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Education:

PhD: University of Florida MS: Univ. of Georgia BS: Univ. of Georgia

General Areas of Expertise:

crop growth modeling, crop management, precision farming, climate change, environmental impact of N management, renewable energy

Short Bio:

Dr. Batchelor currently serves as professor in Biosystems Engineering at Auburn University. He has worked in the area of crop growth modeling since 1986. From 2010-2015 he served as Dean of the College of Agriculture and Director of the Alabama Agricultural Experiment Station. Dr. Batchelor earned his bachelor's and master's degrees in agricultural engineering at the University of Georgia in 1986 and 1987, respectively, and his doctorate in agricultural engineering at the University of Florida in 1993. He worked at Iowa State University from 1994 until 2005 in the area of crop growth modeling, advancing to the rank of professor. He joined the Mississippi State University faculty in 2005 and served as Head of the Department of Agricultural and Biological Engineering. He led the development of the Sustainable Energy Research Center at Mississippi State University. He also led faculty in creating a proposal that was awarded $39 million in grants from the U.S. Department of Energy to conduct research on biomass derived renewable fuels including bio-crude, bio-oil and syngas that do not compete with existing crops, such as corn and soybeans, needed for the global food supply. Dr. Batchelor also served as the director of the Energy Institute at Mississippi State, which had approximately 200 researchers in several centers and departments. From 2005 to 2007 he served as a Distinguished International Professor for the University of Hohenheim in Stuttgart, Germany. In 2009 he was named a Fellow of the American Society of Agricultural and Biological Engineers for his contributions to information and electrical technologies and biological engineering.

Five Representative Publications:

Liang, H., K. Hu, W. D. Batchelor, Z. Qi and B. Li. 2017. An integrated soil-crop system model for water and nitrogen management in North China. Scientific Reports 6:25755 | DOI: 10.1038/srep25755.

Zhang*, J., Y. Miao and W.D. Batchelor. 2017. Evaluation of the CERES-Rice model for precision nitrogen management for rice in northeast China. 2017. Proceedings of the 11th European Conference on Precision Agriculture, Advances in Animal Biosciences 8(2): 328-332.

Memic*, E., S. Graeff, W. Claupein and W.D. Batchelor. 2017. GIS-Based spatial nitrogen management model for maize. Proceedings of the 11th European Conference on Precision Agriculture, Advances in Animal Biosciences 8(2): 312-316.

Li, X.X., J. Hui, S. Garre, Y. Chang-rong, L. Qin, W.D. Batchelor and Q. Liu. 2017. Spatiotemporal variation of drought characteristics in the context of climate change in the Huang-Huai-Hai plain. China. Journal of Integrative Agriculture 16(0):60345-7. DOI 10.1016/S2095-3119 (16) 61545-9.

Thorp*, K.R., K.C. DeJonge, A. Kaleita, W.D. Batchelor and J.O. Paz. 2008. Methodology for the use of DSSAT models for precision agriculture decision support. Computers and Electronics in Agriculture 64(2):276-285.

FEWSTERN Symposium 2017 Presentation Title and Abstract:

Role of Crop Models to Analyze FEW systems

Global demand for food continues to rise due to increasing population and improving diet. In the US and China, production of cereal crops often requires significant amounts water and nitrogen, both of which consume significant amounts of energy. Irrigation is depleting aquifers in both the US and China, and over application of N is creating water quality degradation. Both irrigation and nitrogen require significant amounts of energy. Energy is used to pump water from surface and groundwater to fields, while the Haber-Bosch process is used to create N for crop production, requiring 34.5 GJ mt-1 of N. Developing optimum water and nitrogen management strategies to better match water and N to crop demand within the season is critical to sustainable FEW systems in the future. The DSSAT family of crop growth models has been used widely around the world to evaluate management strategies, crop response to climate change, precision farming strategies, water use, nitrate leaching, and to estimate global crop yields. The DSSAT crop growth model can be used in FEW systems analyses to evaluate water and nitrogen saving strategies and consequent energy savings, and to estimate nitrate leaching to the environment.