Dr. William David Batchelor

Professor, Biosystems Engineering

Fellow, American Society of Agricultural and Biological Engineers

Work Address
208 Tom E. Corley Building
Auburn, AL 36849-5401
Ph (334) 703-9255
Email: bbatch@auburn.edu

Home Address
1746 Covington Ridge
Auburn, AL 36832
Ph (334) 703-9255

Education

- Ph.D Agricultural Engineering, University of Florida, Gainesville, FL. 12/1993
- MS Agricultural Engineering, University of Georgia, Athens, GA. 12/1987
- BSAE Agricultural Engineering, University of Georgia, Athens, GA. 6/1986

Academic Experience

- ***Director***, Auburn Institute at Huazhong Agricultural University 3/20-present
- ***Adjunct Professor***, Crop, Soil and Environmental Sciences, Auburn University 5/18-present
- ***Professor,*** Biosystems Engineering, Auburn University 7/10-present
- ***Dean***, College of Agriculture, Auburn University. 7/10-5/15
- ***Director***, Alabama Agricultural Experiment Station, Auburn University. 7/10-5/15
- ***Interim Director***, Institute for Clean Energy Technology, Mississippi State University. 1/10-3/10
- ***Director,*** Energy Institute, Mississippi State University. 9/08 – 7/10
- ***Director,*** Sustainable Energy Research Center, Mississippi State University. 10/05 – 7/10
- ***Professor and Department Head***, Agricultural and Biological Engineering, Mississippi State University. 1/05 – 7/10
- ***Distinguished International Professor***, University of Hohenheim, Stuttgart, Germany. 2004-2007
- ***Professor***, Agricultural and Biosystems Engineering, Iowa State Univ., Ames, IA. 7/04 – 1/05
- ***Associate Professor***, Agricultural and Biosystems Engineering, Iowa State University, Ames, IA. 7/99 – 6/04
- ***Bioinformatics Faculty***, Iowa State University, Ames, IA. 9/00 – 1/05
- ***Water Resources Faculty***, Iowa State University, Ames, IA. 12/98 – 1/05
- ***Biotechnology Faculty***, Iowa State University, Ames, IA. 1/95 – 1/05
- ***Assistant Professor***, Agricultural and Biosystems Engineering, Iowa State University, Ames, IA. 8/94 – 6/99
- ***Research Associate***, Biological Engineering Dept., Virginia Tech, Blacksburg, VA. 9/93 - 7/94
- ***USDA Fellow***, Agricultural Engineering, University of Florida, Gainesville, FL. 9/90 - 8/93
- ***Instructor***, Agricultural Engineering, University of Georgia, Athens, GA. 12/87 - 8/90
- ***Graduate Research Assistant***, Agricultural Engineering, Univ. of Georgia, Athens, GA. 6/86 – 12/87

Honors and Awards

- ***Recipient*** of the United States President's National Service Award 2019
- ***Inducted*** into the Auburn University College of Agriculture Academy of Fellows 2016
- Certificate of appreciation from the Southern Association of Agricultural Experiment Station Directors for service to Alabama as the Alabama Agricultural Experiment Station Director. 2015
- Honored as ***Visiting Professor***, Shangdong Peanut Research Institute, Qingdau, China. 2014
- Appointed as ***Extraordinary Researcher*** at Liaoning Ocean and Fisheries Science Research Institute, Dalian China. 2012
- Named ***Honorary Visiting Professor***, Qingdau Agricultural University, Qingdau China. 2012
- ***Presidential Citation*** from the Institute of Biological Engineers for service to the Institution. 3/3/2012
- Appointed by the Alabama Legislature to the ***University Advisory Board*** which provides technical advice to the Energy Council, whose membership is comprised of State House of Representatives and Senators from ten oil producing States, Representatives from five Canadian Provinces, and Venezuela. 12/2011
- Presented a ***Resolution of Commendation*** by the Alabama State Senate, Resolution #11-543. 11/2011
- Inducted as ***Honorary Member,*** Alpha Gamma Rho. 2010
- ***Elected as President*** of the Institute of Biological Engineering, a national organization for biological engineering professionals. This is a three year appointment as President Elect (2010), President (2011) and Past President (2012). 2009
- ***Elected as Fellow*** of the American Society of Agricultural and Biological Engineers, an honor given to less than 2% of the International membership. 2009
- Inducted into the Bagley College of Engineering ***Academy of Fellows***, Mississippi State University. 2/19/09
- Selected by the Southern Growth Policy Board as the Mississippi winner of the ***Innovator Award*** for the work of the Sustainable Energy Research Center, Directed by Bill Batchelor and Glenn Steele. 1/2009
- Appointed by the Mississippi Legislature to the ***University Advisory Board*** which provides technical advice to the Energy Council, whose membership is comprised of State House of Representatives and Senators from ten oil producing States, Representatives from five Canadian Provinces, and Venezuela. 2008-2010
- ***Certificate of Appreciation*** for service as Editor, Information and Electrical Technology Division of the *Transactions of the American Society of Agricultural and Biological Engineers* and *Applied Engineering in Agriculture* Journals, American Society of Agricultural and Biological Engineers. 6/08
- Named ***Hearin Eminent Scholar*** by the Bagley College of Engineering, Mississippi State University. 8/06 – 8/08
- 2nd place in student paper competition for paper entitled "Cost Analysis of Microscale Biomass Gasification Facilities through Mathematical Modeling" authored by Lin Wei, 7-2008

L.O. Pordesimo, C.W. Herndon and W.D. Batchelor, awarded by the Association of Overseas Chinese Agricultural, Biological and Food Engineers.

- ***Select Paper Award*** for paper entitled "A Cross Validation Approach to Evaluate CERES-Maize Simulation of Corn Yield Spatial Variability" by K. R. Thorp, W.D. Batchelor and J.O. Paz, American Society of Agricultural and Biological Engineers. 7-2005
- Named ***Distinguished International Professor*** by the University of Hohenheim, Stuttgart Germany, to lead an international research and training program in crop modeling and precision farming. 2004-2007
- ***Certificate of Appreciation*** for playing a key role in the globalization efforts of the College of Agriculture through the creation and implementation of a study abroad program, Iowa State University. 8-2004
- Selected by the ***National Academy of Engineering as one of 100 young engineers*** in the USA to participate in the Frontiers of Engineering symposium. 9/18/2003 – 9/20/2003
- ***Select Paper Award*** for paper entitled "A Web-based soybean yield simulation model to analyze the effects of interacting yield-limiting factors" by J.O. Paz and W.D. Batchelor. American Society of Agricultural Engineers. 7/2003
- Received ***Certificate of Excellence*** in Instruction for presentations at the DSSAT 4.0 Crop Modeling Workshop, Griffin, GA. 12/8/02 – 12/13/02
- Named ***New Holland Young Researcher of the Year*** by the American Society of Agricultural Engineers, the top research award for ASAE members under 40 years old. 7/2002
- ***Select Paper Award*** for paper entitled "Linking Multiple Layers of Information for Diagnosing Cause of Spatial Yield Variability in Soybean" by A. Irmak, J.W. Jones, W. D. Batchelor and J. O. Paz. American Society of Agricultural Engineers. 6/2001
- ***Exceptional Student Support Recognition***, Iowa State University. 4/2001
- The Soybean Research and Development Council won the United Soybean Board's ***Meritorious Service Award*** for their project entitled "Production Research to Increase Soybean Yields" led by Dr. Batchelor, principal investigator. 2/2001
- ***Select Paper Award*** for paper entitled "Integrating remotely sensed images to improve crop model calibrations", American Society of Agricultural Engineers. 7/2000
- ***Exceptional Student Support Recognition***, Iowa State University. 4/2000
- ***Exceptional Student Support Recognition,*** Iowa State University. 4/1999
- Served as faculty co-advisor to Jay Fallick, who won 2nd and 3rd place, in the written and oral American Society of Agricultural Engineers National student paper competition for paper entitled "Coupling Soybean Cyst Nematode Damage to CROPGRO-Soybean". 4/1999
- ***Early Achievement in Research award***, Iowa State University College of Agriculture. 1/1999
- Served as faculty co-advisor to Jay Fallick, whose honors project entitled "Coupling Soybean Cyst Nematode Damage to CROPGRO-Soybean", won 2nd place in the College of Engineering Honors poster competition, Iowa State University. 12/1998
- ***Exceptional Student Support Recognition***, Iowa State University. 4/1998
- ***Project of the Year*** awarded by the Illinois Soybean Association for project entitled "Production Research to Increase Soybean Yields". Dr. Batchelor was principal investigator of this project which included 40 scientists in five states (IA, IL, MO, WI, FL). 10/1997

- Served as faculty co-advisor to Karen Keppler, who won 4th place in the ASAE National student paper competition for paper entitled "Evaluation of neural network architectures: A case study". 7/1996
- ***Named Newcomer of the Year*** by the Iowa Section of the American Society of Agricultural Engineers. 5/1997
- Served as faculty co-advisor to Karen Keppler, who won 2nd place at the American Society of Agricultural Engineers Mid-Central student paper competition for paper entitled "Evaluation of neural network architectures: A case study". 4/1996

RESEARCH ACTIVITIES

Principal Investigator of grants and contracts totaling over $44 million

1. Coordination of the Auburn Institute at Huazhong Agricultural University. $298,409. Huazhong Agricultural University. **W.D. Batchelor**. 5/1/20 – 4/30/23.

2. Developing and testing maize disease models and soft coupling with DSSAT model. $12,000. USAID-Linkage Grant. CIMMYT. **W.D. Batchelor**. 1/17-12/17.

3. Incorporating maize lethal necrosis (MLN) into the DSSAT model. $12,000. USAID-Linkage Grant. CIMMYT. **W.D. Batchelor**. 1/17-12/17.

4. Sustainable Energy Research Center. **W.D. Batchelor** and W.G. Steele. United States Department of Energy. 1/1/10-12/30/12. $13,083,125.

5. Sustainable Energy Research Center. **W.D. Batchelor** and W.G. Steele. United States Department of Energy. 1/1/08-12/30/10. $13,530,000.

6. Sustainable Energy Research Center. **W.D. Batchelor** and W.G. Steele. United States Department of Energy. 6/1/06 – 12/31/08. $13,617,842.

7. Development of a user interface for the CEMSA database**. W.D. Batchelor**. Iowa Soybean Association. 3/1/04-6/1/04. $15,000.

8. Training producers to use WebGro to increase soybean yields. **W. D. Batchelor**, P. Pedersen, J.O. Paz. Iowa Soybean Promotion Board. 9/1/03 - 8/31/04. $16,140.

9. Development of software to analyze on-farm precision agriculture databases**. W.D. Batchelor**. Iowa Soybean Promotion Board. 6/1/03 - 5/31/04. $59,289.

10. Transferring CIFA from Cargill to Iowa State University**. W.D. Batchelor**. Iowa State University. 2002-2004. $100,000.

11. DSS Integration Plan. **W.D. Batchelor**. Iowa Soybean Association. 10/1/02 - 3/31/03. $5,000.

12. Managing interactive stresses to increase soybean yields**. W.D. Batchelor**, M. Owen, G. Tylka, M. Westgate, G. Munkvold, B. Horton. Soybean Research and Development Council. 4/00 – 3/03. $850,202.

13. Evaluating genetic by environment interactions on physiological traits for three corn hybrids**. W.D. Batchelor**. Monsanto. 5/1/99 – 4/30/00. $98,696.

14. Continuation of precision farming research to evaluate optimum nitrogen rates. **W.D. Batchelor** and A. Blackmer. Iowa Corn Promotion Board. 7/1/99 - 6/30/00. $35,000.

15. Production research to increase soybean yields. **W.D. Batchelor**, K. Whigham, G. Tylka, M. Owen, XB Yang, L. Pedigo et al. Soybean Research and Development Council. 4/1/97 - 3/31/00. $2,699,598.

16. Economic analysis of variable rate management for corn and soybean production**. W.D. Batchelor**, B.A. Babcock, R. Kanwar, T.S. Colvin, R. Cruse, S. Tim. Iowa Corn Promotion Board. 6/1/96 - 5/30/99. $113,164.

17. Economic evaluation of crop management systems for sustainable agriculture. **W.D. Batchelor,** B.A. Babcock, R. Kanwar, T.S. Colvin, R. Cruse, S. Tim. Leopold Center for Sustainable Agriculture. 6/1/96 - 5/30/99. $98,913.

18. Validation of CERES-Maize for inbred corn lines. **W.D. Batchelor**. Asgrow Seed Co. 6/1/96 - 4/1/97. $10,600.

19. Validation of corn and soybean models in eastern Iowa. **W.D. Batchelor**. Amana Farms, Inc. 5/1/95 - 12/1/95. $750.

20. Validation of corn and soybean models in eastern Iowa. **W.D. Batchelor**. Crop Tech Services. 5/1/95 - 12/1/95. $750.

Co-Principal Investigator of grants and contracts totaling over $9 million

1. Tian, D., B. Ortiz, **W.D. Batchelor**, B. Liu and I. Kisekka. $500,000. FACT: A Data-Driven Framework for Climate-Smart Analytics for Irrigation Management. NIFA-FACT program. 6/2019-6/2022.

2. Davis, J., J. Campbell, **W.D. Batchelor**, Y. Biao, D. Brothers and K. Goneke. $20,000. Development of a hands-on trainer in electrical systems and electronic control systems to strengthen electrical problem solving skills in poultry processing plants, feed mills, hatcheries and on the farm. Alabama Poultry and Egg Association. 2019-2020.

3. Precision Agriculture: Technology for more sustainable agriculture and greater food safety. G. Vellidis, **W.D. Batchelor** and P. Mask. US Dept. of Education: FIPSE. 10/1/04-9/30/07. $210,000.

4. Use of crop growth models to minimize yield variability and environmental problems in different regions in Baden-Wuttemberg: Development of management prescription. W. Claupein, S. Graeff and **W.D. Batchelor.** Landesstiftung Foundation, Stuttgart, Germany. 11/1/04-10/31/05. $491,647.

5. Integrating molecular, physiological and agronomic approaches to meet soybean markets of the near future. M. Westgate, J. Shanks, B. Nicklau and **W.D. Batchelor**. Baker Foundation. 3/04 - 2/06. $100,000.

6. Test and evaluation of coupled climate-ecosystem models. Z. Pan, E. Takle, **W.D. Batchelor**. NIGEC. 7/01/02 - 6/30/05. $173,702.

7. Linking ecological and soil property information to improve site specific management. D.Clay, S. Clay, M. Ellsbury, C. Carlson, D. Malo, K. Dalsted, B. French, M. Dierson**, W. Batchelor**. USDA-NRI. 10/1/01 - 9/30/03. $150,000.

8. Evaluating and improving CROPGRO-Soybean and CERES-Maize models for predicting growth and yield response to climate change factors. K.J. Boote, J.W. Jones**, W.D. Batchelor**. NIGEC. 10/1/01 - 6/30/04. $450,123.

9. An agroecosystem water management model: coupling of plant, soil and climate components. Pan, Z., R. Horton and **W.D. Batchelor**. Baker Endowment, Iowa State University. 7/1/01 - 6/30/03. $194,955.

10. Daily soil erosion and water runoff estimates in Iowa. R. Cruse, D. Todey, M. Al-Kaisi, **W. Batchelor**, D. Flanagan, D. James, W. Krajewski, J. Laflen, J. Opsomer, M. Tomer. Baker Endowment, Iowa State University. 7/1/01 - 6/30/03. $292,292.

11. Modeling corn and soybean production in a sheltered field. C.W. Mize**, W.D. Batchelor** et al.. USDA-NRI. 10/00 - 9/03. $523,745.

12. Prediction of gray leafspot severity as a decision tool in maize production. USDA Integrated Pest Management Program. Munkvold, G.P**., W.D. Batchelor**, J.P. Stack. USDA Integrated Pest Management Program. 10/1/99 – 9/30/02. $99,741.

13. Using Remotely Sensed Data to Diagnose Soybean Yield Limiting Factors. W. Wiebold, **W. D. Batchelor** et al. North Central Soybean Research Program. 3/99 – 2/02. $1,200,000.

14. Site-specific management practices to enhance the production efficiency of soybeans. D. Farnham (**W.D. Batchelor** et al. are coordinators). Iowa Soybean Promotion Board. 4/1/99 - 3/31/02. $706,059.

15. Mapping of soil and field characteristics to understand soybean yield. B. Weibold, N. Kitchen, K. Sudduth, H. Palm, **W. D. Batchelor** et al. North Central Soybean Research Program (Subcontract from Univ. of MO. 4/1/99 - 3/31/02. $960,251.

16. Defining environmental effects on soybean seed composition. M. Westgate and **W.D. Batchelor**. ISU Grain Quality Initiative. 10/98 - 9/99. $25,000.

17. Incorporating genetics and precision farming information into decision support systems. J.W. Jones, K.J. Boote**, W.D. Batchelor** et al. United Soybean Board. 10/1/98 - 9/30/00. $740,000.

18. Comprehensive literature review of factors affecting soybean nutrient composition. M. Westgate and **W.D. Batchelor**. Illinois Soybean Production Operating Board. 7/1/98 - 12/21/99. $37,332.

19. Integrated assessment of environmental and economic impacts of precision farming on Iowa crop production. U.S. Tim, **W.D. Batchelor**, R.S. Kanwar, B.Babcock, R. Cruse. USDA-NRI. 10/1/97 - 9/30/00. $290,103.

20. Modeling crop growth in a nursery. J. Thompson and **W.D. Batchelor**. Missouri Dept. of Conservation. 7/1/97 - 6/30/99. $16,800.

21. Continuation of shelterbelt research. C.W. Mize**, W.D. Batchelor**, R. Cruse, and M. Ghaffarzadeh. Leopold Center for Sustainable Agriculture. 7/1/96 - 6/30/99. $41,700.

22. Modeling a shelterbelt agroforestry ecosystem. C.W. Mize, **W.D. Batchelor**, J. Brandle, J. Colletti, R. Cruse et al. USDA-NRI. 10/1/96 - 9/30/00. $330,000.

23. Transferring soybean production technology to specific sites using decision support systems. J.W. Jones, K.J. Boote, **W.D. Batchelor** et al. United Soybean Board. 10/1/96 - 9/30/98. $960,000.

24. Neural network modeling for prediction of gray leaf spot of corn. G. Munkvold**, W.D. Batchelor**, C. Martinson. Pioneer Hi-Bred Int. 10/1/96 - 9/30/99. $69,954.

25. On-farm site-specific crop management for Iowa. K. Whigham, **W. D. Batchelor** et al. Iowa Soybean Promotion Board. 4/1/96 - 3/30/99. $772,849.

26. Monitoring and predicting soybean cyst nematode egg hatch in soybean, corn, and fallow fields. F. Nutter, G. Tylka, **W.D. Batchelor**. Iowa Soybean Promotion Board. 7/1/95 - 6/30/98. $112,802.

27. Integrated pest management for wireworms. L. Pedigo, M. Rice and **W.D. Batchelo**r. Leopold Center for Sustainable Agriculture. 7/1/95 - 6/30/98. $74,850.

28. Economic evaluation of alternative hog waste management systems. B.A. Babcock, J. Miranowski and **W.D. Batchelor**. Iowa Pork Promotion Association, Iowa Soybean Promotion Board and Iowa Corn Promotion Board. 3/1/95 - 6/30/96. $110,300.

Education Grants

Principal or co-principal investigator of grants totaling over $637K

1. Auburn Institute Summer 2022 Teaching Program. **W.D. Batchelor**. Huazhong Agricultural University. 4/1/22 – 3/31/23. $152,400.

2. Auburn Institute Spring and Summer 2021 Teaching Program. **W.D. Batchelor**. Huazhong Agricultural University. 4/1/21 - 9/30/2–. $105,030.

3. Auburn Institute Summer 2020 Short Course Program. **W.D. Batchelor**. Huazhong Agricultural University. 5/15/2020-9/30/2020. $64,819.

4. Precision Agriculture: Technology for More Sustainable Agriculture and Greater Food Safety. G. Vellidis, **W.D. Batchelor**, P. Mask. Fund for Improvement for Post-secondary Education (FIPSE), Department of Education. 10/1/04-9/30/07. $210,000.

5. Computer applications and systems modeling; Problem solving in an international setting. **W.D. Batchelor**. Iowa State University Study Abroad and Exchange Advisory Committee. 8/1/04-8/19/04. $1,923.

6. Computer applications and systems modeling; Problem solving in an international setting. **W.D. Batchelor**. Iowa State University Study Abroad and Exchange Advisory Committee. 6/12/02-6/20/02. $1,470.

7. A 3-D web-based model to evaluate yield management and environmental impacts. D.N. Yarger, J.W. Schafer and **W.D. Batchelor**. US Department of Education. 10/1/99 – 9/30/01. $99,948.

8. Development of U St 322R – College of Engineering honors seminar entitled “Introduction to Neural Networks”. **W.D. Batchelor**. Iowa State University Honors Program. 1/96-6/96. $500.

9. Predicting biological processes using neural networks. **W.D. Batchelor**. Women in Science and Engineering Program, Iowa State University. 6/95-8/95. $1,500.

Gifts

Principal investigator of gifts valued at $13,676,000

1. Crop Inventory Forecasting and Analysis (CIFA) System Software. **W.D. Batchelor**. Funding source: Cargill. September 2002. Software appraised at $13,576,000.

2. Transferring CIFA from Cargill to Iowa State University. **W.D. Batchelor**. Funding source: Cargill. September 2002. $100,000.

Patents and Provisional Patents

1. Yu, Fei, Q. Yan and **W.D. Batchelor**. 2014. Catalyst for converting syngas into liquid hydrocarbons and methods thereof. United States Patent No. 9,283,551.

2. Yu, F., J. Jeanson, Q. Yan, **W.D. Batchelor** and J. Pote. 2014. Process and catalyst for converting biomass municipal solid wastes (MSW) derived syngas to liquid hydrocarbon mixtures and oxygenates by a single state. Provisional Patent filed January 23, 2013. (Provisional)

Peer Reviewed Publications

*(* indicates MS, Ph.D., Post Doc, or Research Scientist supervised by Dr. Batchelor)*

Publication Metrics (as of July 2022):
Citations listed on Google Scholar: 10,675
h-Index: 41
i-Index: 91

1. Zhang, Q., Dang, P., Chen, C., Feng, Y., **Batchelor, W.,** Lamb, M. and Sanz-Saez, A. 2022. Tolerance to mid-season drought in peanut can be achieved by high water use efficiency or high efficient use of water. Crop Sci. Accepted Author Manuscript. https://doi.org/10.1002/csc2.20806
2. Guo, D., C. Chen, B. Zhou, **W.D. Batchelor**, X. Han, Z. Ding, M. Du, M. Zhao, M. Li and W. Ma. 2022. Drip fertigation with relatively low water and N input achieved higher grain yield of maize by improving pre- and post-silking dry matter accumulation. Sustainability 2022, 14, 7850. https://doi.org/10.3390/su14137850
3. Li, C., X. Wang, Z. Guo, N. Huang, S. Hou, G. He, **W.D. Batchelor**, H.M. Kadambot, Z. Wang and D. Zhang. 2022. Optimizing nitrogen fertilizer inputs and plant populations for greener wheat production with high yields and high efficiency in dryland areas. Field Crops Research 276 (2022) 108374.
4. Zhang, Di, D. Li, H. Li, H. Wang, J. Liu, H. Ju, **W.D. Batchelor**, R. Li, and Y. Li. 2022. Strategies to reduce crop water footprint in intensive wheat-maize rotations in North China Plain. Agronomy 2022, 12(2), 357; **https://doi.org/10.3390/agronomy12020357**
5. Zhang, J., J. Li, S. Saeed, **W.D. Batchelor**, M. Alariqi, Q. Meng, F. Zhu, J. Zou, Z. Xu, H. Si, Q. Wang, X. Zhang, H. Zhu, S. Jin and D. Yuan. 2022. Identification and functional analysis of lncRNA by CRISPR/Cas9 during the cotton response to sap-sucking insect infestations. Frontiers in Plant Science, 23 February 2022| https://doi.org/10.3389/fpls.2022.784511
6. Huo, W., X. Chai, **W.D. Batchelor**, A. Kafle and G. Feng. 2022. Arbuscular mycorrhizal fungi contributes to cotton plant phosphorus uptake in a high phosphorus soil. Journal of Integrative Agriculture. https://www.chinaagrisci.com/Jwk_zgnykxen/EN/abstract/abstract403694.shtml
7. Liu, Z., Q. Bian, J. Bai, G. He, M. Chen, H. Zheng, H. Wang, J. Cong, H. Ying, Y. Yin, Q. Zhang, F. Zhang and **W.D. Batchelor**. 2022. Closing the yield gap can be achieved without groundwater extraction in Chinese wheat production. Global Food Security 33 (June 2022), 100630. https://doi.org/10.1016/j.gfs.2022.100630.

8. Wang, C., M. Xu, Y. Wang, **W.D. Batchelor**, J. Zhang, J. Kuai, and L. Ling. 2022. Long-term optimum management of rapeseed cultivation simulated with the CROPGRO-Canola model. Agronomy **2022**, 12, 1191. https://doi.org/10.3390/agronomy12051191

9. Zhang, H., **W.D. Batchelor**, H. Liang, H. Han, J. Li and K. Hu. 2022. Simulation of N2O emissions from greenhouse vegetable production under different management systems in North China. Ecological Modelling 470 (2022) 110019. https://doi.org/10.1016/j.ecolmodel.2022.110019

10. Xu, M., C. Wang, L. Ling, **W.D. Batchelor**, J. Zhang and J. Kuai. 2021. Sensitivity analysis of the CROPGRO-Canola model in China: A case study for rapeseed. PLOS One 16(1): e0259929. https://doi.org/10.1371/journal.pone.0259929.

11. Li, D., S. Mo, **W.D. Batchelor**, R. Cheng, H. Wang and R. Li. 2021. Regulation of nitrogen topdressing and paclobutrazol at different stages on spike differentiation and yield of winter wheat. PeerJ 9:e12473 DOI 10.7717/peerj.12473.

12. Liu, Z., X. Yang, R. Xie, X. Lin, T. Li, **W.D. Batchelor**, J. Zhao, Z. Zhang, S. Sun, F. Zhang, Q. Huang, Z. Su, K. Wang, B. Ming, P. Hou and S. Li. 2021. Prolongation of the grain filling period and change in radiation simultaneously increased maize yields in China. Agricultural and Forest Meteorology 308-309 (2021) 108573. https://doi.org/10.1016/j.agrformet.2021.108573

13. Wang, X., Y. Miao, **W.D. Batchelor**, R. Dong and K. Kusnierek. 2021. Evaluating model-based strategies for in-season nitrogen management of maize using weather data fusion. 2021. Agricultural and Forest Meteorology 308-309 (2021) 108564. https://doi.org/10.1016/j.agrformet.2021.108564

14. Gai, H., T. Yan, A. Zhang, **W.D. Batchelor** and Y. Tian. 2021. Exploring factors influencing farmers' continuance intention to crop residue retention: Evidence from rural China. Environmental Research and Public Health 2021, 18, 7412. https://www.mdpi.com/1660-4601/18/14/7412

15. Liu, Z., H. Ying, M. Chen, J. Bai, Y. Xue, Y. Yin, **W.D. Batchelor**, M. Du, Y. Guo, Q. Zhang, Z. Cui, F. Zhang and Z. Dou. 2021. Optimization of China's maize and soy production can ensure feed sufficiency at lower nitrogen and carbon footprints. Nature Food 2021 (2):426-433. https://doi.org/10.1038/s43016-021-00300-1.

16. Liu, Y., B. Cui, **W.D. Batchelor** and C. Zhang. 2021. Evaluation on the meteorological service for mitigating the severe impacts of typhoon Rammasun. Tropical Conversation Science 14:1-9. DOI: 10.1177/1940082921992660.

17. Memic, E., S. Graeff-Honninger, O. Hensel and **W.D. Batchelor**. 2020. Extending the CSM-CERES-Beet model to simulate impact of observed leaf disease damage on sugar beet yield. Agronomy 2020, 10, 1930; doi:10.3390/agronomy10121930.

18. Cammarano, D., H. Zha, L. Wilson, Y. Li, **W.D. Batchelor** and Y. Miao. 2020. A remote sensing-based approach to management zone delineation in small scale farming systems. Agronomy 2020, 10, 1767; doi:10.3390/agronomy10111767.

19. Li, D., **W.D. Batchelor**, D. Zhang, H. Miao, H. Li, S. Song and R. Li. 2020. Analysis of melatonin regulation of germination and antioxidant metabolism in different wheat cultivars under polyethylene glycol stress. PLoS ONE15(8):e0237536. https://doi.org/10.1371/journal.pone.0237536

20. Liu, T. X., Yang, **W.D. Batchelor**, Z. Liu, Z. Zhang, N. Wan, S. Sun, B. He, J. Gao, F. Bai, F. Zhang and J. Zhao. 2020. A Case Study of climate-smart management of foxtail millet (*Setaria italica*) under future climate change in Lishu county of Jilin, China. Agricultural and Forest Meteorology 292-293 (2020) 108131.

21. Hu, K., H. Liang, H. Lv, **W.D. Batchelor**, X. Lian, Z. Wang, and S. Lin. 2020. Simulating DON leaching and optimizing water and N management practices for greenhouse vegetable production systems. Agricultural Water Management 241 (2020) 106377.

22. **Batchelor, W.D**., L.M. Suresh, X. Zhen, Y. Beyene, M. Wilson, G. Kruseman and B. Prasanna. 2020. Simulation of maize lethal necrosis (MLN) damage using the CERES-Maize model. Agronomy 2020, 10, 710; doi:10.3390/agronomy10050710.

23. Shi, Xinrui, **W.D. Batchelor**, H. Liang, S. Li, B. Li and K. Hu. 2020. Determining optimal water and nitrogen management under different initial residual soil mineral nitrogen levels in northwest China based on a model approach. Agricultural Water Management 234(2020): 106110.

24. Yang, W., H. Feng, X. Zhang, J. Zhang, J. Doonan, U. Schurr, **W.D. Batchelor**, L. Xiong and J. Yang. 2020. Crop phenomics and high-throughput phenotyping: past decades, future and challenges. Molecular Plant 13, 187-214, February 2020.

25. Shi, Xinrui, K. Hu, **W.D. Batchelor**, H. Liang, Y. Wu, Q. Wang, J. Fu, X. Cui and F. Zhou. 2020. Exploring optimal nitrogen management strategies to mitigate nitrogen losses from paddy soil in the middle reaches of the Yangtze River. Agricultural Water Management 228(2020):105877.

26. Liu, Z., Y. Yin, J. Pan, Y. Hao, D. Lu, **W.D. Batchelor**, W. Ma, Z. Cui. 2019. Yield gap analysis of county level irrigated wheat production in Hebei Province, China. Agronomy 111(5):2245-2254.

27. Zha, H., D. Cammarano, L. Wilson, Y. Li, **W.D. Batchelor** and Y. Miao. 2019. Combining crop modelling and remote sensing to create yield maps for management zone delineation in small scale farming systems. In Stafford, J.V. (Ed), Precision Agriculture 19:883-889, Wageningen Academic Publishers, The Netherlands. pp 883-890 DOI: 10.3920/978-90-8686-888-9

28. Memic, E., S. Graeff, **W.D. Batchelor**. 2019. Extending the CERES-Beet model to simulate leaf disease in sugar beet. In: 12th European Conference on Precision Agriculture (edited by: John V. Stafford), pp 977-983. Montpellier, France (DOI: 10.3920/978-90-8686-888-9_120).

29. Zhang, D., H. Wang, D. Li, H. Li, H. Ju, R. Li, **W.D. Batchelor** and Y. Li. 2019. DSSAT-CERES-WHEAT model to optimize plant density and nitrogen best management practices. Agroecosystems 114(1):19-32.

30. Roll, G., **W.D. Batchelor**, A. Castro, M. Simon, and S. Graeff. 2019. Development and evaluation of a leaf disease damage extension in CSM-CERES Wheat. Agronomy 9(3):120; https://doi.org/10.3390/agronomy9030120.

31. Liang, H., K. Hu**, W.D. Batchelor**, Q. Chen, B. Liang and B. Li. 2019. Modeling dissolved organic nitrogen leaching under different N management practices for the intensive greenhouse production using the improved WHCNS_veg model. Geoderma 337(2019):1039-1050.

32. Anar, M.J., Z. Lin, G. Hoogenboom, V. Sheila, **W.D. Batchelor**, J. Teboh, M. Ostlie, B. Schatz and M. Khan. 2019. Modeling growth, development and yield of sugarbeet using DSSAT. Agricultural Systems 169:58-70.

33. Zhang, J., Y. Miao and **W.D. Batchelor**. 2018. Estimation of optimum nitrogen rates for cool season rice in Northeastern China using the CERES-Rice model. Agronomy 8(11):263; doi:10.3390/agronomy8110263.

34. Xu, R., H. Tian, S. Pan, S. Prior, Y. Feng, **W.D. Batchelor**, J. Chen, and J. Yang. 2018. Global ammonia emissions from synthetic nitrogen fertilizer applications in agricultural systems: empirical and process-based estimates and uncertainty. Global Change Biology **https://doi.org/10.1111/gcb.14499**.

35. Memic, E., S. Graeff, W. Claupein and **W.D. Batchelor**. 2018. GIS-Based spatial nitrogen management model for maize – short and long term marginal net return maximizing nitrogen application rates. Precision Agriculture. 20(2),295-312. https://doi.org/10.1007/s11119-018-9603-4.

36. Zhen, X., H. Shao, W. Zhang, W. Huo, **W.D. Batchelor**, P. Hou, E. Wang, G. Mi, Y. Miao, H. Li and F. Zhang. 2018. Testing a bell-shaped function for estimation of fully expanded leaf area in modern maize under potential production conditions. The Crop Journal (2018). https://doi.org/10.1016/j.cj.2018.03.008.

37. Zhang, D., R. Li, **W.D. Batchelor**, J. Hui and Y. Li. 2018. Evaluation of limited irrigation strategies to improve water use efficiency and wheat yields in the North China Plain. PLOS ONE 13(1):e0189989.

38. Liang, H., Hu, K., **W.D. Batchelor**, W. Qin and B. Li. 2018. Developing a water and nitrogen management model for greenhouse vegetable production in China: sensitivity analysis and validation. Ecological Modeling 36:24-33.

39. 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. Advances in Animal Biosciences 8(2):328-332.

40. Memic, E., S. Graeff, W. Claupein and **W.D. Batchelor**. 2017. GIS-Based spatial nitrogen management model for maize. Advances in Animal Biosciences 8(2):312-316.

41. 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.

42. Liang, H., K. Hu, **W. D. Batchelor**, Z. Qi and B. Li. 2016. An integrated soil-crop system model for water and nitrogen management in North China. Scientific Reports 6:25755 | DOI: 10.1038/srep25755.

43. Kim, H., P.B. Parajuli, F. Yu, E. P. Columbus and **W. D. Batchelor**. 2013. Economic evaluation of syngas production: model development and analysis. Transactions of the American Society of Agricultural and Biological Engineers 55(3):1033-1045.

44. Wei*, L., S. D. To, L. O. Pordesimo, and **W. D. Batchelor.** 2011. Evaluation of electricity micro-scale electricity generation cost using biomass-derived syngas through modeling. International Journal of Energy Research 35:989-1003.

45. Yang*, P., E.P. Columbus, J. Wooten, **W.D. Batchelor**, P. R. Buchireddy, X. Ye and L. Wei. 2009. Evaluation of syngas storage under different pressures and temperatures. Applied Engineering in Agriculture 25(1):121-128.

46. Igathinathane*, C., L.O. Pordesimo, E.P. Columbus, **W.D. Batchelor**., and S. Sokhansanj. 2009. Sieveless Particle Size Distribution of Particulate Materials through Computer Vision. Computers and Electronics in Agriculture 66(2):147-158.

47. Wei*, L., L.O. Pordesimo, S.D. To, C.W. Herndon and **W.D. Batchelor**. 2009. Evaluation of micro-scale syngas production costs through modeling. Transactions of the American Society of Agricultural and Biological Engineering 52(5):1649-1659.

48. Wei*, L., L.O. Pordesimo, C. Igathinathane, and **W.D. Batchelor**. 2009. Process engineering evaluation of ethanol production from wood through bioprocessing and chemical catalysis. Biomass and Bioenergy 33:255-266.

49. Igathinathane*, C., L.O. Pordesimo and **W.D. Batchelor**. 2009. Major orthogonal dimensions measurement of food grains by machine vision using ImageJ. Food Research International 42(1): 76-84.

50. Link*, E.J., S. Graeff, and **W.D. Batchelor**. 2008. Evaluation of current and model-based site-specific nitrogen applications on wheat (Triticum aestivum L.) yield and environmental quality. Precision Agriculture:251-267.

51. 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.

52. Igathinathane*, C., L.O. Pordesimo, E.P. Columbus, **W.D. Batchelor** and S.R. Methuku. 2008. Shape Identification and Particles Size Distribution from Basic Shape Parameters using ImageJ. Computers and Electronics in Agriculture 63(2):168-182.

53. Thorp*, K.R., B.L. Steward, A.L. Kaleita, and **W.D. Batchelor**. 2008. Using aerial hyperspectral remote sensing imagery to estimate corn plant stand density. Transactions of the ASABE 51(1):311-320.

54. Thorp*, K.R., **W.D. Batchelor**, J.O. Paz., Kaleita, A.L., and Dejonge, K.C. 2007. Using cross validation approach to evaluate CERES-Maize yield simulations within a decision support system for precision agriculture. Transaction of the ASABE 50(4):1467-1479

55. Irmak, A., J.W. Jones, **W.D. Batchelor,** S. Irmak, K.J. Boote and J.O. Paz**.** 2006. Artificial neural network model as a data analysis tool in precision farming. Transactions of the ASABE 49(6):2027-2037.

56. Link*, E.J., S. Graeff, S., **W.D. Batchelor,** and W. Claupein. 2006. Evaluating the economic and environmental impact of a German compensation payment policy under uniform and variable-rate nitrogen management strategies using a crop model. Agricultural Systems 91:135-153.

57. Link*, E.J., S. Graeff, **W.D. Batchelor**, and W. Claupein. 2006. Spatial variability and temporal stability of corn (*Zea mays* L.) grain yields in the Upper Rhine Valley (Germany) – relevance of grid size. Archives of Agronomy and Soil Science 54(4):427-439.

58. Zillmann*, E., S. Graeff, E.J. Link, **W.D. Batchelor**, and W. Claupein. 2006. Assessment of cereal N-requirements derived by optical on-the-go sensors on heterogeneous soils. Agronomy Journal 98:682-690.

59. Irmak, A., J.W. Jones, **W.D. Batchelor,** S. Irmak, J.O. Paz and K. J. Boote. 2006. Analysis of spatial yield variability using a combined crop model-empirical approach. Transactions of the ASAE 49(3):811-818.

60. Miao, Y. D.J. Mulla, **W.D. Batchelor**, J.O. Paz and P.C. Robert. 2006. Evaluating management zone optimal N rates with a crop growth model. Agronomy Journal 98(3):545-553.

61. Thorp*, K.R., **W.D. Batchelor**, J.O. Paz, B.L. Steward and P.C. Caragea. 2006. Methodology to link production and environmental risks of precision nitrogen management strategies in corn. Agricultural Systems 89(2-3):272-298.

62. Clay, S.A., J. Klienjan, D.E. Clay, F. Forcella and **W.D. Batchelor**. 2005. Growth and fecundity of several weed species in corn and soybeans. Agronomy Journal 97:294-302.

63. Lizaso*, J.I., **W.D. Batchelor**, K.J. Boote and M.E. Westgate. 2005. Development of a leaf level canopy assimilation model for CERES-Maize. Agronomy Journal 97:722-733.

64. Lizaso*, J.I., **W.D. Batchelor**, K.J. Boote and M.E. Westgate. 2005. Evaluating a leaf level canopy assimilation model linked to CERES-Maize. Agronomy Journal 97:734-740.

65. Sudduth, K.A., N.R. Kitchen, W.J. Wiebold, **W.D. Batchelor**, G.A. Bollero, D.G. Bullock, D.E. Clay, H.L. Palm, F.J. Pierce, R.T. Schuler and K.D. Thelen. 2005. Relating EC_a to soil properties across the North-Central USA. Computers and Electronics in Agriculture 46:263-283.

66. Mize, C.W., M. Egeh*, and **W.D. Batchelor**. 2005. Predicting maize and soybean production in a sheltered field in the cornbelt region of north central USA. Agroforestry Systems 64(2):107-116.

67. Seidl*, M.S., **W.D. Batchelor**, and J.O. Paz. 2004. Integrating remote images with crop models to improve spatial yield prediction for soybeans. Transactions of the ASAE 47(6):2081-2090.

68. Paz*, J.O., **W.D. Batchelor**, P. Pedersen. 2004. WebGro: A web-based soybean management decision support system. Agronomy Journal 96:1771-1779.

69. Paz*, J.O., **W.D. Batchelor** and J.W. Jones. 2003. Estimating potential economic return for variable rate soybean variety management. Transactions of the ASAE 46(4):1225-1234.

70. **W.D. Batchelor**, J.O. Paz and J.W. Jones. 2003. Estimating Break-Even Cost to Move from Single to Multiple Soybean Variety Management Within a Field. ***(peer reviewed)*** Proceedings of the 4th European Conference on Precision Agriculture, pp 69-75, edited by J. Stafford and A. Werner. Wageningen Academic publishers.

71. Lizaso*, J.I., **W.D. Batchelor** and M.E. Westgate. 2003. A leaf area model to simulate cultivar-specific expansion and senescence of maize leaves. Field Crops Research 80(1):1-17.

72. Boote, K.J., J.W. Jones, **W.D. Batchelor**, E.D. Nafziger, O. Myers, and K. Boedhram. 2003. Genetic coefficients in crop models and links to field performance and genomics. Agronomy Journal 95(1):32-51.

73. Lizaso*, J.I., **W. D. Batchelor**, M. E. Westgate and L. Echarte. 2003. Enhancing the ability of CERES-Maize to compute light capture. Agricultural Systems 76(1): 293-311

74. Jones, J.W., G. Hoogenboom, C. Porter, K.J. Boote, **W.D. Batchelor**, L.A. Hunt, P. Wilkens, U. Singh, A. Gijsman, and J. T. Ritchie. 2003. DSSAT Cropping System Model. Special Edition of European Journal of Agronomy 18(2003):235-265 (***invited paper***)

75. Westgate, M. E., J. I. Lizaso* and **W. D. Batchelor**. 2003. Quantitative relationships between pollen shed density and grain yield in maize (*Zea mays* L.). Crop Science 43(3):934-942.

76. Lizaso*, J.I., M.E. Westgate, **W.D. Batchelor** and A. Fonseca. 2003. Predicting potential kernel set in maize from simple flowering characteristics. Crop Science 43(3):892-903.

77. Fallick*, J.B., **W.D. Batchelor**, G. Tylka, T. Niblack and J.O. Paz. 2002. Coupling soybean cyst nematode damage to CROPGRO-Soybean. Transactions of the ASAE 45(2): 433-441.

78. Sadler, E. J., E. M. Barnes, **W. D. Batchelor**, J. Paz, and A. Irmak. 2002. Addressing spatial and temporal variability in crop model applications. In L. R. Ahuja, L. Ma and T. Howell (ed.) Agricultural System Models in Field Research and Technology Transfer. Lewis Publishers, Inc., Boca Raton, FL. pp 253-263. *(Peer Reviewed Chapter).*

79. Irmak, A., J.W. Jones, **W. D. Batchelor** and J. O. Paz. 2002. Linking Multiple Layers of Information for Diagnosing Causes of Spatial Yield Variability in Soybean. Transactions of the ASAE 45(3):839-849.

80. Irmak, **W.D. Batchelor**, J.W. Jones, S. Irmak, J.O. Paz and H. Beck. 2002. Relationship between plant available soil water and yield for explaining within-field soybean yield variability. Applied Engineering in Agriculture 18(4):471-482.

81. Lizaso*, J.I., **W.D. Batchelor** and M.E. Westgate. 2002. Using the Normalized Difference Vegetation Index and a Crop Simulation Model to Predict Soil Spatial Variability. Transactions of the ASAE 45(4):1217–1222.

82. Paz*, J.O., **W.D. Batchelor** and D. Bullock. 2002. Procedure to use a crop model to identify water-stressed areas in soybean fields using on-farm data. Applied Engineering in Agriculture 18(5): 643-646.

83. **Batchelor, W.D.,** B. Basso and J.O. Paz. 2002. Examples of strategies to analyze spatial and temporal yield variability using crop models. Special Edition of European Journal of Agronomy Vol. 18 (1-2): 141-158 (***invited paper***).

84. Qi, X., C.W. Mize, **W.D. Batchelor**, E.S. Takle, and I.V. Litvina. 2001. SBELTS: A model of soybean production under tree shelter. Agroforestry Systems 52:53-61.

85. Steenhoek, L. M. Misra, **W.D. Batchelor**, and J. Davidson. 2001. Probabilistic neural networks for segmentation of features in corn kernel images. Applied Engineering in Agriculture 17(2):225-234.

86. Bootlink, H.W.G., J.J. Stoorvogel, B.J. Van Alphen, R. Vargas, **W.D. Batchelor** and J.O. Paz. 2001. Tools for optimizing management of spatially-variable fields. Agricultural Systems 70(2-3):445-476.

87. Lizaso*, J.I., **W.D. Batchelor**, and N. Boedhram. 2001. Alternate approach to improve kernel number calculation in CERES-Maize. Transactions of the ASAE 44(4):1011-1018.

88. Irmak, A., J.W. Jones, **W.D. Batchelor** and J.O. Paz. 2001. Estimating spatially variable soil properties for application of crop models in precision agriculture. Transactions of the ASAE 44(5):1343-1353.

89. Seidl*, M.S, **W.D. Batchelor**, J.B. Fallick and J.O. Paz. 2001. GIS-crop model based decision support system to evaluate corn and soybean prescriptions. Applied Engineering in Agriculture 17(5):80-87.

90. Paz*, J.O., **W.D. Batchelor**, G.L. Tylka and R.G. Hartzler. 2001. A modeling approach to quantify the effects of spatial soybean yield limiting factors. Transactions of the ASAE 44(5): 1329-1334.

91. Paz*, J.O., **W.D. Batchelor** and G.L. Tylka. 2001. Method to use crop growth models to estimate potential return for variable-rate management in soybeans. Transactions of the ASAE 44(5): 1335-1341.

92. Boedhram*, N., T.J. Arkebauer, and **W.D. Batchelor.** 2001. Season-long Characterization of Vertical Distribution of Leaf Area in Corn. Agronomy Journal 93(6):1235-1242.

93. Andales*, A.A., **W.D. Batchelor**, and C.E. Anderson. 2000. Modification of a soybean model to improve soil temperature and emergence date prediction. Transactions of the ASAE 43(1):121-129.

94. Andales*, A.A., **W.D. Batchelor**, C.E. Anderson, D.E. Farnham, and D.K. Whigham. 2000. Incorporating tillage effects into a soybean model. Agricultural Systems 66(2):69-98.

95. Calmon, M.A., **W.D. Batchelor**, J.W. Jones, J.T. Ritchie, K.J. Boote, and L.C. Hammond. 1999. Simulating soybean root growth and soil water extraction using a functional crop growth model. Transactions of the ASAE 42(6): 1867-1877.

96. Paz*, J.O., **W.D. Batchelor**, T.S. Colvin, S.D. Logsdon, T.C. Kaspar, D.L. Karlen, and B.A. Babcock. 1999. Model-based techniques to determine variable rate nitrogen for corn. Agricultural Systems 60(1999):69-75.

97. Garrison*, M.V., **W.D. Batchelor**, R.S. Kanwar. J.T. Ritchie. 1999 Validation of the CERES-Maize water and nitrogen balances under tile drained conditions. Agricultural Systems (1999):189-200.

98. Lefko, S.A., L.P. Pedigo, **W.D. Batchelor,** and M.E. Rice. 1998. Spatial model of wireworm habitat. Environmental Entomology 27(2):184-190.

99. Lefko, S.A., L.P. Pedigo, M.E. Rice, and **W.D. Batchelor**. 1998. Wireworm incidence and diversity in Iowa conservation reserve environments. Environmental Entomology 27(2):312-317.

100. Sexton*, P.J., **W.D. Batchelor**, K.J. Boote, R.M. Shibles. 1998. Evaluation of CROPGRO for prediction of soybean nitrogen balance in a midwestern environment. Transactions of the ASAE 41(5):1543-1548.

101. Paz*, J.O., **W.D. Batchelor**, T.S. Colvin, S.D. Logsdon, T.C. Kaspar, and D.L. Karlen. 1998. Calibration of a crop growth model to predict spatial yield variability. Transactions of the ASAE 41(5): 1527-1534.

102. Shen*, J., **W.D. Batchelor**, R. Kanwar, J.T. Ritchie, and J.W. Jones, 1998. Validation of the water balance model in CROPGRO-Soybean. Transactions of the ASAE 41(5):1305-1313.

103. **Batchelor, W.D**., M.R. Zeiss, L.P. Pedigo, and R.M. Shibles. 1997. Development of a model to predict soybean pod color distribution. Transactions of the ASAE 40(1):221-227.

104. **Batchelor, W.D**., X.B. Yang, and A.T. Tschanz. 1997. Development of a neural network for soybean rust epidemics. Transactions of the ASAE 40(1):247-252.

105. Yang, X.B., and **W.D. Batchelor**. 1997. Modeling plant disease dynamics with neural networks. AI Applications 11(3):47-55.

106. Sexton*, P.J., **W.D. Batchelor**, and R.M. Shibles. 1997. Effect of sulfur availability on rubisco content and photosynthetic rate of Kenwood soybean. Crop Science 37(6):1801-1806.

107. **Batchelor, W.D**., K.J. Boote, and J.W. Jones. 1996. Quantifying pod detachment rate of Florunner peanut. Peanut Science 23(1996):23-30.

108. **Batchelor, W.D**., J.W. Jones, and K.J. Boote. 1996. Comparison of methods to compute peanut seed size distribution by crop growth models. Transactions of the ASAE 39(2):737-744.

109. Pinnschmidt, H.O., **W.D. Batchelor**, and P.S. Teng. 1995. Simulation of multiple species pest damage in rice using CERES-Rice. Agricultural Systems 48(1995):193-222.

110. **Batchelor, W.D**., J.W. Jones, K.J. Boote, and G. Hoogenboom. 1994. Carbon-based model to predict peanut pod detachment. Transactions of the ASAE 37(5):1639-1646.

111. **Batchelor, W.D**., J.W. Jones, K.J. Boote, and H.O. Pinnschmidt. 1993. Extending the use of crop models to study pest damage. Transactions of the ASAE 36(2):551-558.

112. **Batchelor, W.D**. and R.W. McClendon. 1992. A blackboard approach for resolving conflicting irrigation and insecticide scheduling recommendations. Transactions of the ASAE 35(2):741-747.

113. **Batchelor, W.D**., R.W. McClendon, and M.E. Wetzstein. 1992. Knowledge engineering approaches in developing expert simulation systems. Computers and Electronics in Agriculture 7:97-107.

114. **Batchelor, W.D**., M.E. Wetzstein, and R.W. McClendon. 1991. Economic theory and expert system information technologies in agriculture. European Review of Agricultural Economics 18:245-261.

115. **Batchelor, W.D**., R.W. McClendon, D.B. Adams, and J.W. Jones. 1989. Evaluation of SMARTSOY: An expert simulation system for insect pest management. Agricultural Systems 31(1):67-81.

116. **Batchelor, W.D**., R.W. McClendon, J.W. Jones, and D.B. Adams. 1989. An expert simulation system for soybean insect pest management. Transactions of the ASAE 32(1) 335-342.

Books and Chapters in Books

1. Volume 1. DSSAT v4: Overview. 2003. Hoogenboom, G., J.W. Jones, C.H. Porter, P.W. Wilkens, K. J. Boote, **W. D. Batchelor**, L. A. Hunt, and G.Y. Tsuji (Editors). 2003 Decision Support System for Agrotechnology Transfer Version 4.0. University of Hawaii, Honolulu, HI

2. Decision Support System for Agrotechnology Transfer Version 4.0. Volume 2. DSSAT v4: Model Documentation. 2003. Porter, C.H., K. J. Boote, **W. D. Batchelor**, L. A. Hunt, J.W. Jones, and G. Hoogenboom. 2003. (Editors). University of Hawaii, Honolulu, HI

3. Westgate, M.E., E. Piper, **W.D. Batchelor** and C. Hurburgh, Jr. 2000. Effects of cultural and environmental conditions during soybean growth on nutritive value of soy products. In Soy in Animal Nutrition, edited by J.K. Drackley. Federation of Animal Science Societies. Pp 75-89.

4. Teng, P.S., **W.D. Batchelor**, H.O. Pinnschmidt, and G.Wilkerson. 1998. Simulation of pest effects on crops using coupled pest-crop models: the potential for decision support. Chapter in book entitled “Understanding Options for Agricultural Production”, edited by G.Y. Tsuji, G. Hoogenboom, and P.K. Thorton. Kluwer Press. pp 221-267.

5. **Batchelor, W.D.,** 1997. Neural network applications in agriculture. In “Agricultural Systems Modeling and Simulation”, edited by Bob Peart and Bruce Curry. Marcel Dekker.

6. Hoogenboom, J.W. Jones, P.W. Wilkens, **W.D. Batchelor**, W.T. Bowen, L.A. Hunt, N.B. Pickering, U.Singh, D.C. Godwin, B. Baer, K.J. Boote, J.T. Ritchie, and J.W. White. 1994. Crop Models. G.Y. Tsuji, G. Uehara, and S. Balas (eds.). DSSAT v3., vol 2-2. Pp. 95-244. University of Hawaii, Honolulu, Hawaii.

7. Boote, K.J., **W.D. Batchelor**, J.W. Jones, H. Pinnschmidt, and G. Bourgeois. 1993. Pest damage relations at the field level. In Systems Approaches for Agricultural Development, F.P. Devris, P. Teng, and K. Metsalaar, editors. Kluwer Academic Publishers, Dordrecht, Netherlands. pp 277-296.

Published Book Reviews

1. **Batchelor, W.D.** 1999. Artificial intelligence for biology and agriculture. Crop Science 39(6):

2. **Batchelor, W.D.** 1997. Review of “PLANTMOD 2.1. Exploring the physiology of plant communities” by I.R. Johnson. Field Crops Research 54(1996):87-89.

3. **Batchelor, W.D.** 1997. Review of “Modeling Potential Crop Growth Processes” by J. Goudriaan and H.H. van Laar. Agricultural Systems 39(1):127-129.

Software

1. DSSAT v4 CD-ROM and sofware. 2003. Hoogenboom, G., J.W. Jones, P.W. Wilkens, C.H. Porter, **W.D. Batchelor**, L.A. Hunt, K.J. Boote, U. Singh, O. Uryasev, W.T.Bowen, A. Gijsman, A. du Toit,

J.W. White, and G.Y. Tsuji. 2003. Decision Support System for Agrotechnology Transfer Version 4.0 [CD-ROM]. University of Hawaii, Honolulu, HI.

Copyrighted Material

1. **Batchelor, W.D.** 1992. Expert systems in the power industry. Course notes. US Copyright # 513-721. 65 pages.

2. **Batchelor, W.D.** 1991. Expert system development using Intelligence Compiler. Short course notes and Instructor's manual. Second edition. US Copyright # 462-406. 207 pages. Supported by a contract from the Southern Company Services, Atlanta, Ga.

3. **Batchelor, W.D.** 1990. Expert system development using Intelligence Compiler. Short course notes and Instructor's manual. US Copyright # 438-084. 197 pages. Supported by a contract from the Southern Company Services, Atlanta, Ga.

Thesis and Dissertation

1. **Batchelor, W.D**. 1987. Soybean insect pest management using a crop growth model based expert system. M.S. Thesis, Agricultural Engineering Department, University of Georgia, Athens, Ga. 30601. 209 pages.

2. **Batchelor, W.D**. 1993. Predicting optimum harvest date for peanut production. Ph.D Dissertation, Agricultural Engineering Department, University of Florida, Gainesville, Fl. 32611. 283 pages.

EXTENSION ACTIVITIES

Published Extension Bulletins

1. **Batchelor, W.D.** 2000. The Yields Project: A reference guide for maximizing yields. Iowa Agricultural and Home Economics Experiment Station Bulletin No. EDC 206.

2. **Batchelor, W.D.** 1997. Precision Agriculture Websites. PM-1709. Iowa Agricultural and Home Economics Experiment Station Bulletin No. PM-1709.

3. **Batchelor, W.D.,** K. Whigham, J. DeWitt, T. Hiett, K. Eastman. 1997. Precision Agriculture Series #1: An Introduction to Precision Agriculture. Iowa Agricultural and Home Economics Experiment Station Bulletin No. PM 1703.

Extension Newsletter Articles

1. **Batchelor, W.D**. 1999. Soybean composition variance in fields. Integrated Crop Management Newsletter – Special Precision Ag Edition. IC-482. May 1999. Pg 8.

2. **Batchelor, W.D**., and J.O. Paz. 1999. Crop growth models and yield variability. Integrated Crop Management Newsletter – Special Precision Ag Edition. IC-482. May 1999. Pg 2.

3. **Batchelor, W.D.** 1998. Role of water stress in yield variability. Integrated Crop Management. Precision Ag special Edition. IC-480, pg. 3. Spring, 1998.

4. **Batchelor, W.D.** 1997. One method of evaluating yield variability. Integrated Crop Management - Special Precision Ag Edition. IC-478 (Precision Ag Special Edition), Winter, 1997. pp 2-3.