

**BENCHMARK**

**YOUR ASSET, YOUR  
FORECAST**

ITU/WMO Workshop On AI For Natural Disaster  
Management

**Machine Learning applications for Natural Disaster  
Management - Recent contributions to the AMS AI  
Conference**

**CARLOS F. GAITAN, Ph.D.**  
**CTO**  
**Benchmark Labs, Inc.**

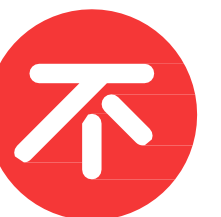




## Quick intro – About us:

**Benchmark Labs** provides IoT forecasting solutions by delivering asset-specific forecasts for the agricultural sector and beyond, to optimize management strategies, reduce water consumption and improve operational margins.

**PLUGANDPLAY**





# AMS AI COMMITTEE: MISSION

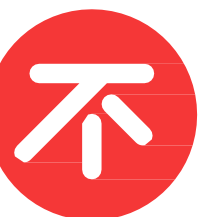
To ensure that members of the Society are informed about and encouraged to use modern artificial intelligence techniques that can contribute meaningfully to their scientific research and algorithm development activities.





# ANNUAL MEETING SESSIONS - 2021

- **AI FOR FEATURE DETECTION**
  - AI FOR CLIMATE APPLICATIONS
  - AI FOR APPLIED REMOTE SENSING
  - AI, ETHICS AND INCLUSION FOR GEOSCIENCES
  - DEEP LEARNING APPLICATIONS FOR ENVIRONMENTAL SCIENCE
  - **AI FOR HIGH-IMPACT WEATHER**
  - AI FOR SEASONAL TO SUBSEASONAL PREDICTION
  - AI FOR TROPICAL WEATHER
  - BLENDING AI WITH NUMERICAL WEATHER AND CLIMATE MODELS
  - AI IN RADAR OBSERVATIONS, ANALYSIS AND APPLICATIONS
  - CAUSAL DISCOVERY AND INFERENCE IN CLIMATE AND ENVIRONMENTAL SCIENCE
  - OPEN DATASETS FOR AI RESEARCH AND APPLICATIONS IN EARTH AND ATMOSPHERIC SCIENCES
  - **NOWCASTING AND SHORT-TERM FORECASTING APPLICATIONS LEVERAGING AI**
- 
- **JOINT SESSIONS**
  - THE EARTH PREDICTION INNOVATION CENTER ( 2 SESSIONS).
  - USING AI TO EXPLOIT SATELITE EARTH OBSERVATIONS
  - HPC TO ACCELERATE MACHINE LEARNING
  - AI APPLICATIONS FOR THE ENERGY INDUSTRY
  - PYTHON FRAMEWORKS FOR REPRODUCIBLE, COMMUNICABLE AI WORKFLOWS
  - **APPLICATIONS OF AI TO THE COASTAL ENVIRONMENT**
  - PHYSICAL INTERPRETABILITY IN ML
  - HYBRID ML AND STATISTICS APPROACHES
  - WHO DETERMINES THE FORECAST? CHANGING THE MIX BETWEEN HUMAN AND TECHNOLOGY
  - ML APPROACHES TO CHARACTERIZE TROPICAL WEATHER
  - **THE FUTURE OF OPERATIONAL METEOROLOGY: LEVERAGING ML TO ENHANCE DECISION-MAKING AND DECISION SUPPORT**
  - ML APPLICATIONS FOR ATMOSPHERIC CHEMISTRY
  - TRANSITIONING AI RESEARCH TO OPERATIONS





# CLIMATENET with NERSC

# AI INITIATIVES

## NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography (AI2ES)



**AI2ES Vision**

The vision of AI2ES is to create trustworthy Artificial Intelligence (AI) methods for diverse environmental science (ES) users that will revolutionize our understanding and prediction of high-impact atmospheric and ocean science phenomena and create new educational pathways to develop a more diverse AI and environmental science workforce.

**The Need for AI2ES**

Changes in weather patterns, oceans, sea level rise, and disaster risk amplify the need for accelerated AI research in the environmental sciences. AI2ES is a convergent, multi-sector NSF Trustworthy AI institute led by the University of Oklahoma that brings together researchers in AI, atmospheric science, ocean science, and risk communication.

# AI2ES WITH NSF



# AI FOR EARTH AT NeurIPS 2020



# THE OPEN DATA INITIATIVES

Public – private partnerships between the federal government and leading cloud providers (e.g., Microsoft, Amazon, Google)

**Registry of Open Data on AWS**

**About**

This registry exists to help people discover and share datasets that are available via AWS resources. [Learn more about sharing data on AWS.](#)

See [all usage examples for datasets listed in this registry](#) tagged with **climate**.

**Search datasets (currently 35 matching datasets)**

You are currently viewing a subset of data tagged with **climate**.

**Add to this registry**

If you want to add a dataset or example of how to use a dataset to this registry, please follow the instructions on the [Registry of Open Data on AWS GitHub repository](#).

Unless specifically stated in the applicable dataset documentation, datasets available through the Registry of Open Data on AWS are not provided and maintained by AWS. Datasets are provided and maintained by a variety of third parties under a variety of licenses. Please check dataset licenses and related documentation to determine if a dataset may be used for your application.

**Earth Engine Data Catalog**

Home View all datasets Browse by tags Landsat MODIS Sentinel API Docs

Earth Engine's public data catalog includes a variety of standard Earth science raster datasets. You can import these datasets into your script environment with a single click. You can also upload your own [raster data](#) or vector data for private use or sharing in your scripts.

Looking for another dataset not in Earth Engine yet? Let us know by [suggesting a dataset](#).

<b>Canada AAFC Annual Crop Inventory</b>	<b>AHN Netherlands 0.5m DEM, Interpolated</b>	<b>AHN Netherlands 0.5m DEM, Non-Interpolated</b>	<b>AHN Netherlands 0.5m DEM, Raw Samples</b>
Starting in 2009, the Earth Observation Team of the Science and Technology Branch (STB) at Agriculture and Agri-Food Canada (AAFC) began the process of generating annual crop type digital maps. Focusing on the Prairie Provinces in 2009 and 2010, a Decision Tree (DT) based methodology ...	The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. It contains ground level samples with all other items above ground (such as buildings, bridges, trees etc.) removed. This version is ...	The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. It contains ground level samples with all other items above ground (such as buildings, bridges, trees etc.) removed. This version is ...	The AHN DEM is a 0.5m DEM covering the Netherlands. It was generated from LIDAR data taken in the spring between 2007 and 2012. It contains ground level samples and items above ground level (such as buildings, bridges, trees etc.). The point cloud ...
crop landcover canada aafc	lidar elevation netherlands dem geophysical ahn	lidar elevation netherlands dem geophysical ahn	lidar elevation netherlands dem geophysical ahn

**ASTER L1T Radiance** **Australian 5M DEM** **DEM-H: Australian SRTM Hydrologically Enforced Digital Elevation Model** **DEM-S: Australian Smoothed Digital Elevation Model**

agriculture climate earth observation meteorological sustainability weather

**AI for Earth**

Put Microsoft cloud and AI tools in the hands of those working to address environmental challenges.

**Take part in AI for Earth**

Be a part of our initiative for environmental innovation.

**AI for Earth technical resources**

We develop open-source tools, models, infrastructure, data, and APIs to accelerate technology development for environmental sustainability.

[Learn about technical resources >](#)



## Gaps related to the implementation/application of AI within the domain of natural disaster management.

- AI models are perceived as black-box models
- Some practitioners are not aware of the need to validate the models with independent data (not used during training)
- Lack of quality checked / controlled data
- Access to HPCs to develop deep learning models – some models take a long time to train in pcs.
- Datasets come in different formats, grids and timesteps, some are not shared in real-time, or have usage restrictions.