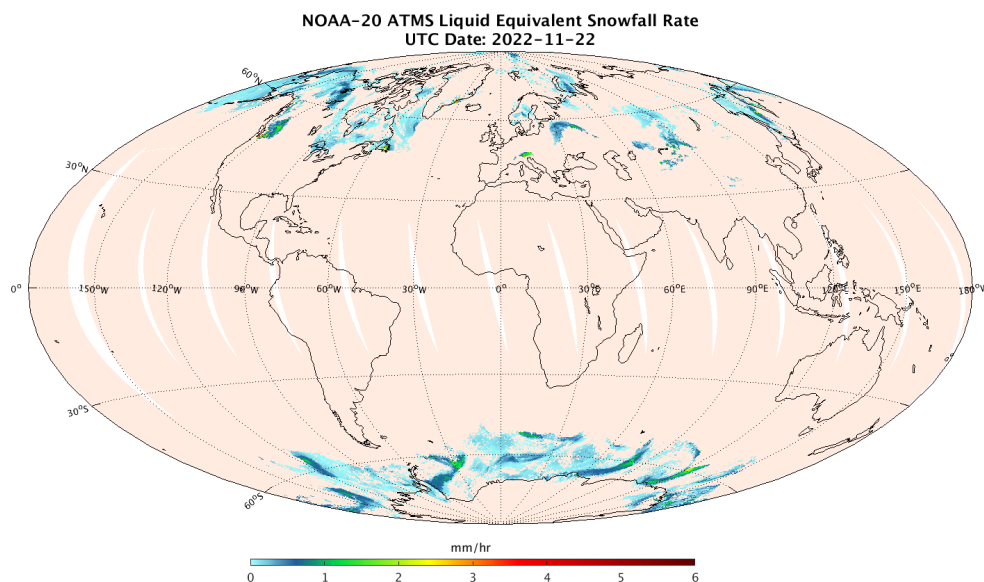
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HIGHLIGHTS FOR NESDIS LEADERSHIP

Use-Inspired Science

CISESS Scientists Develop Critical Tools for Winter Storm Nowcasting

Winter storms present a significant threat to both society and the economy across many regions of the country. Satellites, with their clear and unobstructed view of the Earth, serve as an excellent data source to supplement traditional winter storm data. The CISESS snowfall rate (SFR) team, Drs. Yongzhen Fan, Jun Dong, and Yulan Hong, in collaboration with NOAA/STAR scientist Dr. Huan Meng, have developed the NOAA operational SFR product, a global liquid equivalent snowfall rate estimation retrieved from measurements of passive microwave sensors onboard a constellation of low-earth-orbit satellites, including the Suomi National Polar-orbiting Partnership satellite, NOAA-20, NOAA-21, NOAA-19, MetOp-B, MetOp-C, and the Global Precipitation Measurement satellite. Also developed has been a merged radar-satellite snowfall rate product (mSFR). These are among the limited number of such products available worldwide. The algorithms to generate the SFR products feature a machine-learning snowfall detection model and machine-learning-enhanced physically based snowfall rate estimation model. The global SFR product is available through NOAA CLASS. The CISESS SFR team also built an interactive [website](#) that features SFR over the contiguous U.S. and Alaska with extremely low latency. This website is extensively used by weather forecasters.



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Figure. Example of the SFR product on a global scale.

(Yongzhen Fan, CISESS, yfan1236@umd.edu, Funding: DACS, JSTAR, LEO, METOP-SG; Jun Dong, CISESS, jun.dong@noaa.gov, Funding: JSTAR, LEO, METOP-SG; Yulan Hong, CISESS, yhong126@umd.edu, Funding: DACS, JSTAR, METOP-SG)

People

CISESS Bestows Seed Grants to Five of Its Scientists

Since 2022, CISESS has funded early-career scientists from within the center with the goals of promoting the development of innovative ideas and identifying emerging topics within the purview of the center's research objectives. While four projects have been funded for the last four years, this year, five Seed Grants have been awarded. The recipients are Evan Ellicott (*Wildfire Smoke Early Warning: Using Earth Observations to Improve Health Interventions*), Nigus Melaku (*Developing a Basic Model Interface for Stream Water Temperature to Enhance Water Quality Predictions in NOAA's NextGen Framework*), Veljko Petkovic (*Retrieving Latent Heat from Passive Microwave Satellite Observations*), Xi Shao (*Developing Machine Learning-based Hyperspectral Sensor Data Retrieval Capability in Support of Future NOAA Missions*), and Yuan Zhou (*Developing High Spatiotemporal Resolution Vegetation Datasets from Multi-Sensor Satellite Observations for Enhanced Ecological and Agricultural Monitoring*).

Introduced here is one of the selected projects. Yuan Zhou is working on integrating multi-sensor satellite data to develop high spatiotemporal resolution vegetation datasets. These datasets are critical for monitoring vegetation health, understanding ecological changes, and supporting precision agriculture. More details can be found in [Zhou's Seed Grant project summary](#).

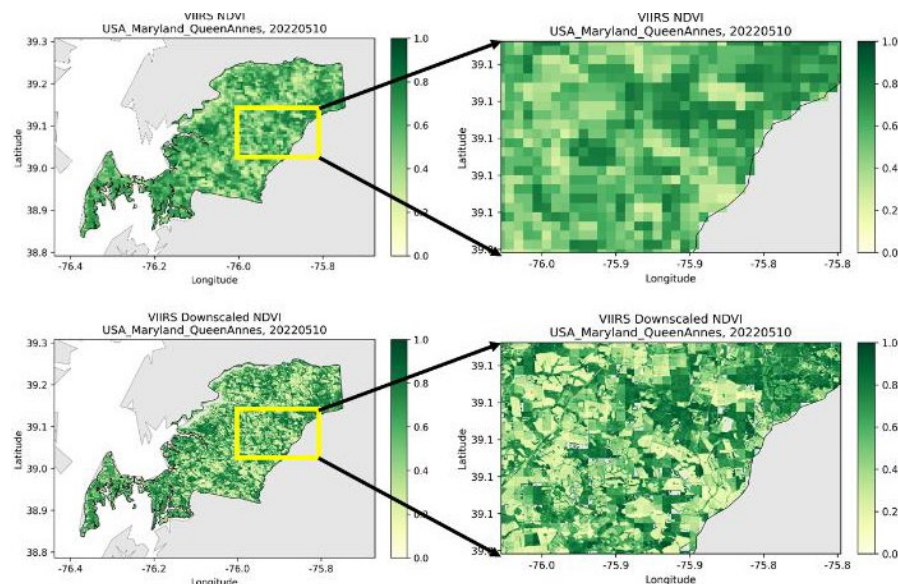


Figure. Preliminary results from Yuan Zhou's project, comparing normalized difference vegetation indices from (top) the original Visible Infrared Imaging Radiometer Suite image at a 1-km resolution and (bottom) the integrated image at a 20-m resolution.

(Yuan Zhou, CISESS, yuan.zhou@noaa.gov, Funding: DACS, JSTAR)

TRAVEL AND MEETING REPORTS

CISESS Students Win Awards at Georgia Tech's ImmerseGT XR Hackathon

In early April, CISESS students Damian Figueroa and Samuel Wiggins, mentored by CISESS Scientist Guangyang Fang, traveled to Atlanta, Georgia, to participate in [ImmerseGT](#), an XR hackathon hosted by the student-led "VR@GT" club at the Georgia Institute of Technology. At ImmerseGT, companies like Snap Inc. (creators of the Snapchat app) provided innovative technology for students to explore, including Snap's experimental augmented reality glasses, the Spectacles.

Damian and his team developed [Desk Buddy](#), an AI assistant brought to life as a character inspired by Microsoft's classic "Clippy." Designed to live in a cozy virtual environment placed on the user's desk, Desk Buddy awaits instructions and can be customized with various personalities. It is also capable of interacting with nearby devices to perform tasks like displaying search results, making it both helpful and charming. "I believe *Desk Buddy* represents the future of personal assistants," said Damian. "One where they exist in your physical space and engage with you through playful interactions."

Samuel's team created [Kääntää](#) (pronounced *kahn-tah*), an augmented reality language-learning app that blends education with a dose of quirky Gen-Z humor. Guided by a virtual cat named Maxwell, users build a personal word bank by scanning real-world objects using a simple pinching gesture. The app harnesses the AI capabilities of the glasses to identify each object and translate it into the target language. Later, Maxwell challenges users to recall the words by re-scanning the original objects—responding with amusing reactions based on whether their answers are correct. "It may be silly, but our app isn't just fun—it *feels like magic* to use!" noted Samuel.

Remarkably, both Damian and Samuel took home awards for their creative work. Damian received the "**Intelligent Immersion**" award, recognizing projects that combined artificial intelligence and XR to redefine user experience through smart, responsive applications. Samuel won two awards: one for the "Lifestyle" track, which celebrated projects exploring how XR can enhance everyday life—from work and socializing to relaxation and entertainment—and a **3rd Place SnapAR award** for the best use of Spectacles technology.

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Damian and Samuel are excited to bring their innovative ideas and skills back to the CISESS Virtual Proving Ground & Training Center, where they contribute to the development of XR-based geoscience educational games. Their award-winning experiences reflect the growing potential of immersive technology in both education and everyday life.

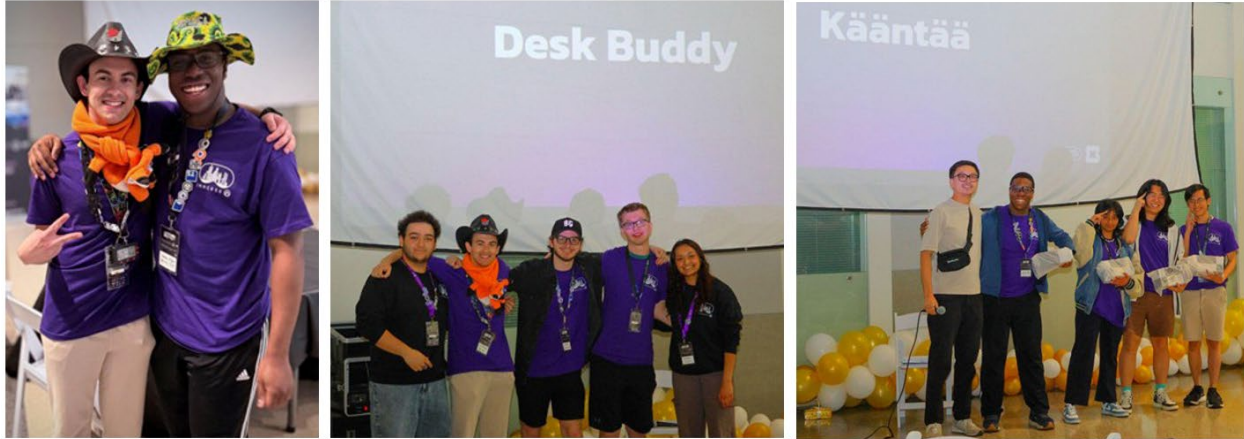


Figure. From left to right: Damian (left) and Samuel (right) at the ImmerseGT closing ceremony; Damian and his team accepting the “Intelligent Immersion” award for Desk Buddy; Samuel (second from left) and his team accepting the SnapAR award for Kääntää from Steven Xu, a developer at SnapAR.

(Guangyang Fang, CISESS, gfang@umd.edu; Funding: GOES-R AWG, GOES-R PGRR)

(Maureen Cribb, CISESS, mcribb@umd.edu, Funding: CISESS Task I)