

Evan J. Coopersmith, PhD, PE – Data Scientist

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Websites: www.soilinsight.com, www.prognosticdatasolutions.com, www.traffichackers.com

Executive Summary

- Data scientist with 5 years of professional experience applying analytical expertise in multiple fields
- Educational and professional experience in the physical sciences and finance
- Published 12 first-authored and 4 co-authored manuscripts in high-impact, international journals
- Gifted teacher with recognized excellence instructing undergraduate and graduate students

Education

Ph.D., July 2013, University of Illinois, Urbana-Champaign, IL, in Civil & Environmental Engineering
B.S.E., June 2006, Princeton University, in Operations Research and Financial Engineering, *Cum Laude*
Honor Societies: Tau Beta Pi and Sigma Xi

Data Science Experience

SoilInsight – Founder and Lead Data Scientist, Chicago, IL

Developed technology to deliver accurate, high resolution soil moisture estimates for agricultural decision-support and other uses.

Jun. 2016 – Present

Prognostic Data Solutions LLC - Founder, Washington D.C. & Chicago, IL

Freelance data scientist and consultant, developing proprietary algorithms for predictive modeling.

TrafficHackers – *Developed predictive models for three major Boston highways using public traffic data. Collaborated with the Massachusetts Department of Transportation and helped to ensure optimal usage of existing datasets. Received mention in the Boston Globe.*

Jan. 2014 – Present

****Private Consulting**** - *Developed proprietary statistical tools to assess probability of large-scale snow events in major American cities using NOAA historical climatic data.*

March 2015 – June 2015

NASA/USDA, Hydrology & Remote Sensing Laboratory – Research Data Scientist, Washington D.C.

Achieved out-of-sample accuracy of soil moisture estimation below NASA's target of $0.04\text{m}^3/\text{m}^3$.

Leveraged in-ground sensor estimates and satellite datasets. Developed predictive algorithms for soil moisture at over 100 locations nationwide. Applied geospatial approaches to produce multi-scale soil moisture estimates at USDA and Climate Reference Network test sites. Collaborated with NOAA to assess sensor reliability and CDC to predict incidence of diseases driven by soil-borne pathogens.

Aug. 2013 – Present

John Deere Technological Innovation Center – Research Data Scientist, Champaign, IL

Produced predictions of field readiness with over 90% accuracy. Worked in concert with agronomic researchers through their local offices during doctoral work. Wrote a white-paper detailing strategic intersections between academic and corporate objectives with respect to usage of 'big data.'

May 2012 – July 2013

BCW Group LLC – Principal and Co-Founder, New York, NY

One of three founding members of a quantitative hedge fund start-up at NYMEX. Achieved 7% returns during a period in which the equity markets fell 35%. Developed proprietary trading algorithms, implemented from 9/2/08 to 4/28/09. Employed machine learning models to build superior risk/reward ratios.

Jan. 2008 – Apr. 2009

Freelance Sabermetric Modeler, Princeton, NJ and Champaign, IL

Asymmetric Objectives & Inefficient Markets: A Non-Parametric Predictor for Major League Baseball Games And the Evaluation of Betting Lines – Mudd Library, Princeton University, Senior Thesis 2006.

Produced 130% annual returns. Developed a proprietary non-parametric predictor for assessing the probabilities of various outcomes using a database of over 50,000 historical baseball games. Placed over 4,000 wagers on baseball games over the course of two seasons.

Spr. 2006 – Fall 2007

Awards	Englebrecht Fellowship – Department of Environmental Engineering <i>Most outstanding graduate student in environmental engineering.</i>	Spring 2013
	CEE Alumni Graduate Fellowship for Teaching Excellence <i>Awarded for promise in teaching. Awarded funding to design and teach a 500-level graduate course in advanced data science topics for civil and environmental engineers.</i>	Spring 2013
	University Fellowship – University of Illinois <i>Awarded for promise in research.</i>	Fall 2006 and Spring 2007
Publications In-Progress	“Lifting” <i>In Situ</i> Soil Moisture Measurements with Machine Learning: A Multi-Depth Analysis of USCRN profiles and an Application for AMSR-E Satellite Validation with ECONet Sensors – Coopersmith, Cosh, Bell, and, Boyles. Under review in <i>Advances in Water Resources</i>	
	Understanding Temporal Stability: A Long-Term Analysis of ARS Watersheds in the 21st Century – Coopersmith, Cosh, and Jacobs.	
Peer-Reviewed Publications	Deploying Temporary Networks for Upscaling of Sparse Network Stations – Coopersmith, Cosh, Bell, Kelly, Hall, Palecki, and Temimi. <i>Int’l Journal of Applied Earth Obs. and Geoinformation.</i> July, 2016. doi: 10.1016/j.jag.2016.07.013.	
	Comparison of <i>In Situ</i> Soil Moisture Measurements: An Examination of the Neutron and Dielectric Measurements within the Illinois Climate Network – Coopersmith, Cosh, and Jacobs. <i>Journal of Atmospheric and Oceanic Tech.</i> June, 2016. doi: 10.1175/JTECH-D-16-0029.1.	
	Multi-Profile Analysis of Soil Moisture within the U.S Climate Reference Network – Coopersmith, Cosh, Bell, and Crow. <i>Vadose Zone Journal</i> , Oct. 2015. doi: 10.2136/vzj2015.01.0016.	
	Comparing AMSR-E Soil Moisture Estimates to the Extended Record of the U.S. Climate Reference Network (USCRN) – Coopersmith, Cosh, Bindlish, and Bell. <i>Advances in Water Res.</i> , Sept. 2015. doi: 10.1016/j.advwatres.2015.09.003.	
	Evaluation of the 2012 Drought with a Newly Established National Soil Monitoring Network – Bell, Leeper, Palecki, Coopersmith, Wilson, Bilotta, and Embler. <i>Vadose Zone Journal</i> , Aug. 2015. doi:10.2136/vzj2015.02.0023	
	Soil Moisture Model Calibration and Validation: An ARS Watershed on the South Fork of the Iowa River – Coopersmith, Cosh, Petersen, Prueger, and Niemeier. <i>Journal of Hydrometeorology</i> , March, 2015. doi: http://dx.doi.org/10.1175/JHM-D-14-0145.1	
	Extending the Soil Moisture Data Record of the U.S. Climate Reference Network (USCRN) and Soil Climate Analysis Network (SCAN) – Coopersmith, Cosh, and Bell. <i>Advances in Water Resources.</i> February, 2015. doi: 10.1016/j.advwatres.2015.02.006	
	Field-Scale Moisture Estimates Using COSMOS Sensors: A Validation Study With Temporary Networks and Leaf-Area-Indices – Coopersmith, Cosh, and Daughtry. <i>Journal of Hydrology.</i> August, 2014. doi: 10.1016/j.jhydrol.2014.07.060	
	Using Similarity of Soil Texture and Hydroclimate to Enhance Soil Moisture Prediction – Coopersmith, Minsker, and Sivapalan. <i>Hydrology & Earth System Sciences.</i> August, 2014. doi:10.5194/hess-18-3095-2014	
	Machine Learning Assessments of Soil Drying – Coopersmith, Minsker, Wenzel, and Gilmore. <i>Computers and Electronics in Agriculture.</i> June, 2014. doi:10.1016/j.compag.2014.04.004	
	Patterns of Regional Climate Change: An Analysis of Changing Hydrologic Regimes <i>Coopersmith, Minsker, and Sivapalan.</i> <i>Water Resources Research.</i> March, 2014.	

doi: 10.1002/2012WR013320 (**Featured Paper**)

Exploring the Physical Controls of Regional Patterns of Flow Duration Curves: Part 1– Insights from Statistical Analyses – Cheng, Yaeger, Viglione, *Coopersmith*, Ye, and Sivapalan. Hydrology & Earth System Sciences. November, 2012, doi:10.5194/hess-16-4435-2012

Exploring the Physical Controls of Regional Patterns of Flow Duration Curves: Part 2 – Role of Seasonality and Associated Process Controls – Ye, Yaeger, *Coopersmith*, Cheng, and Sivapalan. Hydrology & Earth System Sciences. November, 2012, doi:10.5194/hess-16-4447-2012

Exploring the Physical Controls of Regional Patterns of Flow Duration Curves: Part 3 – A Catchment Classification System Based on Seasonality and Runoff Regime – *Coopersmith*, Yaeger, Ye, Cheng, and Sivapalan. Hydrology & Earth System Sciences. November, 2012, doi:10.5194/hess-16-4467-2012

Exploring the Physical Controls of Regional Patterns of Flow Duration Curves: Part 4 - A Synthesis of Empirical Analysis, Process Modeling, and Catchment Classification – Yaeger, *Coopersmith*, Ye, Cheng, and Sivapalan. Hydrology & Earth System Sciences. November, 2012, doi:10.5194/hess-16-4483-2012.

Understanding and Forecasting Hypoxia Using Machine Learning Algorithms – *Coopersmith*, Minsker, and Montagna, Journal of Hydroinformatics. 2011. doi:10.2166/hydro.2010.015

Teaching

CEE 535 – Env. Systems II: Env. & Water Resources Systems Analysis Under Uncertainty

Spring 2013

Served as primary instructor for CEE 535, Environmental Systems II. Wrote original syllabus, designed ~20 lectures, developed all assignments and grading rubrics. Rated 4.5/5.0 (spring '13) from student evaluations.

CEE 201 – Systems Eng. and Econ., Teaching Assistant (TA), U. of Illinois

Fall 2011, Spring 2012, and Fall 2012

Taught fifteen lectures to 130+ students in a required course. Taught two review sessions per week for 20+ students each. Rated 4.7/5.0 (fall '11), 4.8/5.0 (spring '12), and 4.6/5.0 (fall '12) from student evaluations.

Certificate in Graduate Teaching – Center for Teaching Excellence, U. of Illinois

Spring 2012

Completed two-semester program with CTE, received mid-semester evaluation feedback from students on two occasions (see final ratings above), attended pedagogical seminars, and underwent video-analysis of personal teaching habits.

Teacher Scholar Certification – Center for Teaching Exc., U. of Illinois

Spring 2013

Teaching w/ Technology – Center for Teaching Excellence, U. of Illinois

Spring 2013

Constructed original educational materials reviewed by students and faculty. Read and reviewed pedagogical literature, observed experienced instructors, and attended seminars for use of technology in the classroom.

“List of Teachers Ranked as Excellent By Their Students”

Fall 2011, Spring 2012, Fall 2012, and Spring 2013

Awarded for four consecutive semesters, three as a teaching assistant for CEE 201, and a fourth as the primary instructor of CEE 535.

Invited Talks

Multi-Scale Soil Moisture Model Calibration and Validation, The 2014 workshop at MOISST: Advancing Soil Moisture Science and Applications, Stillwater, OK. June 2014

Extending the Soil Moisture Record of the Climate Reference Network with Machine Learning. American Meteorological Society, Symposium on Meteorological Observation and Instrumentation. Westminster, CO. June 2014.

Data-Driven Soil Moisture Modeling: Multi-Scale Analysis for Decision Support, NASA’s SMAP Early-Adopters Teleconference, May 2013.

**Other
Presentations**

Multi-Scale Soil Moisture Monitoring and Modeling at ARS Watersheds for NASA's Soil Moisture Active Passive (SMAP) Calibration/Validation Mission. Oral presentation, American Geophysical Union, San Francisco, Ca. December 2014.

Soil Moisture and Precipitation Monitoring in the South Fork Experimental Watershed during the Iowa Flood Studies (IFloods). ASCE-EWRI Weather Radar and Hydrology (WRaH). Reston, VA. April 2014.

Remotely-Sensed Soil Moisture for Agricultural Decision Support: An Integration of National-Scale Hydroclimatic Classification and Ground-Based Sensors, Oral Presentation, American Geophysical Union, San Francisco, CA. December 2013.

South Fork Watershed of the Iowa River: *In Situ* Soil Moisture Validation. Oral Presentation, SMAP mission fall meeting, Pasadena, CA. November 2013.

Regional Climate Change: An Analysis of a Hydrologic Classification System's Shifted Regime Curves, Oral Presentation, 2013 World Environmental & Water Resources Congress, Cincinnati, OH. May 2013.

National-Scale Hydrologic Classification & Agricultural Decision Support: A Multi-Scale Approach, Oral Presentation, American Geophysical Union, Fall Meeting, San Francisco, CA. December 2012.

Machine-Learning Assessments of Soil Drying, Oral Presentation, American Geophysical Union, Fall Meeting, San Francisco, December 2011, and Computational Methods in Water Resources conference, Champaign, IL. June 2012.

Field-Readiness Forecasts Using Remote Sensing, Statistical Modeling and Adaptive Observation Oral Presentation, Environmental Engineering Spring Symposium, Urbana, IL. April 2011, and National Center for Supercomputing Applications, Private Sector Program, Urbana, IL. May 2011

Machine Learning Algorithms & Benthic Hypoxia in Corpus Christi Bay Oral Presentation, Environmental Engineering Symposium, Urbana, IL. April 2008

Integrating Sensor Data and Informatics to Improve Understanding of Hypoxia in the WATERS Network Testbed at Corpus Christi Bay, Texas – American Geophysical Union, Fall Meeting, San Francisco, CA. December 2007

Modeling of Hypoxic Conditions in Corpus Christi Bay Using Sequential Normalization, Discrete Fourier Transforms, and K-Nearest Neighbor Algorithms. Environmental Engineering Symposium, Urbana, IL. April 2007