Weekly Report – September 18, 2026

Cooperative Institute for Satellite Earth System Studies (CISESS)

NOAA/NESDIS/STAR

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HIGHLIGHTS FOR NESDIS LEADERSHIP

People

CISESS XR Team Members Win Awards at Reality Hack @ MIT 2026

CISESS XR team members, Damian Figueroa and Samuel Wiggins, mentored by CISESS Scientist Guangyang Fang, took part in Reality Hack @ MIT, a community-run experiential technology hackathon held at the Massachusetts Institute of Technology. The event brought together 348 participants to develop innovative applications using augmented reality, virtual reality, artificial intelligence, and other emerging technologies.

Figueroa and his team created *Reboot: Anomaly Holdout*, an immersive mixed-reality game in which players use a custom-built physical control panel to scan rooms, operate defensive systems, and survive an alien threat. The project combines mixed reality passthrough, physical controls, 3D-printed components, embedded electronics, and a virtual environment developed in Unity. The team received the **Best XR Experience Award**, sponsored by Qualcomm.

Wiggins and his team developed *R-EYE-DER*, a hands-free augmented-reality coaching and safety tool for drivers and riders. Designed for Raven AR glasses, the system uses gaze tracking, real-time object detection, and visual and auditory feedback to help users maintain safer visual attention habits. The team received the **Best App for Raven Glasses Prize**, sponsored by Raven Resonance.

The awards demonstrate Figueroa's and Wiggins's growing expertise in XR development, computer vision, artificial intelligence, embedded hardware, and human-computer interaction. They bring these skills to their work with the CISESS Virtual Proving Ground and Training Center, supporting the development of immersive tools for environmental visualization, STEM education, and public outreach.

(Guangyang Fang, CISESS, gfang@umd.edu, Funding: GEO-XO & Seed Grant)

MEDIA INTERACTIONS AND REQUESTS

Adventures in Sea Ice Research

CISESS Scientist and Associate Professor in the University of Maryland's Department of Geophysical Sciences Sinéad Farrell was recently on the podcast "Socializing with Scientists", having a chat about her colorful experiences as a geophysicist studying sea ice in the polar regions. Listen to her full interview here.

(Sinéad Farrell, CISESS, sinead.farrell@noaa.gov, Funding: Jason)

SOCIAL MEDIA AND BLOG POSTS

Storms After Dark: High Winds and Heavy Rain Hit the D.C. Area

The overnight hours of September 3–4 in the Washington, D.C. area were not so serene as a line of severe thunderstorms lashed the area with high winds and heavy rain, reports CISESS Scientist Christopher Smith, the GOES-R Satellite Liaison to the National Weather Service's Weather Prediction Center and Ocean and Tsunami Center. Wind gusts of about 70 mph, the main culprit causing local damage, were reported in the area.

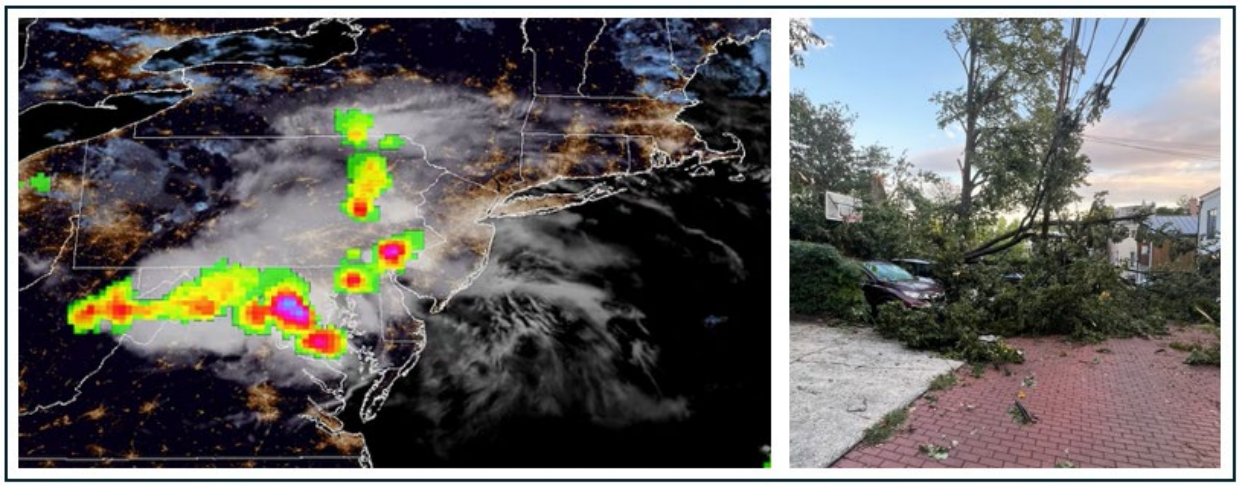

Figure: (left) GOES-East CONUS Geostationary Lightning Mapper Flash Extent Density output, overlaid on GeoColor Imagery, at ~0351 UTC 04 September 2026. Blue shows areas where 100–200 strikes over a grid cell (~8 km) within 5 minutes were observed. (Credit: NESDIS/STAR); (right) Toppled trees in northwest D.C. on 4 September 2026. (Photo credit: Christopher Smith)

(Also published on the Satellite Liaison Blog, along with other blog posts of interest by other contributors.)

(Christopher Smith, CISESS, csmith70@umd.edu, Funding: GOES-R PGRR)

PUBLICATIONS

Spatial Detail Boosts Rainfall–Runoff Modeling
Citation: Li, Jinyang, Kuo-lin Hsu, **Soroosh Sorooshian**, and Dan Lu, 2026: From lumped to spatially distributed hydrologic models: a generalizable data-driven framework across North America. *Water Resour. Res.*, **62**, e2025WR043068, https://doi.org/10.1029/2025WR043068.
Summary: Watersheds are not all alike given that they each have their own individual physical characteristics in terms of slope, vegetation, and soil properties. Even within a watershed, these characteristics vary spatially. This makes modeling rainfall-runoff processes in a watershed challenging. Lumped models, where catchment-wide information is averaged into a single point, are commonly used. But could streamflow predictions for a catchment be improved by representing meteorological and landscape variability in more spatial detail, thereby leading to better flood forecasting and water resource management? CISESS Scientist (and Distinguished Professor and Director of the Center for Hydrometeorology and Remote Sensing at the University of California, Irvine) Soroosh Sorooshian and colleagues explore this in their article published in the journal *Water Resources Research*. They first develop a deep-learning framework that uses spatially distributed meteorological forcings then apply it to 921 hydroclimatically diverse North American catchments in the CAMELS-SPAT (Catchment Attributes and MEteorology for Large-Sample SPATially distributed analysis) dataset. Statistical metrics used to assess the lumped and spatial models in the study include the Nash–Sutcliffe model efficiency coefficient (NSE) for predictive skill and Kling–Gupta Efficiency (KGE) for evaluating how closely a model's simulated time series matches observed data. They report that their proposed framework is an improvement over the lumped approach regardless of catchment size and climate zone, increasing median NSE from 0.60 to 0.65 and KGE from 0.63 to 0.69. Overall, 75.4% and 72.9% of catchments show improvements in NSE and KGE, respectively. A unified regional model trained on many catchments at the same time is the next step to take. This will allow the model to learn from different landscapes and predict streamflow in areas without gauges.

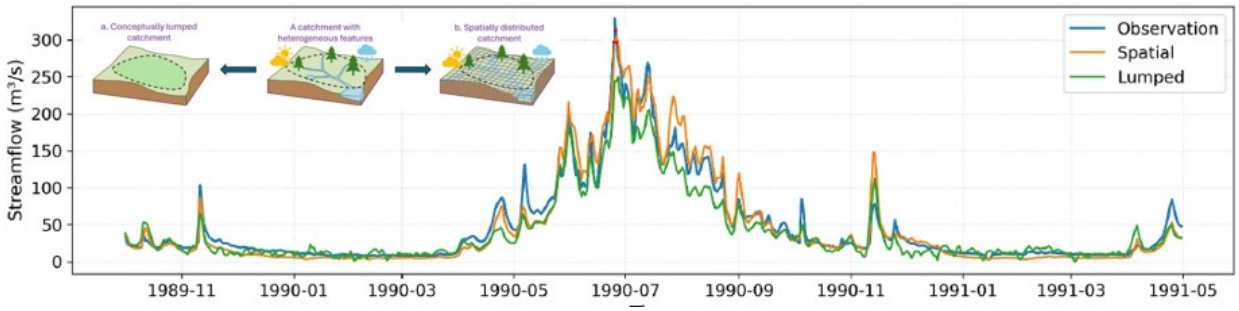

Figure: Observed and predicted streamflow time series for gauge CAN_08NH119 located in a snow-dominated mountain catchment. The inset figure in the upper left shows the conceptual comparison of lumped and spatially distributed modeling frameworks. The new model (orange line) accurately reproduces both the timing and magnitude of annual freshet peaks during the period covered.

(Soroosh Sorooshian, CISESS, soroosh@uci.edu; Funding: JPSS PGRR)

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