

ISSUE 03

UFS INSIGHTS

MAY 2024



A UFS Collaboration
Powered by **EPIC**



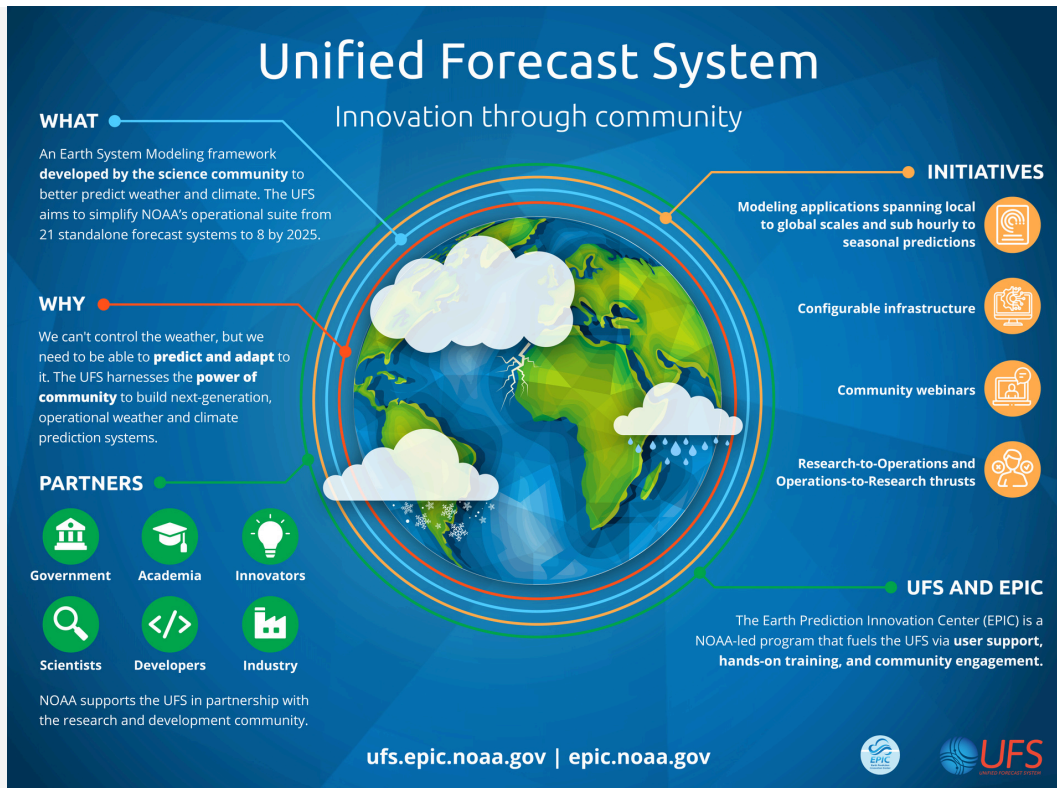
OUR MISSION

The Unified Forecast System

While we cannot control the weather, we can understand how to better predict it. That's where the Unified Forecast System (UFS) comes in. The UFS is an Earth System Modeling framework developed by a community of scientists and engineers who come together to produce cutting-edge science components and software infrastructure to enhance the numerical weather prediction systems that can be used by the Weather Enterprise. The UFS includes multiple applications that span local to global scales and offer sub-hourly to seasonal predictions. These applications package together elements such as preprocessing and postprocessing tools, numerical models, data assimilation, verification and validation packages.

Explore UFS key components, innovative partnerships, and impactful initiatives shaping the future of meteorology in the infographic below.

[Explore the UFS portal](#)



Earth Prediction Innovation Center (EPIC)

NOAA's EPIC program fosters the work being done with the UFS by nurturing a collaborative weather community. EPIC offers an environment for the growth of next-generation models, management of cloud-ready code, community engagement and user support, a pipeline for research and model transition to operations, end-to-end testing for UFS applications, and expanded support for NOAA's Earth system models.

[EPIC's Homepage](#)



UPCOMING EVENTS



Annual UFS Physics Workshop July 9-12, 2024 Norman, OK/online

This event will address the ongoing need to improve how convection is represented in the UFS. Discussions will cover the latest scientific advances from the convection parameterization research community and operational numerical weather prediction centers.

[Event information](#)



Unifying Innovations in Forecasting Capabilities Workshop July 22-26, 2024 Jackson, MS/online

Join us this July at Jackson State University (JSU) or online for the Unifying Innovations in Forecasting Capabilities Workshop 2024 (UIFCW24). The event, co-sponsored by EPIC and JSU, is about engaging and uniting our efforts to advance forecasting capabilities for a more informed future. The theme is "Collaborative Progress in Earth System Modeling."

Abstracts due: May 31, 2024

In-person registration deadline: June 30, 2024

[Register](#)

[Submit an abstract](#)

UFS Innovators

We want to shine the spotlight and recognize "UFS Innovators." These are the individuals who truly put the "innovation" in Earth Prediction Innovation Center. While not all featured innovators are directly part of the EPIC program, they are integral members of the UFS community. Their efforts and contributions are what drive the program's success. These dedicated professionals are instrumental in advancing the UFS, constantly pushing boundaries to enhance its capabilities.



Christina Holt

Christina Holt leads the UFS Unified Workflow (UW) Team, which is distributed among the [Cooperative Institute for Research in Environmental Sciences/University of Colorado Boulder](#) (CIRES/CU), NOAA Global Systems Laboratory (GSL), and EPIC. The team serves as a keystone in a broader collaboration involving George Mason University, [National Centers for Environmental Prediction Environmental Modeling Center](#), NOAA Physical Sciences Laboratory (PSL), and the [Developmental Testbed Center](#). Christina stepped into her role as Product Owner for the UW Team thanks to support from NOAA GSL and CIRES/CU, the NOAA [Joint Technology Transfer Initiative Program](#) from FY22, and the [Software Engineering for Novel Architectures Project](#) at NOAA GSL. The UW Team develops tools and software drivers that are highly configurable and easy to use, supporting a framework that streamlines the configuration and operation of UFS scientific software components. These tools enhance technology transfer between UFS applications, reduce learning curves, and simplify testing of new configurations. Learn more about these innovations on the [UW Tools page](#).

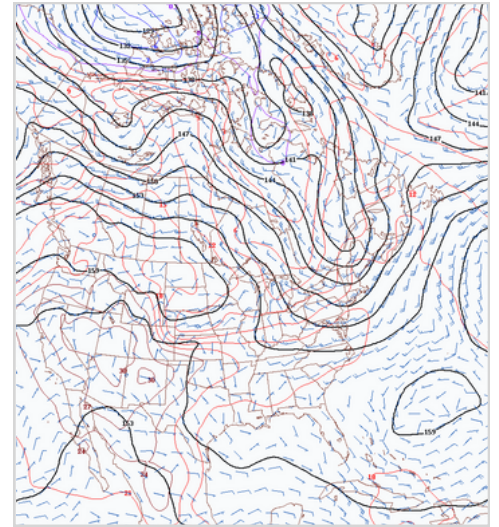
Christina has spent the last decade working with NOAA's weather prediction systems at CIRES/CU, NOAA GSL, and in private industry. She holds a Ph.D. in Atmospheric Sciences from Texas A&M University and a bachelor's degree in computer science from the University of Colorado.

NEWS AND INSIGHTS

NOAA Data Assimilation Consortium Launched

A new Data Assimilation Consortium will help improve the accuracy of computer weather forecast predictions using the UFS. The collaboration, which brings together six U.S. universities, will harness an investment of \$6.6M to push forward new data assimilation science into UFS operations. The consortium will also work closely with EPIC, deliver student training and an exchange of expertise between NOAA and the [Joint Center for Satellite Data Assimilation](#), and build collaborations with the [U.K. Met Office](#) and new [Transatlantic Data Science Academy](#).

[Press release](#)



Spack-stack for Forecasting and Environmental Modeling

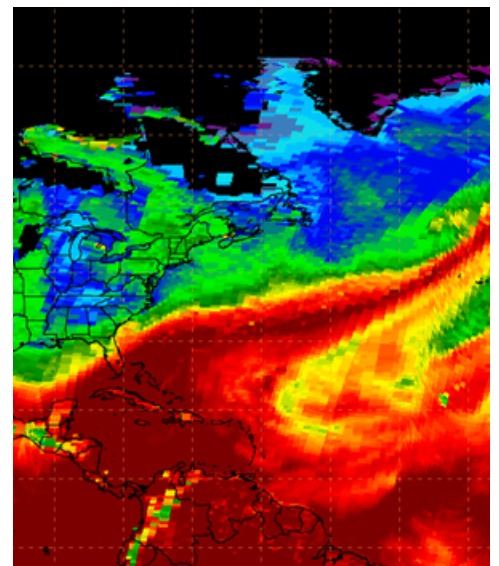
Spack-stack is useful for organizing software libraries that support the UFS and Joint Effort for Data assimilation Integration (JEDI) projects, along with several other Earth system prediction models. Explore the latest thoughts from EPIC's Software Integration Product Owner on the role of spack-stack in monitoring our environment.

[Read more](#)

Better Predictions of Atmospheric Rivers

EPIC's Solutions Architect discusses the latest advances in forecasting atmospheric river events. EPIC, NOAA PSL and GSL, and others are working together to more accurately predict the timing, location and overall precipitation of atmospheric river events in the western U.S. These phenomena can bring widespread flooding, mudslides, and hazards but can also deliver much-needed top-ups to water levels in arid regions.

[Read more](#)



NEWS AND INSIGHTS



EPIC Spring Application Training 2024

In April 2024, EPIC hosted its Spring Application Training on “Contributing Code to the UFS.” This sprint-like event offered information on basic Linux and Git skills that the community needs to know when contributing innovations into UFS code via pull request. Participants could start with very limited GitHub knowledge and leave with working examples of how to contribute code. EPIC offers CodeFests or Application Training on a quarterly basis; [check back regularly](#) to register!

[See the training slides](#)

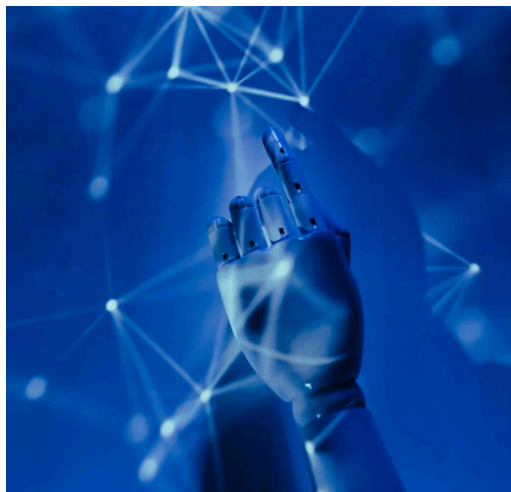
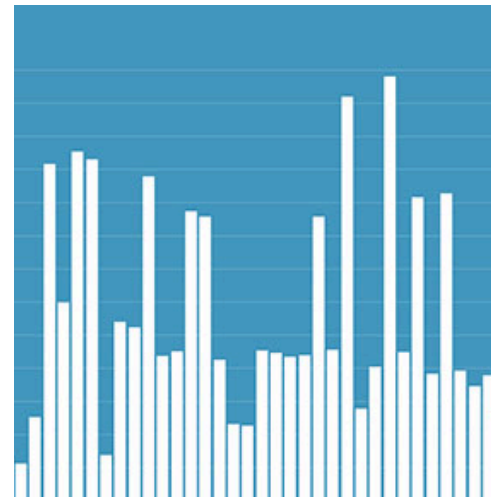
[More about EPIC Application Training](#)

[More about EPIC CodeFests](#)

Measuring Computational Performance in Weather Model Testing

Learn about our findings from extensive UFS Weather Model regression testing on Hercules and Derecho supercomputers. These machines demonstrated their speed and efficiency, offering insightful comparisons with NOAA machines such as Jet, Gaea, and Hera. If you're interested in learning more about these differences, our report details the performance variations.

[Read more](#)



Artificial Intelligence for Numerical Weather Prediction

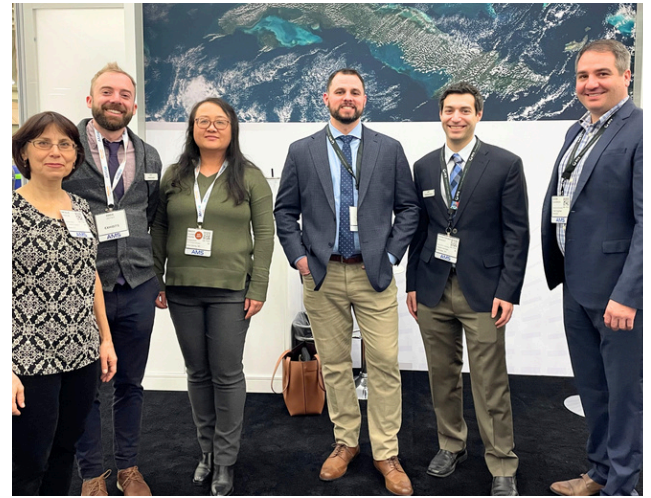
Curious about the future of weather forecasting? A new report explores the integration of data-driven models into NOAA's research-to-operations pipeline for numerical weather prediction (NWP). A result of a workshop held in November 2023, the article outlines opportunities, barriers, future strategies, and grand challenges for integrating AI/machine learning into NOAA's NWP operations. Learn more about the potential path forward and how it could impact our understanding of weather events.

[Read the article here](#)

NEWS AND INSIGHTS

EPIC and the UFS at the AMS Annual Meeting

EPIC and the UFS [had a strong presence](#) at the latest American Meteorological Society (AMS) Annual Meeting in Baltimore, MD. EPIC hosted [a workshop](#) on building, configuring, and running the UFS Short-Range Weather Application in the cloud. The UFS Steering Committee spearheaded the [Third Symposium on Community Modeling and Innovation](#), covering research-to-operations, open innovation, fire weather, community-modeling infrastructure, data assimilation (DA), post-processing, and model verification. EPIC also shared the stage with program managers from the U.K. Met Office to discuss the new DA Consortium and the joint [Transatlantic Data Science Academy](#) that will develop an international training and skills exchange program between the U.K. and the U.S.

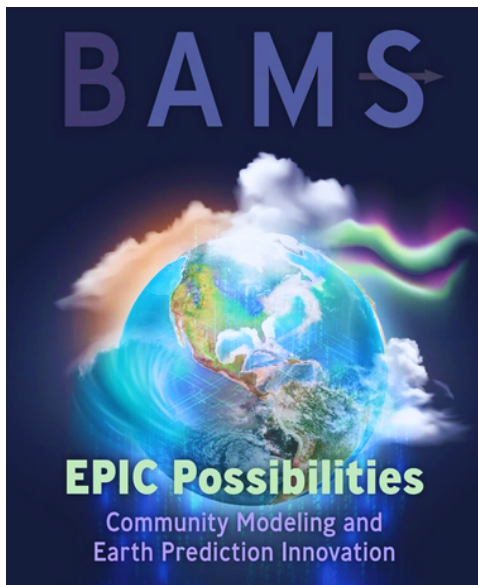


[EPIC and the UFS at AMS](#)

EPIC Possibilities

EPIC made a splash in the February edition of the Bulletin of the American Meteorological Society (BAMS) with a cover entitled “EPIC Possibilities – Community Modeling and Earth Prediction Innovation.” [EPIC](#), mandated by Congress in 2018, is the catalyst to drive a collaborative weather research community network to help develop the UFS.

Article accessible to AMS members [here](#)



Open Data for All

Guidance from the White House has mandated that researchers who receive federal funds must make their publications and data publicly available at no cost and without delay. What are the pitfalls and promises of making scientific results publicly available?

[Read more from NOAA's Weather Program Office](#)



RESOURCES

Explore Our UFS Webinar Series

The UFS hosts a [webinar series](#) in collaboration with the National Weather Service [Science and Technology Integration – Modeling Program Division](#). Talks share advances in science and technology in all aspects of the UFS, in both research and operational settings. We welcome speakers from the modeling community.

[Webinar recordings](#)

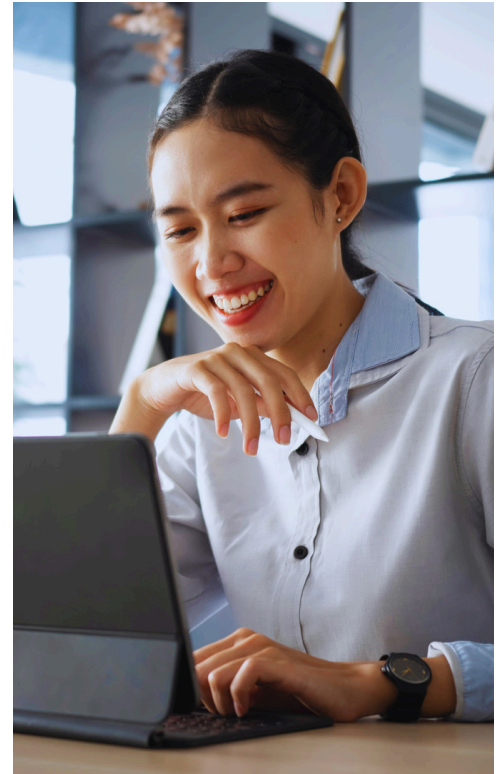
[Subscribe to webinar announcements](#)

[Recommend a speaker or topic](#)

Updated UFS Unified Workflow Tools

The UFS UW Tools software was recently updated. *uwtools* is an open-source Python package that helps automate common tasks needed for many numerical weather prediction workflows. It also provides drivers to automate the configuration and execution of UFS components, providing flexibility, interoperability, and usability to various UFS applications.

[Take a look at the new *uwtools*](#)



UFS Code + EPIC Support

Each EPIC-supported UFS application, model, or component has its own code repository on GitHub, and each repository includes a wiki, question forums, and bug reporting.

EPIC provides user support for many UFS repositories. To request new UFS features or enhancements, post a request on the ufs-community GitHub Discussions page under [Enhancement](#). Check out our [GitHub Registration and Posting Guidelines](#) to get started on GitHub, or [learn more about the repositories we support below!](#)

[Code + Support](#)

Questions? Email us at: support.epic@noaa.gov

New EPIC/UFS Code Resources and Tutorials

Explore our new EPIC/UFS website! The site offers a community presence dedicated to growing meteorological science, collaboration, and innovation. Our tutorial resources cater to both new and experienced users looking to dive into the EPIC/UFS code repositories.

[New EPIC/UFS site](#)
[EPIC tutorials page](#)

We've also enhanced the Get Code section, which now features a uniform format across all application pages, ensuring a consistent look and feel. This redesign makes it easy to find the resources and links you need, streamlining your access to essential tools and supporting your navigation through the site. Discover these updates and more by visiting the updated Get Code section.

[Explore the new Get Code section here](#)

RESOURCES

Get Code

Application	Latest Release Version
Short-Range Weather (SRW)	v2.2.0
UFS Weather Model (WM)	ufs-srw-v2.2.0 (WM tag accompanying the SRW App v2.2.0 release)
Land Data Assimilation (DA) System	v1.2.0
Unified Post Processor (UPP)	v11.0.0
Unified Workflow Tools (UW)	v2.2.0

Suggest a Newsletter Topic

Make your voice heard by contributing to our next newsletter. We welcome ideas for future topics.

[Submit your newsletter topic](#)

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[Sign up for the UFS mailing list](#)

Get Involved

We'd love to connect — it's at the heart of what we do. Send us questions at support.epic@noaa.gov or stay in touch [via our feedback page](#).

