Atmospheric System Research Program Update

Shaima L. Nasiri & Jeff Stehr

ASR Program Managers

June 21, 2021

ARM-ASR Joint User Facility & PI Meeting

2020-2021 Challenges

- We know that the global pandemic has affected your life, your work, and your ASR-supported research

- We are committed to working with you through these challenges

- Thank you for taking the time to join the ARM and ASR communities this week.

Outline

- General updates

- ASR Funding: Reviews and Selections
  - DOE FOA 0002198 selections (FY20)
  - DOE FOA 0002421 selection (FY21 Early Career)
  - DOE FOA 0002391 updates (FY21)
  - Other Prospective FOAs and timelines
  - Upcoming plans

- Communications updates

- Meeting details

Atmospheric System Research (ASR) program

ASR utilizes the long-term cloud, aerosol, precipitation, and meteorological datasets from the Atmospheric Radiation Measurement (ARM) user facility, targeted field campaigns, laboratory studies, and process models to address key uncertainties in processes associated with clouds and aerosols that affect the Earth's radiative balance and hydrological cycle and limit the predictive ability of regional and global models.

Priority research areas are aerosol processes, warm boundary-layer processes, convective processes, and high-latitude processes.

ASR supports research at the national labs as well as through grants to universities and other research institutions.

DOE, BER, EESSD, and ASR

- DOE's FY21 Appropriations bill was passed on 21 Dec. 2020
  - As in FY20, BER was charged with spending $15M to support cloud-aerosol research and computing. DOE tasked ASR with this charge.
  - ASR budget was $36M ($34.5M effectively) (approximately the same as FY20)

- FY22 President's Budget Request was released last month.
  - DOE Office of Science and BER request information can be found at https://science.osti.gov/budget.
  - Budget request for ASR was $39M
  - ASR language: "The Request for ASR will enhance research on clouds, aerosols, and thermodynamic processes, with a focus on data from the ARM fixed sites as well as recent field campaigns conducted in the Arctic during FY 2020 and initial data from the TRACER campaign. ASR will continue to make use of data generated by Large Eddy Simulations at the ARM Oklahoma site."
  - No details yet on House or Senate appropriations bills for FY22

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

- Allison Aiken (LANL), ARM User Executive Committee Chair
- Jim Mather (PNNL), ARM Technical Director
- Nicki Hickmon (ANL), ARM Associate Deputy for Operations
- Jennifer Comstock (PNNL), ARM Engineering and Process Manager
- Adam Theisen (ANL), ARM Instrument Operations Manager
- Giri Prakash (ORNL), ARM Data Services Manager
- Shaocheng Xie (LLNL), ARM Lead Translator
- Jerome Fast (PNNL), PNNL SFA Lead
- Michael Jensen (BNL), BNL-ANL 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
- Jim Smith (Univ. of California-Irvine), 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
- Yunyan Zhang (LLNL), Warm Boundary Layer Processes WG

ASR FY2020 research call FOA-0002198

- ASR issued a targeted research call on 11/20/2019 covering four topic areas:

  - **Aerosol-cloud interactions**

  - **High-latitude atmospheric processes**

  - **Aerosol and/or cloud research associated with ARM's TRACER campaign**

  - **New data products**

- 116 Pre-applications by 1/21/2020

- 87 applications received (3/10/2020 due date)

- 5 virtual review panels met in May, 2020

- Decision process is on-going

  - FOA anticipated $13.5 for awards* (released before final appropriation)

  - Goal is to have all decisions finalized by late July, 2020

2020 Slide

ASR FY2020 research call FOA-0002198

- ASR issued a targeted research call on 11/20/2019 covering four topic areas:

  - **Aerosol-cloud interactions**

  - **High-latitude atmospheric processes**

  - **Aerosol and/or cloud research associated with ARM's TRACER campaign**

  - **New data products**

- 116 Pre-applications by 1/21/2020

- 87 applications received (3/10/2020 due date)

- 5 virtual review panels met in May

- **$19M for 31 awards**

- 58 reviewers (panels and mail-in)

ASR FY2020 research call FOA-0002198 Projects

PI	Proposal Title
Cappa, Christopher	Characterization of carbonaceous aerosols during TRACER-CAT
Chakrabarty, Rajan	Establishing robust correction schemes for improved and reliable ARM-AOS aerosol optical data products
Chiu, Christine	Constraining microphysical processes of warm rain formation using advanced spectral separations, an ensemble retrieval framework and machine learning techniques
de Boer, Gijs	Measurements of TRACER pre-convective conditions and mesoscale circulations using small unmanned aircraft systems (sUAS)
DeMott, Paul	Understanding the natural sources of aerosols and their impacts on cloud formation and climate across hemispheres
Diao, Minghui	Advancing the Understanding of Cloud Microphysical Processes and Aerosol Indirect Effects in High-Latitude Mixed-Phase Clouds by Linking ARM Measurements with Climate Model Simulations
Feingold, Graham	Evaluating Biases in Aerosol-Cloud Interaction Metrics using ARM Data and Models

PI	Proposal Title
Geerts, Bart	Numerical Simulations of Cold Air Outbreaks Using a Multi-Scale Modeling Framework
Harrington, Jerry	Characterizing the Small-Scale Dynamical, Ice Microphysical, and Residual Aerosol Properties of Mid-Latitude Cold Clouds: A Pilot Study
Klein, Petra	Coastal Urban Boundary-layer Interactions with Convection (CUBIC)
Knopf, Daniel	Application of aerosol-ice nucleating particle closure to establish the leading parameters governing ice crystal number concentration under commonly observed mixed-phase cloud conditions
Lasher-Trapp, Sonia	Aerosol Effects upon Convective Cold Pools: Establishing General Trends
Mazzoleni, Claudio	LAACI – Light Absorbing Aerosol-Cloud Interactions Experiment
McFarquhar, Gregory	Using MARCUS, MICRE, and COMBLE data to improve understanding and modeling of cloud, aerosol, and boundary layer processes at high-latitudes
Persson, Ola	Synoptic and Mesoscale Modulation of Dynamic and Thermodynamic Impacts on Central Arctic Sea Ice During MOSAiC

PI	Proposal Title
Petters, Markus	Size-resolved Eddy-Covariance Particle Flux Measurement during the TRACER Campaign
Rapp, Anita	Targeted Mobile Measurements to Isolate the Impacts of Aerosols and Meteorology on Deep Convection
Russell, Lynn	Baselining the Indirect Effect by Improving Quantification of Sea Spray and Marine Sources at Ascension Island
Sheesley, Rebecca	TRACER-MAP: Mapping Aerosol Processes across Houston during convective cell events
Shupe, Matthew	Cloud-atmosphere impacts on the central Arctic surface energy budget
Silber, Israel	Early Stages in the Lifecycle of Polar liquid-bearing Clouds
Smith, James	Ultrafine aerosol particle formation and impacts in Houston during TRACER
Sulia, Kara	Classification of Cloud Particle Imagery and Thermodynamics (COCPIT): A New Databasing Tool for the Characterization of Cloud Particle Images Captured During DOE Field Campaigns

PI	Proposal Title
Thornton, Joel	A combined experimental and hierarchical modeling approach for quantifying the impact of clouds on biogenic organic aerosol
van den Heever, Susan	Examining the Impacts of Microphysical-Dynamical Feedbacks on Convective Clouds in Different Aerosol Environments Using Enhanced Observational and Modeling Strategies
Van Lier-Walqui, Marcus	Polarimetric radar & lightning analysis and high resolution simulations to support TRACER science goals
Wang, Jian	Aerosol hygroscopic growth, mixing state, and cloud condensation nuclei activity during Tracking Aerosol Convection Interactions ExpeRiment (TRACER)
Wang, Yang	Understanding the Vertical Transport and Removal of Aerosols during Deep Convective Events
Williams, Christopher	Advanced Precipitation and Boundary Layer Data Products Derived from ARM Radar Wind Profilers
Wood, Robert	Investigating the role of dynamical processes in driving aerosol-cloud interactions in boundary layers over ocean and land
Zuidema, Paquita	Synthesis of aerosol-cloud interactions over the southeast Atlantic throughout the seasonal cycle

Office of Science Early Career Research Program FOA-0002421

- EESSD had an atmosphere topic in FY21: Aerosol-Cloud Processes

- Eligibility: tenure-track assistant professors at US universities and early-career DOE national laboratory scientists with permanent appointments

- 5-year projects have total budgets of ~$750K for university and $2.5M for national lab projects

- 22 Pre-applications by 11/20/2020

- 16 applications received by 2/16/2021 due date

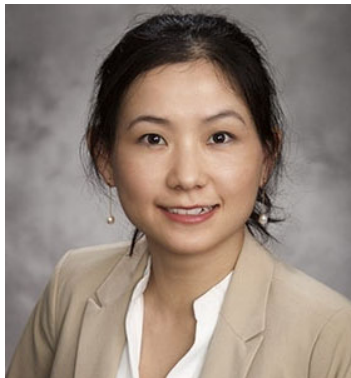- Virtual panel met in March 2021

- 9 reviewers

2021 Early Career Awardees – EESSD Atmosphere

- Gabriel Isaacman-vanWertz, Virginia Tech
  Parameterizing wet removal of aerosol-forming oxygenated gases and its regional and global impacts

- Dié Wang, Brookhaven National Lab
  Understanding deep convective cloud kinematic processes and their responses to aerosols

- Xue Zheng, Lawrence Livermore National Lab
  Using ARM data and multiscale models to advance the understanding of liquid-phase cloud response to aerosol perturbation over ocean and land

ASR FY2021 research call FOA-0002391

- ASR issued a targeted research call on 10/21/2020 covering five topics:

  - **aerosol-cloud interactions**

  - **aerosol processes**

  - **warm boundary layer processes**

  - **Arctic atmospheric processes from ARM's COMBLE and MOSAiC campaigns**

  - **convective cloud processes from ARM's CACTI field campaign**

- 105 Pre-applications by 12/2/2020

- 85 applications received by 1/27/2021 due date

- 5 virtual review panels met in April 2021

- Decisions are currently being finalized

  - FOA anticipated $14.6M in FY21 funds for awards – we expect to be able to spend $14.9M in FY21 funds plus a small amount out-year

  - Goal is to have all decisions finalized and reviews available by late July, 2021

ASR FY2021 research call FOA-0002391 – 2

While program managers have reached out to PIs regarding recommendation of proposals, the documentation and concurrence process is still ongoing.

DOE's guidance to PIs discourages them from making any public statement about the possibility of receiving an award until either (a) DOE issues a press release about the selection of recipients for negotiation of awards or (b) the institution receives a signed award document.

- Decisions are currently being finalized
  - FOA anticipated $14.6M in FY21 funds for awards – we expect to be able to spend $14.9M in FY21 funds plus a small amount out-year
  - Goal is to have all decisions finalized and reviews available by late July, 2021

Prospective new FOAs in 2021 (for 2022 funding)

For FY22 we plan another ASR topical research call later in calendar 2021 (trying, again, for early fall)

Announcements will be made in ASR newsletter, ASR webpage, Office of Science BER funding page, and Grants.gov

ASR FOA	fiscal year of funding	# proposals submitted	# proposals selected	total funding	selection rate
1174	2015	96	19	$9.2 M	20%
1431	2016	26	6	$2.2 M	23%
1430	2016	101	19	$12.0 M	19%
1638	2017	74	15	$9.3 M	20%
1845	2018	70	19	$10.7 M	27%
2034	2019	94	24	$13.2 M	26%
2198	2020	87	31	$19.0 M	35%

Additional plans for 2021/2022

- Workshops

  - ASR and ARM, along with AmeriFlux, co-sponsored a Land-Atmosphere Interactions Workshop June 10-11, 2021

    - Excellent discussion and broad community involvement

    - Invited presentations are available for viewing online

  - Additional workshops on other topics are likely

    - 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

ASR communications updates

- Don't forget to subscribe to ASR's newsletter
  - Self-subscribe at https://asr.science.energy.gov/news/subscribe
  - No longer receiving newsletters? Reach out to accounts@arm.gov for troubleshooting

- ASR communications continues to work on streamlining submission of your publications to DOE's OSTI system.
  - Keep submitting research highlights and publications to the ASR webpage
  - If you receive an email from Robert.Stafford@pnnl.gov about grant number or publication status, please respond promptly.

- If you are promoting your ASR-supported research on social media, please tag #ASRnews.
  - Consider tagging DOE Office of Science, @DOEscience, too.

- Send ideas for newsletter stories to asrnews@arm.gov or the program managers

A few meeting announcements and reminders

- Virtual meeting
  - More people are able to attend this year – 637 people are registered
  - Q&A feature in Zoom makes it easy to ask questions
    - Please keep the Q&A for questions
  - Chat feature in Zoom is also available for comments and kudos
  - Slack is available for more detailed discussions
    - Channels for each session and each poster

- Posters prioritized this year
  - Thanks to ARM/ASR communications team led by Rolanda Jundt for the poster templates
  - Slack channels for poster discussion
    - Slack instructions are available from the Poster list on the meeting webpage
    - New for many of us; more details in Sally McFarlane's presentation

- Optional informal networking sessions
  - Wonder software is very easy to use

Ask the program manager