CRISTINE L. S. MORGAN
Professor of Soil Science and Hydropedology
Dept. of Soil and Crop Sciences, Texas A&M University, College Station, Texas

Education/Training

2003 PhD Soil Science, University of Wisconsin-Madison, Madison WI
2001 MS Soil Science, University of Wisconsin-Madison, Madison WI
1998 BS Plant and Environmental Soil Science, Texas A&M University, Magna Cum Laude

Positions and Employment

2014- Professor, Soil & Crop Sciences, Texas A&M University
2010-2014 Associate Professor, Soil & Crop Sciences, Texas A&M University
2003-2010 Assistant Professor, Soil & Crop Sciences, Texas A&M University

Program Overview

Spatial heterogeneity of soil affects the quality and quantity of water in streams, reservoirs, and groundwater. The ability to characterize the spatial distribution of soil properties is paramount to understanding water movement, nutrient transport, and soil erosion on a landscape. My research program focuses on methods and instruments to quantify soil properties and variability of soil properties for use in watershed- and field-scale hydrological models. I also look at improving the accuracy of these models by developing parameterization schemes to better represent soil properties. My research will improve the success of non-point source pollution modeling, land-surface modeling, and precision agriculture. The undergraduate course I teach is designed to teach students how to create, understand and interpret field descriptions of soils. With these skills, students are able to evaluate soil properties regarding the variability, limitations, and uses of soils across a landscape. These courses prepare students for careers as urban planners, real estate agents, consultants, policy writers, restoration ecologists, agriculturalist, geologists, and graduate students. I also teach an Applied Spatial statistics class (SCSC 663) this course gives students in the natural resources the tools to statistically analyze and interpret spatial data, and a Pedology course (SCSC 603), which gives student tools understanding soil genesis, soil characterization data, and digital soil assessment.

Significant 5-year accomplishments

Research: Acquired $1.6 million USD in external grants, of which $1.0 million went to my research program. Provided national & international leadership in developing methods and proving concept of using VisNIR spectroscopy to quantify soil constituents, such as organic carbon, inorganic carbon, clay content, and fine clay content *in situ.* Leader of a research team that is improving the understanding of the impact that spatial and temporal dynamics of soil cracking have on surface hydrology, groundwater recharge, and water quality. Our findings on the influence of long term weather patterns on soil cracking is new and changes the current knowledge on how cracks are estimated in surface hydrology models. Our work improves partitioning precipitation into infiltration and runoff, an essential part of any surface hydrology model. Part of multidisciplinary team to develop and deploy UAV technology in precision agriculture.
Since 2011, co-authors/authored 24 publications and have a 860 citations according to Google and 437 according to ResearchID (Web of Science), h-indices are 17 and 12, respectively.
Teaching. Raised visibility of Texas A&M Soil Science program Internationally, by co-coordinating the first International Soil Judging Contest at the 20th World Congress of Soil Science. Lead development of a new class SCSC 205 Problem Solving in Plant and Soil Systems and instructed 3 semesters. The class has an enrollment of approx. 65 students, is an experiential-learning style class with a lab. Instructed 10 semesters of Soil Morphology and Interpretations (SCSC 310) and two graduate classes, Applied Spatial Statistics (SCSC 663) and Pedology (SCSC 603). Hosted 4 visiting scholars, supervised 1 post doctoral research associate, 4 Ph.D. students, 10 MS students. One Ph.D. student is now an assistant professor. Supervised 4 undergraduate research projects.

Publications

Ten most recent (48 total)

1. Koch, A., A. McBratney, M. Adams. D. Field, R. Hill, R. Lal, Rattan, L. Abbott, D. Angers, J. Baldock, E. Barbier, D. Binkley, M. Bird, J. Bouma, C. Chenu, J. Crawford, C. Flora, K. Goulding, S. Gunwald, J. Hempel, J. Jastrow, J. Lehmann, K. Lorenz, B. Minasny, C. Morgan, A. O'Donnell, W. Parton, C. Rice, D. Wall, D. Whitehead, I. Young, M Zimmermann. 2013. Soil security: solving the global soil crisis. Global Policy. 4:434-441. **18 Citations**
2. Ge. Y., C.L.S. Morgan. 2014. Mid infrared attenuated total reflectance spectroscopy for soil carbon and particle size determination. Geoderma 213:57-63.
3. Ge, Y., C.L.S. Morgan, J.A. Ackerson. 2014. VisNIR spectra of dried ground soils predict properties of soils scanned moist and intact. Geoderma. 221-222:61-69. **10 Citations**
4. Kishne, A., H. Neely, C.L.S. Morgan, 2014. How much surface water can gilgai microtopography capture? Journal of Hydrology. 513:256-261.
5. Neely, H.L., J. P. Ackerson, C.L.S. Morgan, K.J. McInnes. 2014. Instrumentation to measure soil subsidence and water content in a single borehole. 78:1251-1257.
6. Ackerson, J.P., C. L.S. Morgan, M. E. Everett, K. J. McInnes. 2014. The role of water content in electrical resistivity tomography of a Vertisol. 78:1552-1562.
7. Tokumoto, I., J.L. Heilman, S. Schwinning, K.J. McInnes, M.E. Litvak, C.L.S. Morgan, R.H. Kamps. 2014. Small-scale variability in water storage and plant available water in shallow, rocky soils. Plant and Soil. 385:193-204.
8. Sheridan, R., S. Popescu, D. Gatziolis, C. Morgan, and N Ku. 2014. Modeling forest aboveground biomass and volume using airborne LIDAR metrics and forest inventory and analysis data in the Pacific Northwest. Remote Sensing. Remote Sensing. 7:229-255.
9. Ackerson, J.P., J.A.M. Demattê, C.L.S. Morgan. 2015. Predicting clay content on field-moist intact tropical soils using a dried, ground VisNIR library with external parameter orthogonalization. Geoderma. 259:196-204.
10. Chen, Y., S. Ale, N. Rajan**,** C.L.S. Morgan and J. Park. 2015. Hydrological responses of land use change from upland cotton to cellulosic bioenergy crops in the southern High Plains of Texas. Global Change Biology-Bioenergy doi: 10.1111/gcbb.1230.

Awards Honors

- 2015, 2013, 2012 2nd Place Overall Team, Regional Collegiate Soils Judging.
- 2011, Editor's Citation for Excellence in Manuscript Review, Soil Science Society of America Journal
- 2011, T-Camp Namesake. "Camp Morgan" Texas A&M University
- 2010, Special Achievement Award in Research, Soil & Crop Sciences Department, TAMU
- 2009, Young Scholar Award, Soil Science Society of America, Division S6
- 2009, Honor Professor Award, College of Agriculture and Life Sciences, TAMU
- 2007, Special Achievement Award in Teaching, Soil & Crop Sciences Department, TAMU
- 2009, Top 10 most cited manuscripts in Soil Science Society of America Journal (Waiser et al 2007)
- Superior Paper Award. American Association of Agricultural and Biosystems Engineering.

Professional Experience

- 2014, Co-Coordinator 1st International Soil Judging Competition, World Congress of Soil Science, Jeju Korea
- 2014-2017 Editor-in-Chief, Geoderma
- 2014-2015 Fellows Committee, Soil Science Society of America
- 2013 Soil Physics Chair, Soil Science Society of America
- 2009-2014, Associate Editor, Soil Science Society of America Journal S06 Division
- 2009-2010 Bouyoucos Conference Committee, Chair, American Society of Agronomy
- 2010 Women in Agronomy Committee, Chair , American Society of Agronomy
- 2015,2008 Advisory Committee Member, Pedometrics Group of the International Union of Soil Scientists