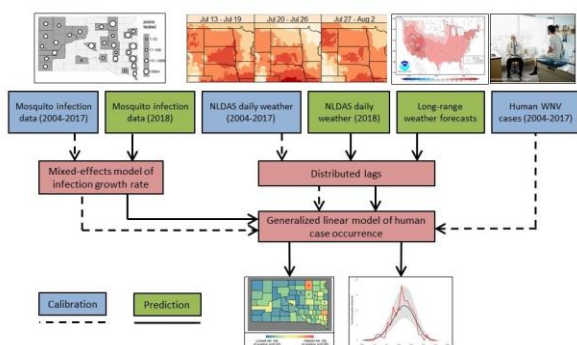
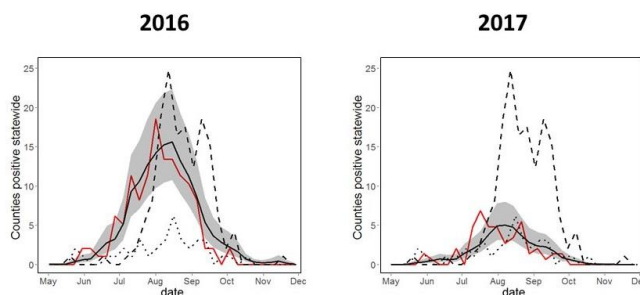


## ARBOVIRUS MAPPING AND PREDICTION TO FORECAST MOSQUITO-BORNE DISEASE OUTBREAKS

In the United States, the Northern Great Plains is a high-risk geographic region for West Nile Virus (WNV) transmission. Of the 50 states, South Dakota has a long-term record of the highest reported incidence of WNV neuroinvasive disease. As part of the NASA HAQ Applications program, [Michael Wimberly \(U. of Oklahoma\)](#) and his team developed a WNV early warning system in South Dakota. Forecasts produced by the Arbovirus Monitoring and Prediction (ArboMAP) system are driven by a combination of mosquito infection data and environmental monitoring data (including the NASA Land Data Assimilation Systems, NLDAS) and are calibrated with historical human case data. [ArboMAP](#) forecasts can be accessed via Google Earth Engine and other automated reporting tools. Released in January 2019, this code is freely available via [GitHub](#) and is currently in operational use for WNV forecasting in South Dakota.



Conceptual diagram of information flow through the ArboMAP system. Photo credit: ArboMAP



Prospective WNV forecasts: Prediction with 95% intervals (black line/gray shading); Observed cases in 2016 or 2017 (red line); Observed cases in 2012 (dashed line); Observed cases in 2015 (dotted line). Photo credit: ArboMAP

## NASA HEALTH AND AIR QUALITY TEAM SUPPORTS ONE HEALTH DAY 2018

Every November, [One Health Day](#) is celebrated to promote the development of transdisciplinary projects that address health threats to humans, animals, and the environment. On One Health Day 2018, the NASA HAQ and Communications Teams shared three projects on the NASA Applied Sciences Program [website](#) that promoted the use of Earth observations in public health applications. These projects included [Preventing Heat-Related Illnesses in New York](#) (Tabassum Insaif, New York State Department of Health), [Cholera Forecasts Enhancing National Preparedness and Support Measures](#) (Antarpreet Jutla, West Virginia U.), and [Space Views Aid Florida 'Red Tide' Health Alerts](#) (Richard Stumpf, NOAA).



Photo credit:  
One Health Commission

### HEALTH AND AIR QUALITY APPLICATIONS APPLIED SCIENCES PROGRAM

haQ

**JOHN HAYNES**  
PROGRAM MANAGER  
HEADQUARTERS

**SUE ESTES**  
ASSOCIATE  
U. OF ALABAMA-  
HUNTSVILLE

**JACQUELYN WITTE**  
ASSOCIATE  
GODDARD SPACE FLIGHT  
CENTER/SSAI

**HELENA CHAPMAN**  
AAAS S&T POLICY FELLOW  
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## HAQAST 5 MEETING FEATURES TALKS ON AIR QUALITY AND PUBLIC HEALTH APPLICATIONS FROM INVESTIGATORS AND STAKEHOLDERS

The NASA Health and Air Quality Applied Sciences Team (HAQAST 5) semi-annual meeting, held in Phoenix, AZ, was hosted by Arizona State University with coordinating assistance from the Maricopa County Air Quality Department. With 104 in-person attendees and 277 online participants, this marks the largest total attendance at any HAQAST (AQAST) meeting. Representatives from the Maricopa County Air Quality Department provided insight on management and research efforts to better understand air quality trends and extreme events (e.g., dust storms), due to unique southwest topography. Presentation from stakeholders included WESTAR/WRAP, NESCAUM, American Cancer Society, Clean Air Institute, and Health Effects Institute, among others. The meeting agenda provided high-impact updates by presenters and facilitated dialogue on strategies to strengthen collaborations between air quality management and the public health sector. A total of 23 posters were also presented.

HAQAST 5 showcased three special highlights. First, four Maryland high school students (**Kevin Liu, River Hill High School; Bill Tong, Atholton High School; Jeffrey Tong, Montgomery Blair High School; Alex Xie, Gilman Upper School**) developed the [DustWatch app](#) to provide end-users with data (e.g., air quality index, wind, dust concentration), emergency notifications, and educational information. They are currently working with three advisors: **Edgar Nzokwe (Booz Allen Hamilton); Dexin Zhang (NOAA NWS);** and HAQAST member **Daniel Tong (George Mason U.)**. Second, **Brad Pierce (U. of Wisconsin, Madison)** and team completed a demonstration of enhancements to the National Weather Service air quality forecast system, where results led to an improvement in ozone prediction. Third, **Mark Zondlo (Princeton U.)** and team used Aura OMI and Suomi-NPP OMPS SO<sub>2</sub> data to examine the Kilauea volcanic eruption. Preliminary data show enhanced signals of SO<sub>2</sub> for the duration of the volcanic eruption.



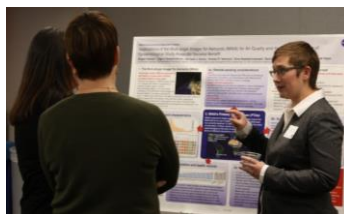
Photo credit: HAQAST



T. Holloway (left) and S. Estes (right) present at HAQAST5. Photo credit: H. Chapman



HAQAST5 session led by T. Holloway. Photo credit: H. Chapman



A. Nastan describes MAIA Applications at the HAQAST5 poster session.



Photo credit: HAQAST

## NASA INVESTIGATORS IN THE NEWS

**Michael Wimberly (U. of Oklahoma):** [Arbovirus Mapping and Prediction to Forecast Mosquito-Borne Disease Outbreaks](#): M. Wimberly and his team developed the Arbovirus Monitoring and Prediction (ArboMAP) system. ArboMAP uses a combination of mosquito infection data and environmental monitoring data (including the NASA Land Data Assimilation Systems, NLDAS) and is calibrated with historical human case data.

**Daniel Tong (George Mason U.):** [Dust Rising](#): D. Tong is the topic matter expert in a new critically acclaimed documentary, *Dust Rising*, which premiered at the Environmental Film Festival DC in March.

## NASA HEALTH AND AIR QUALITY TEAM PRESENTS TALKS AT AMS2019 HYPERWALL AND SCIENTIFIC SESSIONS

At the American Meteorological Society (AMS) 2019, held in Phoenix, AZ, the NASA HAQ Team coordinated a scientific session, *NASA Earth Observation Systems and Applications for Health: Looking at Predicting Extreme Environmental Events and How it Affects Health*, moderated by **Sue Estes (U. of Alabama in Huntsville)**, to an audience of approximately 70 attendees. Four topics were presented: *Using Spatially Contiguous Remote Sensing Reanalysis Data to Estimate Policy Relevant Health Effects of Extreme Heat Exposures in New York State* (**Tabassum Insaf, New York State Department of Health; Presented by Temilayo Adeyeye**); *Assessment of Ozone Production and Accumulation over Lake Michigan* (**Arastoo Pour Biazar, U. of Alabama in Huntsville**); *Toward Cholera-free Nations: How NASA Satellites Help Track Pathogenic Vibrios* (**Antarpreet Jutla, West Virginia U.; Presented by Moiz Usmani**); and *Using the One Health Approach to Strengthen Environmental Health Collaborations* (**Helena Chapman, NASA HQ**). As part of the scientific session, *Future Observations of the Middle Atmosphere—Needs and Capabilities*, **Jacquelyn Witte (NASA Goddard/SSAI)** presented, *The Value of Homogenized Ozone-sonde Networks – 20 Years in the SHADOZ*. Organized by the Science Communications Support Team (**Steve Graham, NASA Goddard**), the three NASA Hyperwall talks at the exhibit hall included: *Linking Satellite Data to the One Health Approach* (**Helena Chapman, NASA HQ**); *Mosquito Meets MODIS* (**Sue Estes, U. of Alabama in Huntsville**); and *Presentation Power: Designing for Impact* (**McRae Lenahan, Alden Leonard, NASA Applied Sciences Communications Team/U.Group**). Also, as part of the AMS Town Hall sessions, **Abigail Nastan (NASA JPL)** organized a MAIA Applications Town Hall, *NASA’s Multi-Angle Imager for Aerosols: Addressing the Health Impacts of Particulate Air Pollution*, that was well attended.



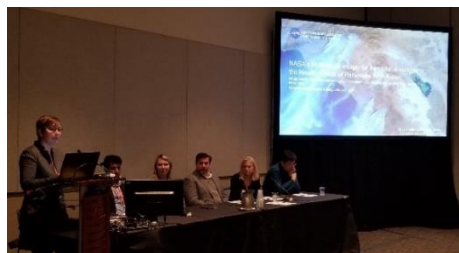
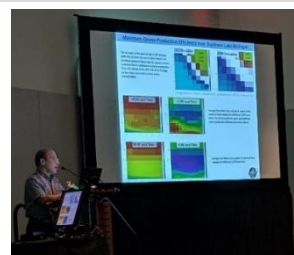
HAQ session presenters at AMS2019.

Photo credit: M. Estes



T. Adeyeye (left) and A. Pour Biazar (right) present at AMS2019.

Photo credit: H. Chapman



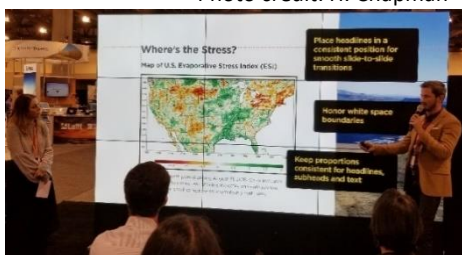
A. Nastan opens the MAIA Town Hall at AMS2019.

Photo credit: H. Chapman



J. Witte presents at AMS2019.

Photo credit: H. Chapman



M. Lenahan and A. Leonard (left), S. Estes (middle), and H. Chapman (right) present Hyperwall talks. Photo credit: H. Chapman, M. Estes



## GEO HEALTH COMMUNITY OF PRACTICE HOLDS QUARTERLY TELECON



In February 2019, the Group on Earth Observations (GEO) Health Community of Practice (CoP) held the [quarterly telecon](#) to provide program/project updates and finalize the GEO Health CoP goals and work plan. This work plan supports GEO efforts and advances development of the GEO Earth Observations for Health (EO4HEALTH) community activity to a potential initiative. **Kristin Wegner (UCAR/GLOBE)** presented a brief description of the [GLOBE Zika Education and Prevention project](#) and the [GLOBE Mission Mosquito campaign](#). Then, **Juli Trtanj (NOAA)** led a detailed discussion of each Working Group's section of the work plan. A total of 30 participants, representing different agencies in public and private sectors, participated on the telecon. The next quarterly telecon is planned for May 2019.

## UPCOMING

### Funding Opportunities:

ROSES-2018  
Letters of Intent due  
March 2018 – January 2019  
Full Applications due  
May 2018 – April 2019

### Meetings:

[American Thoracic Society International Conference](#)  
May 17-22, 2019  
Dallas, TX

[Air and Waste Management Association's Annual Conference & Exhibition](#)  
June 25-28, 2019  
Quebec City, Quebec, Canada

## ONE HEALTH IN THE NEWS

In March-April 2019, the U.S. Department of State Bureau of Educational and Cultural Affairs sponsored 22 participants representing 19 countries on a three-week International Visitor Leadership Program on "Global Health Security". The participants interacted with government officials, academia, nonprofit institutions, and private sector companies in nine cities regarding the use of integrated information systems to advance global health security. **John Haynes (NASA HQ)**, **John Balbus (NIH/NIEHS)**, and **Juli Trtanj (NOAA)** were invited to give keynote presentations at the opening session, which focused on Early Warning for Health. Each spoke about the role of their agencies and the importance of partnerships between agencies and sectors.



J. Haynes (left) and J. Trtanj (right) present their keynote talks.

Photo credit: H. Chapman

## ARSET VALENTINES

The [NASA Applied Remote Sensing Training \(ARSET\)](#) team developed "Valentine" cards to promote the use of Earth observations in research and practice. These Valentines inform the public about the [Fundamentals of Remote Sensing](#) training and online [webinar](#) trainings.



Photo credit: NASA ARSET

## AMERICAN LUNG ASSOCIATION LAUNCHES YEAR OF AIR POLLUTION & HEALTH 2019

The [American Lung Association \(ALA\)](#) has launched the “[Year of Air Pollution & Health 2019](#)” campaign, in efforts to increase public understanding and awareness of the harmful effects of air pollution on health. Each month will highlight a different theme, including sources of air pollution, influence of environmental hazards, effects on community health, and mitigation strategies. To learn more about this ALA campaign, please download the [annual calendar](#) and visit the ALA website for [additional resources](#) and [blog articles](#).



Photo credit: ALA

## PAST

### Meetings:

#### [HAQAST 5 Team Meeting](#)

January 3-4, 2019

Phoenix, AZ

#### [American Meteorological Society](#)

##### [Annual Meeting](#)

January 6-10, 2019

Phoenix, AZ

#### [American Association for the Advancement of Science Annual](#)

##### [Meeting](#)

February 14-17, 2019

Washington, DC

#### [Association of Schools and Programs of Public Health Annual Meeting](#)

March 20-22, 2019

Arlington, VA

## SHARING SCIENCE WITH AJAS DELEGATES

As part of the American Association for the Advancement of Science (AAAS) Annual Meeting 2019, [American Junior Academy of Science \(AJAS\)](#) delegates visited the Smithsonian National Museum of Natural History’s “[Outbreak: Epidemics in a Connected World](#)” exhibit. **Dorian Janney (NASA Goddard)**, **Helena Chapman (NASA HQ)**, and **Jeanne Jordan (George Washington U.)**, current exhibit docents, were invited to share their scientific career trajectories with AJAS delegates. AJAS is a national honor society that recognizes U.S. high school students for their scientific research.



AJAS delegates visit the “Outbreak” exhibit and learn about science careers with three docents (left). H. Chapman engages AJAS delegates with a disease detective challenge (right). Photo credit: AJAS/Michael Colella

## PUBLICATIONS

[Estimating Cholera Risk from an Exploratory Analysis of its Association with Satellite-derived Land Surface Temperatures](#) *International Journal of Remote Sensing* (R. Khan et al.)

[Estimating Variability in Downwelling Surface Shortwave Radiation in a Tropical Highland Environment](#) *PLoS One* (S. Stettz et al.)

[Incorporating the One Health Framework in Medical Education](#) *Medical Teacher* (H.J. Chapman and S. Gupta)

[Examination of the Physical Atmosphere in the Great Lakes Region and Its Potential Impact on Air Quality—Overwater Stability and Satellite Assimilation](#) *Journal of Applied Meteorology and Climatology* (R.T. McNider et al.)