



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Atmospheric System Research Update

Shaima Nasiri and Jeff Stehr
ASR Program Managers

August 7, 2023

2023 ARM-ASR Joint User Facility & PI Meeting

Welcome

- ▶ 2023 ARM User Facility and ASR Principal Investigators meeting
 - ▶ ARM facility users and ARM infrastructure members
 - ▶ ASR-supported scientists
 - ▶ SBIR leads
 - ▶ Research Development and Partnership Pilot awardees
 - ▶ FY22 RENEW awardees
 - ▶ Observers



SC's Statement of Commitment

SC Statement of Commitment outlines DOE's expectation for professional behaviors and our commitment to a safe, diverse, and inclusive environment. All participants are expected to read and agree to as part of their participation in the meeting.

The DOE Office of Science (SC) is fully and unconditionally committed to fostering safe, diverse, equitable, and inclusive work, research, and funding environments that value mutual respect and personal integrity...

...SC's effective stewardship and promotion of diverse and inclusive workplaces that value and celebrate a diversity of people, ideas, cultures, and educational backgrounds is foundational to delivering on our mission. Harnessing a diverse range of views, expertise, and experiences drives scientific and technological innovation and enables the SC community to push the frontiers of scientific knowledge for the betterment of America's prosperity and security.

Discrimination and harassment undermine SC's ability to achieve its mission by reducing productivity, discouraging or inhibiting talent retention and career advancement, and weakening the integrity of the SC enterprise overall. SC does not tolerate discrimination or harassment of any kind, including sexual or non-sexual harassment, bullying, intimidation, violence, threats of violence, retaliation, or other disruptive behavior in the federal workplace, including DOE field site offices, or at national laboratories, scientific user facilities, academic institutions, other institutions receiving SC funding, or other locations where activities funded by SC are carried out...

...SC expects the scientific community, particularly those engaging in SC-sponsored activities, to always conduct themselves in a manner that is respectful, ethical, and professional. This renewed commitment is part of SC's continuing effort to identify opportunities to improve its policies, practices, and communications in furtherance of its core values and its mission.

For the full SC Statement: <https://science.osti.gov/SW-DEI/SC-Statement-of-Commitment>

Outline

- ▶ **General updates**
 - ▶ Working groups
 - ▶ Workshops
- ▶ **ASR Funding: Reviews and Selections**
 - ▶ DOE FOA 0002850 updates (FY23)
 - ▶ Other Prospective FOAs and timelines
 - ▶ Upcoming plans
- ▶ **Communications updates**
 - ▶ Highlights and Publications
 - ▶ Open house



Atmospheric System Research



Goal

- Quantify the interactions among aerosols, clouds, precipitation, and radiation to improve understanding of key cloud, aerosol, precipitation, and radiation processes that affect the Earth's radiative balance and hydrological cycle, especially processes that limit the predictive ability of regional and global models.

Objectives

- Conduct observational, data analysis, and/or modeling studies using observations supported by BER – typically from the ARM facility and/or PI laboratories – to improve understanding and model representation of climate-relevant atmospheric processes.

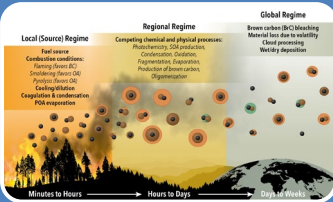


ASR working groups after October 2022 meeting



Convective cloud processes

- Adam Varble (PNNL)
- Hugh Morrison (NCAR)



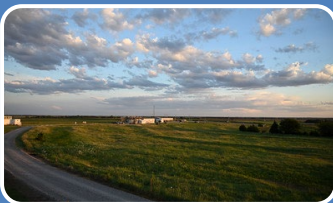
Aerosol processes

- Markus Petters (University of California-Riverside)
- Nicole Riemer (University of Illinois)



High latitude processes

- Gijs de Boer (University of Colorado)
- Greg McFarquhar (University of Oklahoma)



Warm boundary-layer processes

- Yunyan Zhang (LLNL)
- Rob Wood (University of Washington)

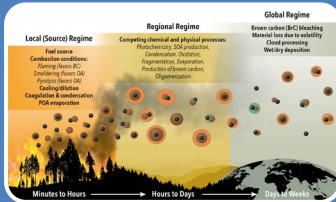


ASR working groups after August 2023 meeting



Convective cloud processes

- Adam Varble
- Hugh Morrison (2025)



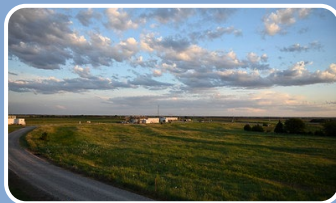
Aerosol processes

- Markus Petters (2026)
- Nicole Riemer (2024)



High latitude processes

- Gijs de Boer
- Greg McFarquhar (2025)



Warm boundary-layer processes

- Yunyan Zhang → Christine Chiu (CSU) (2027)
- Rob Wood (2024)

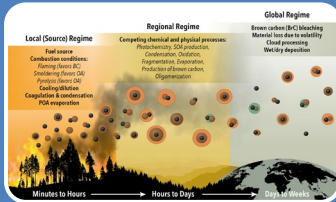


ASR working groups after August 2023 meeting



Convective cloud processes

- **Adam Varble** → **Dié Wang (BNL) (2027)**
- Hugh Morrison (2025)



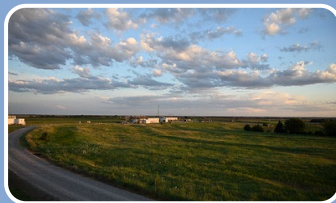
Aerosol processes

- Markus Petters (2026)
- Nicole Riemer (2024)



High latitude processes

- **Gijs de Boer** → **Jessie Creamean (CSU) (2027)**
- Greg McFarquhar (2025)



Warm boundary-layer processes

- Yunyan Zhang → Christine Chiu (2027)
- Rob Wood (2024)



Workshop updates

- ▶ [DOE-NOAA Marine Cloud Brightening Workshop Report](#) was published in November 2022. Report is available on the BER webpage.
- ▶ ASR Future of Atmospheric Large Eddy Simulation (LES) Workshop Report has been delayed but should be released in late summer or early fall.
- ▶ PNNL will be hosting a small, in-person ASR-sponsored workshop on Ice Processes this October.

ASR FY2023 research call FOA-0002850

- ▶ ASR issued a targeted research call on October 27, 2022 with 4 topics:
 - 1. Cloud, aerosol, precipitation, and thermodynamic processes from TRACER**
 - 2. Cloud, aerosol, precipitation, and radiation processes from SAIL**
 - 3. Warm boundary layer processes**
 - 4. Early use of observations from ARM's Southeast U.S. deployment**
- ▶ 90 Pre-applications by December 8, 2022
- ▶ 74 applications received (February 23, 2023 due date)
- ▶ Three two-day virtual review panels met in April 2023
- ▶ Supporting 23 projects (24 proposals) for a total of \$16.4M (\$15.4M in FY23 funds)
- ▶ All decisions were finalized by July 2023



FOA-0002850 Awards

PI Name	PI Institution	Proposal Title
Adebiyi, Adeyemi	University of California, Merced	Investigating the overlooked longwave impacts of mineral dust on warm boundary-layer clouds
Brooks, Sarah	Texas A&M University	Influence of Aerosol Physicochemical Properties on Ice Nucleation in Convective Clouds
de Boer, Gijs	University of Colorado, Boulder	Integrated Perspectives on Clouds, Precipitation, and the Surface Energy Budget in the Colorado Rocky Mountains using Observations from SAIL and SPLASH
Feingold, Graham	NOAA/OAR	Aerosol-Cloud Interactions Centered on MAGIC: Insights from Measurements and Lagrangian Large Eddy Simulation
Freeman, Sean	University of Alabama in Huntsville	Examining the Influences of Changing Aerosol and Thermodynamics on Southeastern Isolated Convective Clouds using New Observations and Advanced Modeling
Goldstein, Allen	University of California, Berkeley	Vertically-Resolved Aerosol Composition Measurements for Improved Understanding of Aerosol Processes and Aerosol-Cloud Interactions Impacting Deep Convection during TRACER

FOA-0002850 Awards (continued)

PI Name	PI Institution	Proposal Title
Gutmann, Ethan	University Corporation for Atmospheric Research	Changing diurnal energy cycles impact net water vapor fluxes in mountain watersheds
Huang, Yongjie	University of Oklahoma	Surface, Aerosol, and Meteorological Controls on Subtropical Coastal Metropolitan Convective Clouds: Observations and Simulations from TRACER
Juliano, Timothy	University Corporation for Atmospheric Research	Examining the influence of heterogeneous forest canopy on shallow convection at the third ARM Mobile Facility (AMF3) site
Mecikalski, John	University of Alabama in Huntsville	Understanding Convective Cloud Evolution through Analysis of ARM AMF3 Surface, Radar, GOES-16 Satellite Observations, and Numerical Model Simulations
Perkins, Russell	Colorado State University	Comprehensive Characterization of the Seasonal Cycles of Ice Nucleating Particles for Studies of Precipitation Drivers in SAIL
Sheesley, Rebecca	Baylor University	Gas-phase precursors, aerosol composition and new particle formation during TRACER using spatially resolved TRACER-MAP datasets; TRACER-MAP-NPF

FOA-0002850 Awards (continued)

PI Name	PI Institution	Proposal Title
Smith, William	NASA Langley Research Center	Atmospheric regimes and drivers of cloud variability and aerosol-cloud-radiation interactions over the coastal northeast Pacific
Steiner, Allison	University of Michigan	Aerosol-cloud interactions driven by primary and secondary biological aerosols during TRACER
Tian, Yang	University Corporation for Atmospheric Research	Untangling Dynamical and Microphysical Controls of Convective Updraft Vertical Velocity: Insights From a Lagrangian Perspective
Torri, Giuseppe	University of Hawaii	Initiation of deep convection by boundary-layer circulations during TRACER
Vagasky, Hannah	Atmospheric and Environmental Research	Comparison of TRACER and GoAmazon Deep Convective Clouds with Respect to Urban Aerosol Load
Wagner, Timothy	University of Wisconsin-Madison	Characterizing Boundary Layer Processes During Transition Periods With Observations and Modeling

FOA-0002850 Awards (continued)

PI Name	PI Institution	Proposal Title
Wang, Jingfeng	Georgia Tech	A Theoretical and Observational Study of the Impact of Longwave Radiation on Snowmelt and Sublimation using SAIL/SPLASH Field Observations
Wang, Yang	University of Miami	Interactions between the boundary layer new particle formation and cloud systems: observations from ARMs Southeast U.S. field campaign
Welp, Lisa	Purdue University	Using water stable isotopes to quantify the roles of entrainment, drizzle, and aerosols in determining marine stratocumulus properties
Yuan, Tianle	University of Maryland Baltimore County	Assessing the Dependence of Aerosol-Cloud Interactions on Low-Cloud Mesoscale Morphology with ARM Observations
Zhang, Yue	Texas A&M University	Pilot Study: Improving the Characterization of Cloud Formation Properties and Hygroscopicity of Aerosol Particles in the Southeastern U.S. Region

FY23 selections in context

ASR FOA	fiscal year of funding	Approx. # proposals submitted	# proposals selected	total funding	selection rate
1845	2018	70	19	\$10.7 M	27%
2034	2019	94	24	\$13.2 M	26%
2198	2020	87	31	\$19.0 M	35%
2391	2021	85	26	\$15.6 M	31%
2579	2022	94	22	\$14.5 M	22%
2850	2023	74	24	\$16.4 M	32%

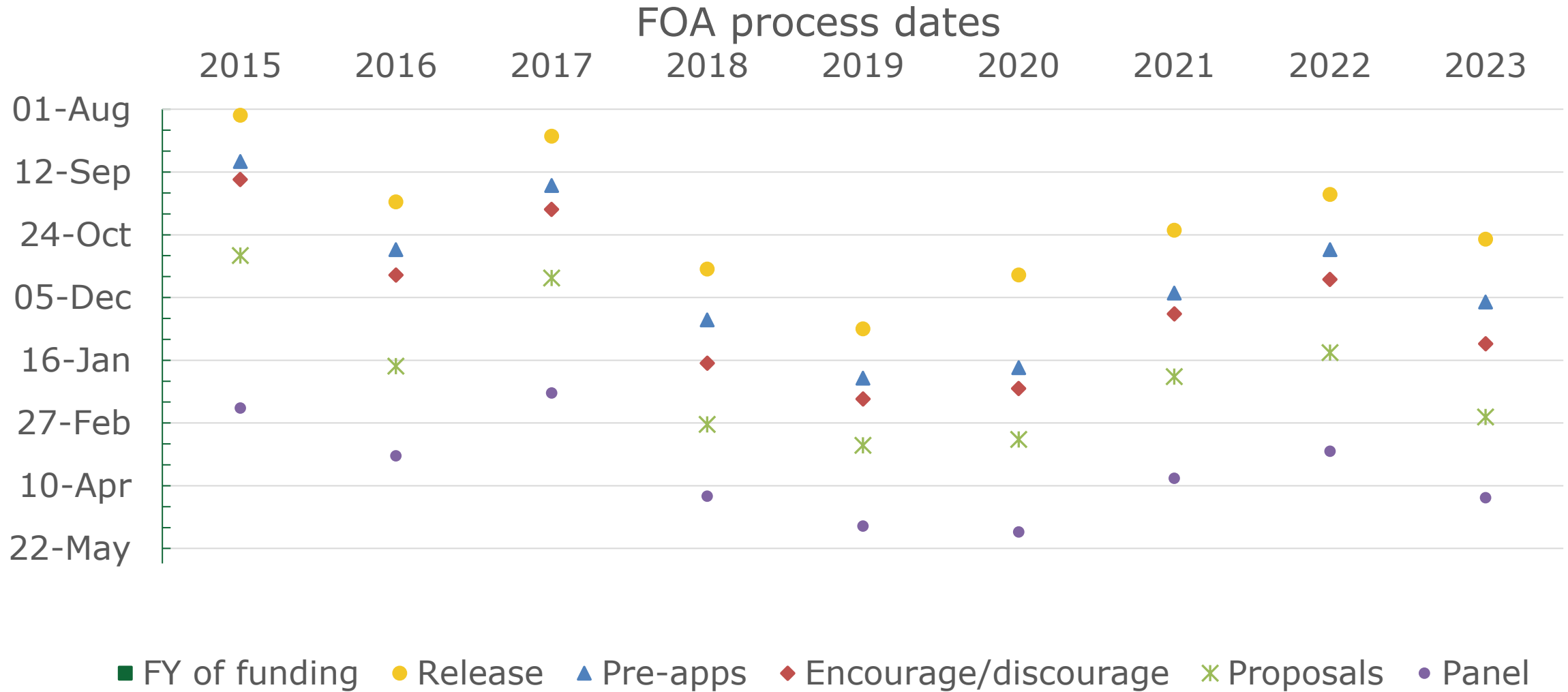


Plans for FY24

- ▶ **Planning for a targeted ASR FOA for FY24**
 - ▶ Announcements will be made in ASR newsletter, ASR webpage, Office of Science BER funding page, Grants.gov, and GovDelivery.
- ▶ **Office of Science Early Career Research Program FOA**
 - ▶ EESSD traditionally rotates between Environmental System Sciences, Earth and Environmental Systems Modeling, and Atmospheric System Research for topics
- ▶ **Additional workshops are possible**
 - ▶ Workshop guidelines: broad interest to the ASR community; emerging topics; new capabilities; opportunities for interdisciplinary science
 - ▶ Workshops can be very helpful to BER for planning
 - ▶ BER-organized workshops; ASR-supported workshops; community workshops with requests to ASR for support

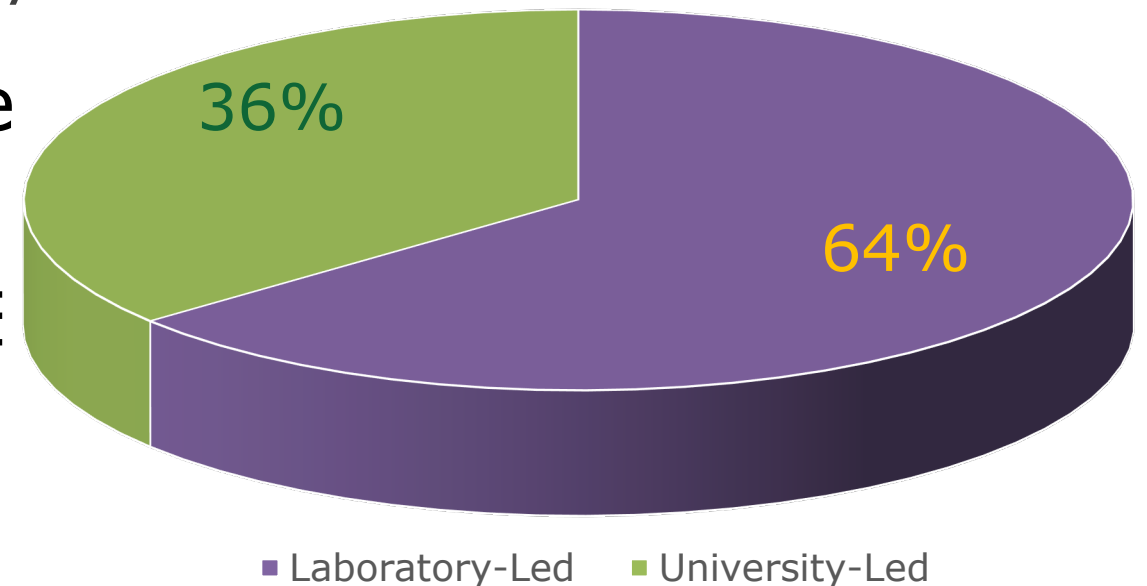


Historical FOA dates



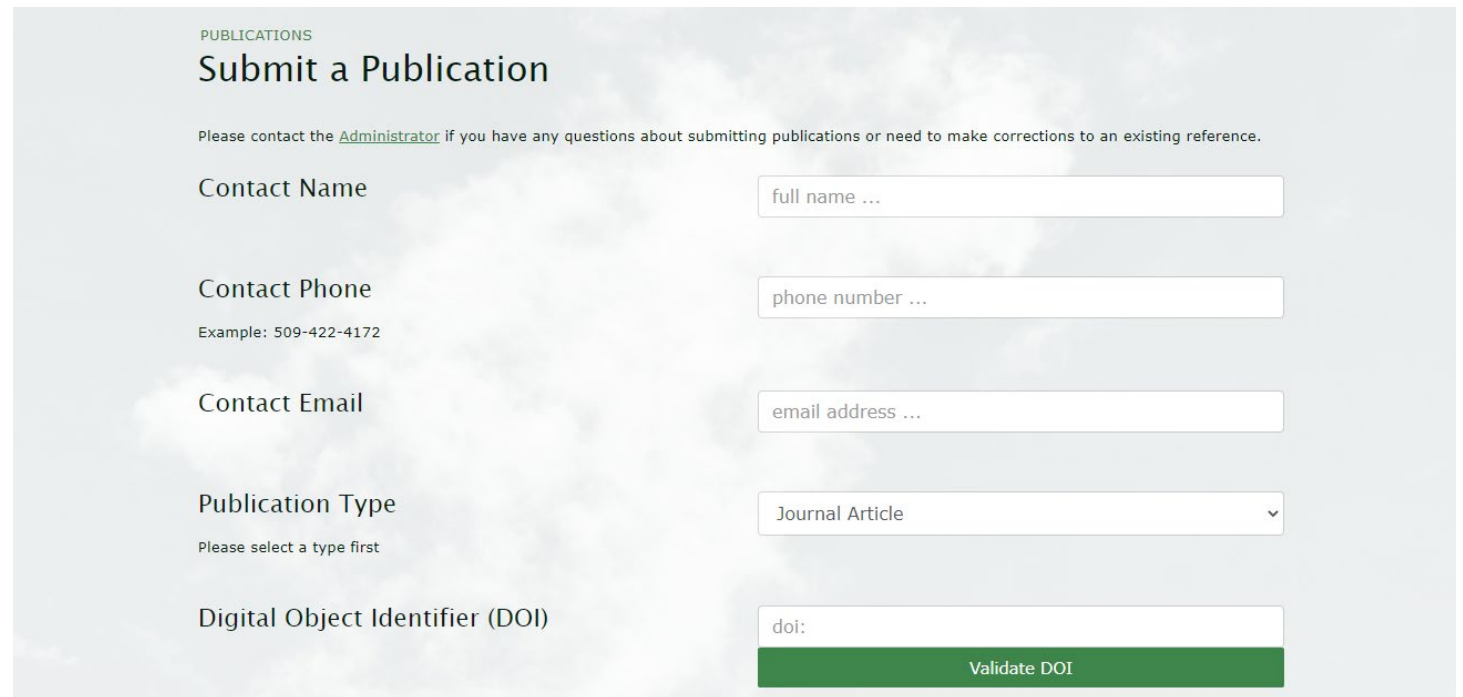
Documenting tax-payer funded research

- ▶ Important to document DOE-funded science
 - ▶ DOE Office of Science grants require journal articles to be archived with OSTI
 - ▶ New requirement that government-funded research results be accessible immediately with no paywalls
- ▶ ASR Research Highlights share your work with the public, scientific community, and DOE
 - ▶ 109 highlights submitted January 1, 2022 to July 20, 2023



Sharing Your Journal Publications

- ▶ ASR has created a simple form that publishes your science to the ASR website *and* shares with OSTI
- ▶ Pulls data from DOI
- ▶ Include your DOE award/contract no.
- ▶ Opportunity to recognize colleagues and institutions
- ▶ Upload your accepted manuscript to be shared to OSTI without a paywall



The screenshot shows a web form titled "PUBLICATIONS Submit a Publication". Below the title is a note: "Please contact the [Administrator](#) if you have any questions about submitting publications or need to make corrections to an existing reference." The form contains several input fields: "Contact Name" (placeholder: full name ...), "Contact Phone" (placeholder: phone number ...; example: 509-422-4172), "Contact Email" (placeholder: email address ...), "Publication Type" (dropdown menu with "Journal Article" selected), and "Digital Object Identifier (DOI)" (placeholder: doi:). A green button labeled "Validate DOI" is positioned below the DOI field.

Share Your Research through Highlights

- ▶ Please submit a research highlight for each of your ASR-funded publications
 - ▶ Critical opportunity to summarize your work and impact
 - ▶ Form Connects to publication
 - ▶ Describe your science and its impact
 - ▶ Include science summary slide and images

Science

A sentence or two, accessible to the non-specialist audience, of the science accomplished.

B *I* U ☰ ☰ Formats ▾ Paragraph ▾

Impact

A sentence or two, accessible to the non-specialist audience, of the "impact". For a use-inspired science highlight, impact is typically a potential technological advancement, while the "impact" of a discovery science highlight might be to open up new frontiers of science or resolve a longstanding question.

B *I* U ☰ ☰ Formats ▾ Paragraph ▾

Summary

A paragraph (~175 words that provides additional detail), hopefully still accessible to the non-specialist audience, but may be more technical if necessary.

B *I* U ☰ ☰ Formats ▾ Paragraph ▾



EESSD Open Houses

- ▶ As part of the RDPP initiative, EESSD committed to improving outreach to the broader community
- ▶ Scott Collis has been on a part-time detail to EESSD from ANL to help with outreach
- ▶ ASR held a small virtual open house earlier this summer.
 - ▶ The recording will soon be made available on the ASR webpage.
- ▶ Open houses for ESS and Modeling are being scheduled
- ▶ May continue in the future

This meeting brought to you by the ARM-ASR Coordination Team (AACT), ARM and ASR program managers, and the ARM and ASR community

- ▶ **Jennifer Delamere (Univ. of Alaska Fairbanks), User Executive Committee Chair**
- ▶ Jim Mather (PNNL), ARM Technical Director
- ▶ Nicki Hickmon (ANL), ARM Associate Director for Operations
- ▶ Jennifer Comstock (PNNL), ARM Associate Director for Research
- ▶ Adam Theisen (ANL), ARM Instrument Operations Manager
- ▶ Giri Prakash (ORNL), ARM Data Services Manager
- ▶ Scott Giangrande (BNL), ARM Lead Translator
- ▶ Jerome Fast (PNNL), ICLASS SFA Lead
- ▶ Michael Jensen (BNL), PASCALS SFA Lead
- ▶ **Yunyan Zhang (LLNL), THREAD SFA Lead**
- ▶ Greg McFarquhar (Univ. of Oklahoma), High Latitude Processes WG
- ▶ Gijs de Boer (Univ. of Colorado), High Latitude Processes WG
- ▶ Nicole Riemer (Univ. of Illinois), Aerosol Processes WG
- ▶ **Markus Petters (Univ. California Riverside), Aerosol Processes WG**
- ▶ Adam Varble (PNNL), Convective Processes WG
- ▶ Hugh Morrison (NCAR), Convective Processes WG
- ▶ Rob Wood (Univ. of Washington), Warm Boundary Layer Processes WG
- ▶ **Christine Chiu (Colorado State Univ.), Warm Boundary Layer Processes WG**



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