# Leveraging AI in the Exploitation of Satellite Earth Observations & Numerical Weather Prediction

Using Artificial Intelligence (AI) and Deep/Machine Learning Techniques for the Exploitation of Satellite Data, Internet-Of-Things (IoT) and other sources, in Earth Observation Remote Sensing, NWP Data Assimilation, Forecasting and Situational Awareness Applications

**SAVE THE DATE**
## April 23–25, 2019

**LOCATION**
## NOAA Center for Weather and Climate Prediction
## 5830 University Court
## College Park, Maryland 20740

**WHO SHOULD ATTEND**
Scientists, program managers, and leaders from the public, academic and commercial sectors interested in identifying innovative ways to use satellite and other environmental data.

**DEADLINE FOR REGISTRATION AND ABSTRACT SUBMISSION**
February 15, 2019, Registration is FREE

**INQUIRIES TO**
stacy.bunin@noaa.gov

## 1ST WORKSHOP

**Leveraging AI in the Exploitation of Satellite Earth Observations & Numerical Weather Prediction**

**April 23–25, 2019**

**NOAA Center for Weather and Climate Prediction (NCWCP)**
**5830 University Court**
**College Park, Maryland 20740**

**Register at:**
**https://www.star.nesdis.noaa.gov/star/ meeting_2019AIWorkshop.php**

### Background and Workshop Motivations

Artificial Intelligence (AI), machine/deep learning techniques (including deep neural networks, DNNs) have advanced considerably in recent years across a number of areas and applications: in medicine, self-driving cars, social media, the finance industry, etc. The astonishing increase in accuracy and applicability of AI has been significant in the private sector, driven by the ease, efficiency, cost-effectiveness, speed and auto-learning features of AI. Significant advances have also been made in application of AI in different areas of meteorology and oceanography.

However, until recently, far fewer AI applications were developed in the area of environmental data exploitation of satellite data, high-level information extraction in the area of Numerical Weather Prediction (NWP), data assimilation and forecasting, as well as for extreme weather prediction and nowcasting.

There have been encouraging signs that AI is increasingly considered for these applications, with promising results—including predictive skills—and this trend is expected to continue with the ever-increasing volume of satellite data and the increased societal reliance on improved forecasting accuracy and resolutions. The increase of data volume comes from higher resolution satellites and sensors, from a growing list of new sensors (traditional as well as smallsats/cubesats), and from an explosion of new virtual observing systems made possible by the internet of things (IoT). These large increases are expected to present major challenges for exploiting these data sources, and AI has emerged as a potentially transformational and mitigating technology.

### Purpose of Workshop

The workshop will help gather scientists, program managers, and leaders from public, academic and private sectors. It will enable experts involved in the development and adaptation of AI tools and applications in a number of fields to meet and exchange experiences.

It is important to note that there are fields with similar fundamental issues as the field of environmental data information (from space- and ground-based platforms), NWP data assimilation, forecasting, and other environmental prediction systems. These fundamental issues include image and signal processing, pattern recognition, morphing, projection mapping, data mining, clustering, etc. This will facilitate the cross-fertilization of knowledge in different communities to benefit environmental observation and numerical prediction using machine-learning techniques.

This gathering will allow participants to exchange ideas, share lessons learned, and to discuss both the future potential and limitations of AI. It will also help to establish collaborations for using AI tools for many purposes, including:

- Reviewing AI-enabling technology and tools
- Furthering scientific objectives of better utilization of Earth observation
- Sharing ideas to improve NWP skills
- Improving efficiency of environmental data processing and exploitation for cost effectiveness
- Identifying innovative ways to use satellite data and other environmental data to create new products and services and generate new markets
- Expanding commercial markets of high-level environment-related products and services to benefit society and the economy

### Workshop Format

The workshop will begin with a keynote address by Dr. Neil Jacobs (Assistant Secretary of Commerce for Environmental Observation and Prediction) followed by a series of overview presentations and discussions. The workshop will have oral presentations as well as posters organized by sessions. It will also have panel discussions and invited speaker presentations. Tutorials on AI/ML tools are also planned as part of the workshop.

## Registration Fee

No registration fee is expected for this workshop. Links to pages where you can order lunch will be provided in the future.

## Registration and Deadlines

If you are interested in participating in the workshop, please use the link below to apply. Registration and abstract submission closes February 15, 2019, but applicants are encouraged to submit as early as possible. When registering, please indicate whether you would like to give an oral presentation or a poster, and whether you would like to be part of a panel discussion.

**To register please visit:**

https://www.star.nesdis.noaa.gov/star/meeting_2019AIWorkshop.php

Alternatively, you can send an email to narges.shahroudi@noaa.gov with CC to ana.carrion@noaa.gov and stacy.bunin@noaa.gov.
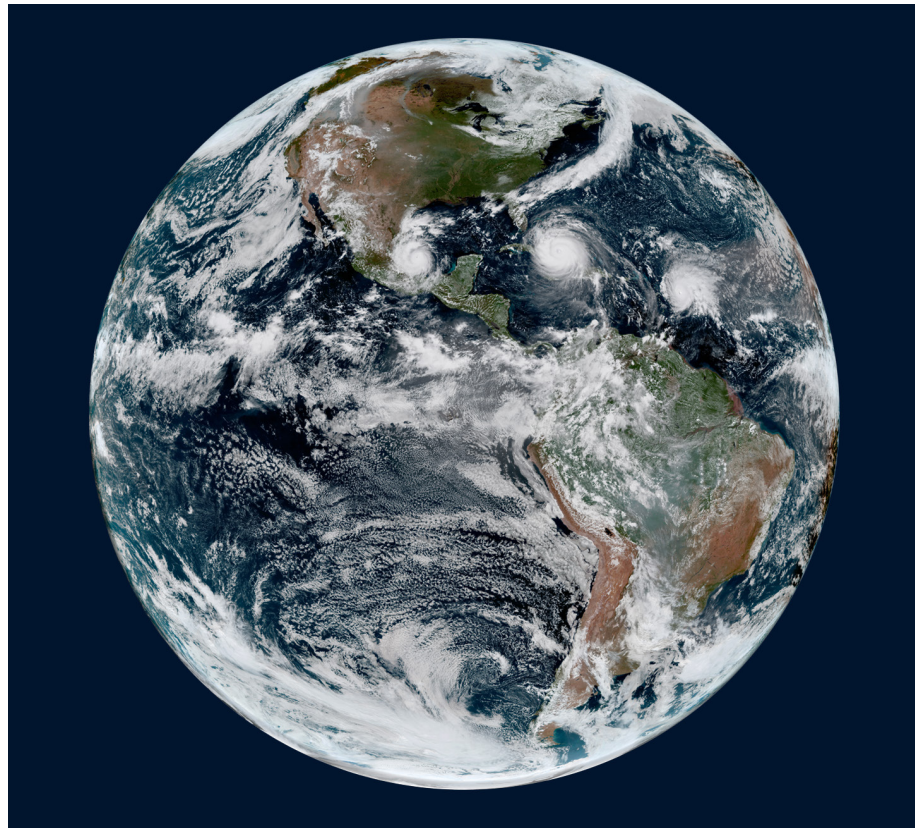
## Presentation Uploading

Oral Presenters are encouraged to submit their presentations ahead of time, by sending an email to narges.shahroudi@noaa.gov with CC to ana. carrion@noaa.gov and stacy.bunin@noaa.gov. The preferred format is pdf or PPT, preferably by April 20th, 2019, but no later than the day before the presentation.

## Milestones

- Registration and abstract submission will close February 15th, 2019.
- Notification will be sent to applicants about participation and submission (oral/poster) March 1st, 2019.

## Location

The workshop will be hosted in the NCWCP building in College Park, Maryland. This location offers convenient access to the Metro public transit system of the Washington, DC area (College Park/Univ. of MD Metro station, and the Metro bus). It is also within walking distance of downtown College Park, MD.

## Parking

For parking, participants are invited to park in the NCWCP parking. Note that a Government-issued ID is required.

## Building Access

Some State ID's are considered Non-Compliant for U.S. Federal Government building access. A list of those States and options for other forms of Government ID's and information are listed at http://www.dhs.gov/real-id-enforcement-brief#.

Foreign nationals (those who are not U.S. citizens or green card holders) have to submit the foreign visitor form in advance for the meeting (see deadlines above). These should be submitted to Ana.Carrion@noaa.gov with CC to narges.shahroudi@noaa.gov

## Dining and Accommodation Options in College Park, MD

http://shopcollegepark.org

## Science & Organization Committee

### Government

- S. Boukabara, Chair (NOAA/NESDIS/STAR)
- Vladimir Krasnopolsky, Co-Chair (NOAA/NWS/NCEP)
- Edward Kearns (NOAA)
- Jebb Stewart, (NOAA/OAR/ESRL, CIRA)
- Nikunj Oza (NASA/Ames and NASA/ESTO)
- John Ten Hoeve (NOAA/NWS Office of Org. Excellence)

### Academia

- K. Ide (Univ. Of Maryland)
- Amy McGovern (Univ. Of Oklahoma, AMS AI Committee Member)
- Allen Huang (Univ. Of Wisconsin)
- Philippe Tissot (Texas A&M-Corpus Christi, AMS AI Committee Chair)
- Sue E. Haupt (NCAR)

### Private Sector

- John Williams (The Weather Company, an IBM Business)
- Jack Kelly (DeepMind, Google)
- Pete Childs (Priogen Energy)
- Peter Dolan (Alphabet)
- David Hall (NVIDIA)
- Lucas Joppa (Microsoft, AMS AI Committee Member)

### Local Organizing Committee

- Kevin Garrett, Science & Technical Coordination Lead
- Ross Hoffman, Organization and Coordination
- Eric Maddy, Science & Technical Coordination
- Narges Shahroudi, Technical Support
- Erin Jones, Technical Support
- Ana Carrion, Administration
- Stacy Bunin, Organization and leadership support
- Lori Brown, IT/Web Support