2020 ASR/ARM Topical Workshop on Machine Learning and Statistical Methods for Observations, Modeling, and Observational Constraints on Modeling

October 19th-20th, 2020

We will hold an open virtual topical session/workshop on machine learning and statistical methods for observations, modeling, and observational constraints on modeling on October 19th and 20th , 2020 from 9AM-1PM PST each day. This workshop will take the place of the regular machine learning and statistical constraint breakouts that normally would have happened at the ARM/ASR PI meeting. Over the course of two days there will be talks on a variety of data driven methods for observations and modeling including three exciting keynote speakers. If you have any questions, feel free to contact [joseph.hardin@pnnl.gov](mailto:joseph.hardin@pnnl.gov) .

To attend the workshop, please register at the following link to receive an invitation to a Zoom virtual session: <https://www.zoomgov.com/webinar/register/WN_ZE5FmQROTOq0ywqex-pQgQ>

A list of talk abstracts can be found at <https://www.dropbox.com/s/xxs17iixy5sfn1p/ML%20Abstracts%202020.pdf?dl=0>

## Agenda:

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| Monday October 19th |  |  |
| Time (PST) | Speaker | Title |
| 9:00 AM | Introductions | Introductions and announcements |
| 9:10 | Rick Stevens | Keynote: DOE AI for science Report |
| 9:40 | Sam Silva | Physically Regularized Machine Learning Emulators of Aerosol Activation |
| 9:55 | Hugh Morrison | Hierarchical Approach To Cloud Microphysics Scheme Development Using Observations, Physical Models, Bayesian Inference, And Machine Learning |
| 10:10 | Karly J. Reimel | Confronting microphysical uncertainty with BOSS |
| 10:25 | M.R. Kumjian | Using ARM Polarimetric Doppler Radar Observations to Probabilstically Inform Particle-Property Predicting Bulk Ice Microphysics Schemes |
| 10:40 | Ignacio Lopez-Gomez | Machine Learning-Based Calibration of a Unified Parameterization of Turbulence and Convection for Climate Models |
| 10:55 | Sheng-Lun Tai | Simulation of Continental Shallow Cumulus Populations using an Observation-Constrained Cloud-System Resolving Model |
| 11:10 | Discussion |  |
| 11:25 | Break |  |
| 11:35 | Samson Hagos | A Machine Learning Assisted Cloud Population Model As A Parameterization Of Cumulus Convection |
| 11:50 | Guang J. Zhang | A Deep Learning Based Approach to Moist Physics Parameterization |
| 12:05 | Jun, Mikyoung | Statistical and Machine Learning Methods Applied to the Prediction of Tropical Rainfall |
| 12:20 | Dan Feldman | Machine-Learning Science Opportunities with the SAIL Campaign |
| 12:30 | Discussion |  |
| 13:00 | Adjourn |  |

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| Tuesday October 20th |  |  |
| Time (PST) | Speaker | Title |
| 9:00 AM | Introduction |  |
| 9:10 | Amy McGovern | Keynote: NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography |
| 9:30 | Jiali Wang | Challenges of Using Deep-Learning in Generating High-Resolution Climate Data |
| 9:45 | Andrew Geiss | Deep Learning For Radar Infilling And Super Resolution |
| 10:00 | Scott Collis | Introducing Sage: Cyberinfrastructure For The Nation, Pushing AI To The Edge. |
| 10:15 | Robert Jackson | ARMing the Edge: Using Machine Learning At The Edge To Improve Cloud Microphysical Observations |
| 10:30 | Nathaniel Martinez | Classifying Scanning Precipitation Radar Images Using Autoencoders |
| 10:45 | Discussion |  |
| 11:00 | Break |  |
| 11:10 | Elizabeth Barnes | Keynote: Interpretable Machine Learning for Climate Science |
| 11:30 | V. Chandrasekar | Comparing and evaluating Deep Learning and Traditional Models for Storm Nowcasting |
| 11:45 | David Werth | The Application of Machine Learning Techniques to Meteorological Forecasting at the Savannah River Site |
| 12:00 | Vanessa Przybylo | COCPIT: Classification of Cloud Particle Imagery and Thermodynamics |
| 12:15 | Canagaratna, M. R | Improved Multivariate Analysis Data Products for ARM Mass Spectrometer Datasets |
| 12:30 | Discussion |  |
| 13:00 | Adjourn |  |