

Agenda
Artificial Intelligence and the Accessibility and Analysis of Geospatial Data:
A SCINet Workshop

Wooton Hall, Jornada Exp. Range ARS, 2995 Knox St, Las Cruces, NM
September 10-11, 2019

Workshop goals:

1. To identify problems in conducting analyses and model simulations requiring large geospatial datasets on a high performance computer (HPC), and provide solutions for those problems
2. To identify solutions for the common problems in 1.
3. To provide exposure to machine learning and deep learning approaches relevant to geospatial problems in agriculture and natural resources
4. To develop a SCINet geospatial working group of scientists interested in collaborating and networking to address these complex problems
5. To outline short- and long-term products to move the science forward

Tuesday, September 10

8:00	Sign In: Wooton Hall (enter thru front door at corner of Knox and Frenger)	
8:15	Opening Remarks: Dr. Deb Peters	
8:30	Participant Introductions – research area, experience with SCINet/HPC, experience with AI/ML; Workshop goals and products	
9:30	Geospatial successes on the HPC	Rowan Gaffney: Big Data & Machine Learning: Mapping Grassland Vegetation
9:50	Break	
10:10	Geospatial Challenges and Opportunities on the HPC	Dr. Alisa Coffin: “HPC systems and AI in the Long-Term Agroecosystem Research Network–status, challenges, and potential for network level modeling and geospatial research”
10:30		Dr. Dave Fleisher: “Mapping Crop Yields in the Northeastern Seaboard Region: There Must be an Easier Way!”
10:50		Dr. Scott Havens (remote presentation): “Challenges of spatial modeling in the cloud during the era of big data”
11:10		Dr. Feng Gao: “Large area crop phenology and water use mapping using satellite data: opportunities and challenges”
11:30	Working lunch: Common issues to be solved among geospatial ag problems for using the HPC	
1:00	SCINet Basics, Introduction to SCINet resources for geospatial data Dr. Andrew Severin and Jim Coyle, Iowa State University (zoom)	
2:00	Small groups: Identifying SCINet Issues for Geospatial Researchers	
3:00	Break	
3:15	Small Groups continue	
4:00	Report Outs from groups	
5:00	Poster session	
6:00	Adjourn – dinner on your own	

Wednesday, September 11

8:00	Opening Remarks and Summary of Day 1	
8:30	AI/ML in Geospatial Research	Dr. Laura Boucheron (NMSU): “Predictive geospatial modeling using machine learning”
9:15		“Deep learning for geospatial data”
10:00	Break	
10:30	AI/ML in Geospatial Research, continued	Dr. Dawn Browning (Jornada ARS): “Applications of ML in natural resources w/geospatial data”
11:00		Dr. Niall Hanan (NMSU): “Machine learning: friend and foe of geospatial and ecological science”
11:30	Discussion	
12:00	Lunch Break	
1:30	Small working groups (3): integrating ML/DL and the HPC potential and challenges for solving geospatial problems	
3:00	Break	
3:30	Presentations by working groups	
4:00	Development of a SCINet Geospatial Research Working Group: Goals, Roles & Responsibilities; outcomes and products	
5:30	Wrap-up, Closing Remarks and Collection of Participant Feedback	
6:00	Adjourn	

Attendee List and Presentation/Poster Titles

Authors	Affiliation	Title
Anapalli, Saseendran (Sasi) saseendran.anapalli@usda.gov	ARS Sustainable Water Management Research Unit, Stoneville, MS	
Anchang, Julius anchang@nmsu.edu	New Mexico State University	Poster: Machine learning applications from the Savanna Lab
Arthur, Dan dan.arthur@usda.gov	ARS University Park LTAR Site, University Park, PA	Poster: Operationalizing the LTAR Information Ecosystem
Bestelmeyer, Brandon brandon.bestelmeyer@usda.gov	ARS Jornada	
Boucheron, Laura lboucher@nmsu.edu	New Mexico State University	Talk: Deep learning for geospatial data
Browning, Dawn dawn.browning@usda.gov	ARS Jornada	Talk: Applications of ML in natural resources w/geospatial data
Brungard, Colby cbrung@nmsu.edu	New Mexico State University and Jornada	Talk: Predictive geospatial modeling using machine learning
Burruss, N. Dylan et al. dylanb@nmsu.edu	New Mexico State University and ARS Jornada	Poster: Using machine learning to model complex landscapes: predicting the geographic range of Vesicular Stomatitis across the western United States
Carter, Jennifer jennifer.carter@usda.gov	Northern Great Plains Research Laboratory, Manan, ND	
Coffin, Alisa alisa.coffin@usda.gov	ARS Southeast Watershed Research Laboratory, Tifton, GA	Talk: HPC systems and AI in the Long-Term Agroecosystem Research Network—status, challenges, and potential for network level modeling and geospatial research
Coombs, Jason jason.coombs@usda.gov	ARS Jornada	
D'Adamo, Robert robert.dadamo@usda.gov	ARS, Fort Collins, CO	Poster: AgCROS Provides Agricultural Research Data with Exploratory Interfaces to Support Advanced Analytics
Delgado, Jorge jorge.delgado@usda.gov	ARS Soil Management and Sugarbeet Research, Fort Collins, CO	Poster: Potential to Use the New NLEAP-GIS 5.0 to Assess Nitrogen Management to Reduce Nitrate Losses to the Environment
Fleisher, David david.fleisher@usda.gov	ARS Adaptive Cropping Systems Laboratory, Beltsville, MD	Talk: Mapping Crop Yields in the Northeastern Seaboard Region: There Must be an Easier Way!
French, Andrew andrew.french@usda.gov	ARS Water Management and Conservation Research Unit, Maricopa, AZ	
Gaffney, Rowan rowan.gaffney@usda.gov	ARS Rangeland Resources & Systems Research, Fort Collins, CO	Talk: Big Data & Machine Learning: Mapping Grassland Vegetation
Gao, Feng feng.gao@usda.gov	ARS Hydrology and Remote Sensing Laboratory, Beltsville, MD	Talk: Large area crop phenology and water use mapping using satellite data: opportunities and challenges
Geil, Kerrie kerrie.geil@usda.gov	AAAS Science & Technology Policy Fellow at USDA ARS, Beltsville, MD	Poster: SCINet: A research environment with IT resources for all of ARS
Hanan, Niall nhanan@nmsu.edu	New Mexico State University and Jornada	Talk: Machine learning: friend and foe of geospatial and ecological science

Hatfield, Jerry jerry.hatfield@usda.gov	ARS National Laboratory for Agriculture and the Environment, Ames, IA	
Humphreys, John john.humphreys@usda.gov	ARS Jornada	
Ji, Wenjie wenjiji@nmsu.edu	New Mexico State University	Poster: Machine learning applications from the Savanna Lab
Kaplan, Nicole nicole.kaplan@usda.gov	ARS Rangeland Resources & Systems Research, Fort Collins, CO	
Kosecki, Stan stan.kosecki@usda.gov	ARS HQ, Beltsville, MD	
Long, Dan dan.long@usda.gov	ARS Soil and Water Conservation Research, Pendleton, OR	Poster: Interpreting spatial variation in multi-year yield data using Moran eigenvector spatial filtering
McCord, Sarah sarah.mccord@usda.gov	ARS Jornada	Poster: Connecting aggregated rangeland monitoring data to models via the Landscape Data Commons
Peters, Debra et al. Deb.peters@usda.gov	ARS Jornada	Poster: Greening of North American Deserts: Predicting Grass Responses using AI Technologies
Ponce, Guillermo geponce@email.arizona.edu	The University of Arizona, Tucson, AZ	Poster: Machine Learning to Assess Grassland Productivity in Southeastern Arizona
Ramirez, Geovany georam@nmsu.edu	New Mexico State University	Poster: Machine Learning for Accelerating Science
Ross, Wade cwross@nmsu.edu	New Mexico State University	Poster: Machine learning applications from the Savanna Lab
Savoy, Heather et al. Heather.savoy@usda.gov	ARS Jornada	Poster: The DASH Portal: Supporting Agricultural Research by Automating Geospatial Data Tasks
Snyder, Keirith keirith.snyder@usda.gov	ARS Great Basin Rangelands Research, Reno, NV	Poster: Phenology Cameras and Remotely-Sensed Data: Can Machine Learning Help With Image Analysis?
Vandenberg, Bruce bruce.vandenberg@usda.gov	ARS Center for Agricultural Resources Research, Fort Collins, CO	
Vigil, Merle merle.vigil@usda.gov	ARS Soil Management and Sugarbeet Research, Ft Collins, CO and Central Great Plains Research Station, Akron, CO	Poster: Matching N rates to Field Location Yield Potential in Precision Dryland Farming
Young, Katie kiy761@nmsu.edu	New Mexico State University	
Yu, Qiuyan qiuyanyu@nmsu.edu	New Mexico State University	Poster: Machine learning applications from the Savanna Lab