

IOWA STATE UNIVERSITY

Agricultural and Biosystems Engineering

Mehari Tekeste

Assistant Professor

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Education

Ph.D. Agricultural Engineering, 2006
University of Georgia, Athens

M.S. Biosystems Engineering, 2002
University of Wisconsin-Madison

M.S. Soil Technology Group, 2000
University of Wageningen, The Netherlands

B.S. (with distinction) Soil and Water, 1996
Asmara University, Asmara, Eritrea

Recent Patents and Publications

Syed, M., **M.Z. Tekeste**, D. White. 2017. A combined sliding and rolling friction model for DEM calibration. *Journal of Terramechanics*, 72, 9-20

Mousaviraad, M., **M.Z. Tekeste**, R.A. Kurt. 2017. Calibration and validation of Discrete Element Model of corn using grain flow simulation in a commercial screw grain auger. *Trans. ASABE (Accepted Revision)*

Boldaji, M. N., R. Alimardani, A. Hemmat, A. Sharifi, A. Keyhani, **M.Z. Tekeste**, T. Keller. 2014. 3D Finite Element simulation of a single-tip horizontal penetrometer-soil interaction. Part-II: Soil bin verification of the model in a clay-loam soil. Development of the model and evaluation of model parameter. *Soil and Tillage Research*, 144, 211-219.

Meduri, S., Malvade T., Patil S., **Tekeste M.Z.**, Shete Viraj. 2013. Simulation of soil-tillage tool interaction using meshfree method. 2013 Altair Technology Conference, Pune, India.

Boldaji, M. N., R. Alimardani, A. Hemmat, A. Sharifi, A. Keyhani, **M.Z. Tekeste**, T. Keller. 2013. 3D Finite Element simulation of a single-tip horizontal penetrometer-soil interaction. Part-I Development of the model and evaluation of model parameter. *Soil and Tillage Research*, 134, 153-162.

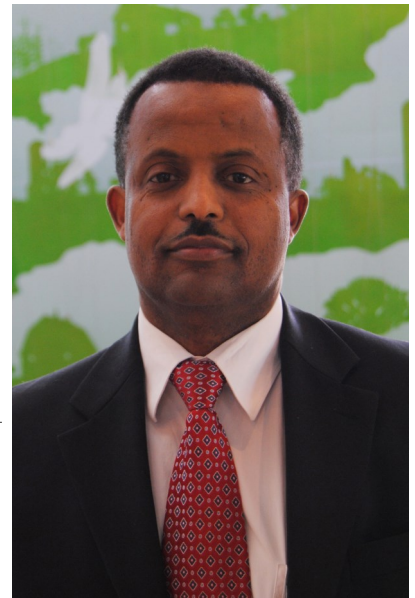
Tekeste, M.Z., E.W. Tollner, R.L. Raper, T.R. Way, C.E. Johnson. 2009. Non-linear finite element analysis of cone penetration in layered sandy loam soil-considering precompression stress state. *Journal of Terramechanics*, 46 (5),229-239.

Book Chapter

Tekeste, M.Z., A.J. Koolen, S. Karmakar 2008. Critical State Soil Parameters for Unsaturated Soil Conditions in Tillage Modeling. In. *Modeling of Soil-Tool Interaction in Tillage*. Ed. S. Karmakar. Transworld Research Network. Karal, India. 229-239.

Teaching

Dr. Tekeste's areas of teaching include machine systems interfacing with soil and crop materials for functional analysis and design of off-road machinery equipment (ABE 340) and applied soil and crop dynamics for off-road machinery (Special Topic-ABE 690).



Research

Dr. Tekeste's current areas of research are (1) simulation of machine performance at machine-soil-crop interface; and (2) precision agriculture technology development for tillage and soil compaction management.

Simulation of Machine Performance at the Machine -Soil-Crop Interface for Off-Road Machinery Equipment

- Development of simple in-situ tests for characterization of soil and crop dynamics properties;
- Soil and crop material model development for discontinuous mechanics Discrete Element Method (DEM) and continuum mechanics Finite Element Method (FEM) simulation tools.

Soil Sensors and Data Analytics for Precision Agriculture

- Measurement of soil compaction to evaluate design and system optimization of tractive devices and precision tire inflation technology effects on soil physical properties and crop yield;
- Development of precision tillage technologies and multi-layer soil sensing data fusion algorithm development for decision support tools;
- Field and laboratory testing of soil dynamics interaction with agricultural and construction equipment for machine design and performance evaluation.