

AI4ESS Recommended Resources

Artificial Intelligence for Earth System Science Summer School

- - [Presentation Slides](#)
- - [Presentation Recordings](#)

Events

- August 2020: [Harnessing the Data Revolution: Knowledge Guided Machine Learning](#)
- Ongoing: [US CLIVAR Data Science Working Group](#)
 - -Every Second Monday at 12pm (noon) Pacific/3pm Eastern or on [Youtube](#)
- September 22-25, 2020: [Climate Informatics Conference](#)
- [GitHub for AI4ESS Hackathon](#)
 - -Some people requested an example of some of yesterday's hack-a-thon tasks. There's now a notebook [Example_NB_Day1.ipynb](#) in the hack-a-thon repository which can be pulled down or viewed. It uses the GOES data to provide some simple dimension reduction and non neural network models.
- [GitHub to Hydro Walk-Through](#)
- Some links for Hyper-parameter Optimization (HPO), since this has come up a few times now in different talks:
 - - [A Comprehensive List of Hyperparameter Optimization & Tuning Solutions](#)
 - - [Cornell University: Sherpa: Robust Hyperparameter Optimization for Machine Learning](#)
 - - [6 Levels of Auto ML](#)
- If you're looking for verification metrics to implement, check out:
 - <https://www.cawcr.gov.au/projects/verification/>
- [StatsModels.org Statistics and Tools](#)
- [Scikit-Learn](#)

- [Keras Metrics](#)
- [Pytorch Ignite Metrics](#)
- [Pixel Annotation Tool](#)

Dorit Hammerling Recommendations

- [An Introduction to Statistical Learning with Applications in R](#)
- [The Elements of Statistical Learning: Data Mining, Inference, and Prediction: Second Edition](#)

Ryan Lagerquist Recommendations:

- You can find interactive code for all the experiments shown here:
 - [David John Gagne: AMS ML Python Course](#)
- Applications of decision trees and forests in atmospheric science:
 - [Using random forests to diagnose aviation turbulence](#)
 - [Enhancing understanding and improving prediction of severe weather through spatiotemporal relational learning](#)
 - [An Automated, Multiparameter Dryline Identification Algorithm](#)
 - [Machine Learning for Real-Time Prediction of Damaging Straight-Line Convective Wind](#)
 - [A Method for Identifying Midlatitude Mesoscale Convective Systems in Radar Mosaics. Part I: Segmentation and Classification](#)
 - [Classifying Convective Storms Using Machine Learning](#)
 - [Storm-Based Probabilistic Hail Forecasting with Machine Learning Applied to Convection-Allowing Ensembles](#)

Jebb Stewart Recommendations:

- Learning:
 - [Tensor Flow: Image Segmentation](#)
 - [FastAI Image Segmentation](#)

- [Pytorch implementation of Semantic Segmentation for Single class from scratch.](#)
- [An overview of semantic image segmentation.](#)

Amy McGovern Recommendations:

- [Blog Post: Ethical Data Science](#)
- Books
 - [Algorithms of Oppression](#) by Safiya Umoja Noble
 - [Race After Technology](#) by Ruha Benjamin
 - [Hello World: Being Human in the Age of Algorithms](#) by Hannah Fry
 - [Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy](#) by Cathy O'Neil
 - [Interpretable Machine Learning](#) (2020) by Christoph Molnar
 - [Limitations of Interpretable Machine Learning](#)

Sue Ellen Haupt Recommendations

- If you email Sue at haupt@ucar.edu, she can send DOI connections to you.
- [Artificial Intelligence Methods in the Environmental Sciences](#)
- AMS Journals – articles on AI applications
- [Using Artificial Intelligence to Improve Real-Time Decision-Making for High-Impact Weather](#)
- [Building the Sun4Cast System: Improvements in Solar Power Forecasting](#)
- [Weather Matters for Energy](#) – has chapters with AI approaches

Claire Monteleoni Recommendations

- [Downscaling code](#)