

Dr. Cristine L. S. Morgan

Current Title: Assistant Professor & Soil Scientist

Appointment: 30% Teaching, 70% Research

Physical Address:

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Education:

Ph.D., Soil Science, University of Wisconsin - Madison, 2003

M.S., Soil Science, University of Wisconsin - Madison, 2000

B.S., Plant and Environmental Soil Science, Texas A&M University, 1998, magne cum laude

Teaching Focus:

Soil Morphology and Interpretations (Agro 310)

Applied Spatial Statistics (Agro 663)

Major advisor for 1 M.S. student

Committee member for 7 students (3-M.S. 4-Ph.D.)

Research Focus:

Research experience addressing a better understanding of soil-water relations as affected by soil heterogeneity at two primary scales: 1) The mesoscale variability over farm fields that is associated with topography, land use, and soil formation processes, and 2) microscale variability related to macropores that strongly influence preferential flow of water and solutes through soil. Mesoscale investigations include experience with GIS, GPS, geostatistics, and non-invasive soil survey instruments to create three dimensional soil mapping techniques for precision landscape-modeling applications, such as precision farming, flux footprint analysis, and erosion; adapting a statistical algorithm for mapping soil properties by combining soil data collected at varying spatial resolutions; and developing instruments to rapidly map soil properties. Microscale investigations include development of a mechanistic water infiltration model that includes macropore effects and is easily parameterized at a high spatial resolution (10 m) over a landscape (100 ha) using soil structural and textural information.

Professional Accomplishments (limit to bullet statements):

- Showed that soil properties such as clay content can be quantified in-situ, quickly by using Visible and Near Infrared Reflectance.
- Created a macropore flow model that uses soil structure for parameterization and can be applied and parameterized at the landscape scale
- Developed techniques to for creating three dimensional soil map at 10-m spatial resolution for large fields (100 ha)
- Adapted spatial interpolation model based on lattice-type data to create 3-dimensional soil maps. The model combines soil data representing multiple spatial scales and measurement accuracies
- Created an inverse yield model that can be used by precision agriculture to map maximum plant-available soil water at a 10 m spatial resolution.

Recent Publications (limit to 10 most recent):

Scientific Journals:

1. Manyame, C. Payne, B. Morgan, C.L.S., Heilman, J. 200X. Modeling hydraulic properties of sandy soils of Niger using pedotransfer functions. *Geoderma*. *Accepted*.

2. Ge, Y., J.A. Thomasson, C.L.S. Morgan, and S.W. Searcy. 200X. VNIR diffuse reflectance spectroscopy for agricultural soil property determination based on regression-kriging. *Trans. ASAE. Accepted.*
3. Ge, Y., C.L.S. Morgan, J.A. Thomasson, and T. Waiser. 2007. A New Perspective to Near Infrared Reflectance Spectroscopy: A Wavelet Approach. *Trans. ASAE. 50: XX-XX. In Press.*
4. Wasier, T., C.L.S. Morgan, D.J. Brown, and C.T. Hallmark. 2007. In Situ Characterization of Soil Clay Content with Visible Near-Infrared Diffuse Reflectance Spectroscopy. 71:XX-XX. *In Press.*
5. Kish, L.B., C.L.S. Morgan, and A. Sz. Kishne. 2006. Vibration-induced conductivity fluctuation (VICOF) testing of soils. 6(4): L359-L365.
6. Molling, C.C., J.C. Strikwerda, J.M. Norman, C.A. Rodgers, R. Wayne, C.L.S. Morgan, G.R. Diak, J.R. Mecikalski. 2005. Distributed runoff formulation designed for a Precision Agricultural Landscape Modeling System. *J. Am. Water Res. Assoc.* 1289-1313.
7. Morgan, C.L.S., J. Zhu, J.M. Norman. 2004. Mapping soil properties using a multi-scale spatial model. *Proc. Precision Agriculture International Conf., Minneapolis, MN. [CD-ROM] ASA, CSSA, and SSSA, Madison, WI.*
8. Zhu, J., C.L.S. Morgan, J.M. Norman, W. Yue, B. Lowery. 2004. Combined mapping of soil properties using a multi-scale spatial model. *Geoderma.* 118:321-334.
9. Morgan, C.L.S., J.M. Norman, and B. Lowery. 2003. Estimating plant-available water across a field with an inverse yield model. *Soil Sci. Soc. Am. J.* 67:620-629.
10. Morgan, C.L.S., J.M. Norman, R. Wolkowski, B. Lowery, G. Morgan, R. Schuler. 2000. Two approaches to mapping plant-available water: EM-38 measurements and inverse yield modeling. *Proc. Precision Agriculture 5th International Conf., Minneapolis, MN. [CD-ROM] ASA, CSSA, and SSSA, Madison, WI.*

Book Chapter:

1. Morgan, C.L.S., C.C. Molling, J.M. Norman, K. McSweeney, and B. Lowery. 2003. Evaluating soil data from several sources using a landscape model. *In Y. Pachepsky, D.E. Radcliffe, and H.M. Selim. Scaling methods in soil physics. CRC Press, NY. pp. 243-260.*

Professional Memberships, Leadership Roles and Honors:

1. Member; Soil Science Society of America, Agronomy Society of America, Soil and Water Conservation Society, Texas Association of Professional Soil Scientists; Texas ASA, Gamma Sigma Delta
2. Committee Member; Women in Agronomy 2002-present; *Soil Science Society of America*
3. Southern Soil Physics Information Exchange Group President 2007, Secretary 2006
4. Editorial board of *Geoderma*
5. Advisory Committee of Pedometrics division of the International Union of Soil Science
6. Champ B. Tanner Agricultural Physics Award; University of Wisconsin; 1999-2002
7. Vilas Professional Development Fellowship; University of Wisconsin; 1999 & 2000
8. Richard D. Powell Memorial Scholarship; University of Wisconsin; 2001-2002
9. First place, National Soil Judging Competition - team & individual; Texas A&M University; 1998
10. First place, Regional Soil Judging Competition - team & individual; Texas A&M University; 1997