

Dr. William David Batchelor
Professor, Biosystems Engineering
Fellow, American Society of Agricultural and Biological Engineers

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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

- **Professor**, Biosystems Engineering, Auburn University 5/15-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

Administrative Accomplishments

Dean, College of Agriculture and Director, Alabama Agricultural Experiment Station (2010-2015)

- Provided leadership for the College of Agriculture and the Alabama Agricultural Experiment Station, which employs approximately 150 faculty and 500 research and support staff. The College has over 1100 undergraduate students (record enrollment) and 275 graduate students. The experiment station consists of approximately 18,000 acres of land and over 300 buildings located on 15 research stations and the main campus.
- Developed process to create a strategic plan for the College of Agriculture.
- Raised nearly \$40 million in private funding for numerous programs and projects.
- Created the Ag Hill Dean's Society which provided \$75-100K per year in discretionary funds to the Dean's office.
- Reorganized football game day parking at Ag Heritage Park to provide approximately \$250K in annual discretionary funding to the Dean's office.
- Raised partial funding and managed the construction of nearly \$52 million in facilities including the construction of the Center for Advanced Science, Innovation and Commerce (\$28 million), Aquatic Resource Center (\$9.5 million), Poultry and Animal Nutrition Center (\$6.5 million), Plant Sciences Building (\$1 million), Alfa Office building (\$1 million), and renovation of the Biosystems Corley Annex (\$4.5 million), Pesticide Laboratory (\$150K), and Comer Hall (\$500K).
- Reorganized the budget and reallocated funding to invest approximately \$5 million in state of the art precision equipment and 13 irrigation systems for the Research and Extension Centers around the state.
- Worked with Colleges and Departments to create the Hunger Solutions Institute, Auburn University Food Systems Institute and the Aquaculture and Fisheries Business Institute, and worked with central administration to reorganize and move the Water Resources Institute, Water Resources Research Institute, and the Environmental Institute into the Agricultural Experiment Station.
- Played a key role in creating an irrigation initiative in Alabama, which involved interaction with numerous state legislators, resulting in legislation for a tax credit for producers who purchase irrigation equipment.
- Developed a marketing and branding program for the College of Agriculture with the goal of diversifying our student body beyond the traditional and declining rural base.
- Worked with departments to develop new majors, including Applied Biotechnology (BS), Food Science (BS), Ag Science (BS), Turfgrass Management (MS), revision of the Environmental Sciences program (BS), and to expand distance education programs.
- Developed an undergraduate research fellowship program (8 fellowships).
- Developed 3+2 programs (accelerated BS/MS programs) with several of the top Agricultural Universities in China with the goal of increasing graduate student enrollment.
- Developed several 2+2 transfer programs with community colleges in Alabama.
- Launched a scholarship program to incentivize students to participate in a study abroad program. This program dramatically increased the number of students participating in short term faculty led study abroad programs over the past two years.
- Developed programs to recruit minority students, bring more industry representatives to campus and into the classroom, and enhanced the Career Fair.
- Developed programs to help new faculty be successful including a new faculty orientation, once per semester lunch with the Dean for assistant professors and new faculty, Washington DC orientation to meet with leaders and program managers at the National Institute of Food and Agriculture, and provided travel funds for regional project participation.
- Created several new faculty and Alumni awards including the Dean's High Impact Paper of the year, Director's Junior and Senior Researcher, Project Team award, Excellence in Extension and Outreach, Advising Excellence, Academy of Fellows, and Alumni award to provide recognition for outstanding faculty and Alumni.
- Developed a program to send several faculty members each year to the Food Systems Leadership Institute and the Lead 21 programs to develop future faculty leaders.

- Created small equipment grant program to assist faculty in replacing and upgrading equipment.
- Worked with department heads to develop a strategic staffing plan for new faculty hires to increase critical mass of faculty in priority areas and maintain critical needs for stakeholders.
- Oversaw the hiring of approximately 40 new assistant and associate professors, representing over 1/4th of our faculty positions within the College.
- Led the development of a strategic plan for our Communications and Marketing department to increase visibility to stakeholders and Alumni.
- Made strategic hires to diversify the College leadership and staff.
- Reorganized central College leadership structure and created positions for Assistant Dean of Extension and Assistant Dean and Director of Global Programs.

Head of Agricultural and Biological Engineering at Mississippi State University (2005 – 2010)

- Increased diversity in the department by hiring three under represented faculty members.
- Managed the construction of a new 42,000 ft² building for the department which was funded by a \$10.5 million state bond and private donations (2005-2008).
- Raised approximately \$500k in private donations to fully furnish the new building.
- Renovated North Farm building (2400 ft²) as long term storage and research space (2006).
- Renovated parts of Davidson Hall to add 5 new offices (2006).
- Renovated gasification building (Pace Seed Lab) after a tornado destroyed the roof (2007)
- Successfully led the department through a national accreditation process in 2005 and was accredited by the Accreditation Board for Engineering and Technology (ABET) for six years (the maximum).
- Increased departmental undergraduate enrollment from 240 to over 320 undergraduate students (2005-present).
- Created and was appointed Director of the Sustainable Energy Research Center (2005) which consists of approximately 50 research faculty with an annual budget of approximately \$13 million.
- Created and was appointed Director of the Energy Institute (2008), which consists of approximately 200 researchers with an annual budget of approximately \$20 million.
- Created the Tissue Engineering Research Center housed in the Biological Engineering Department, which received approximately \$1 million in funding.
- Administered approximately \$1 million in annual funding from Oklahoma State University for bioenergy research and the Department of Energy for combined heating and power (CHP) research.
- Increased number of tenure track faculty by two positions, increased the number of extension faculty by two positions, and increased the number of research faculty by one position. All faculty were funded by state appropriations. Increased number of staff by two to handle increased grant expenditures.
- Placed emphasis on recruiting Ph.D students and increased number of Ph.D students by 20%. Graduate program has increased from approximately 25 students in 2005 to 37 students in 2010.
- Developed an MS and Ph.D program in Engineering Technology to provide opportunities for engineering technology students who seek additional education prior to entering the work force.
- Maintained the day-to-day operations of the department, which has an annual state budget of approximately \$1.5 million. This included oversight of space, teaching assignments, mentoring new faculty, administering budgets and grants, setting strategic goals and directions, and other activities as needed to carry out the position responsibilities.
- Increased grant expenditures of the department from approximately \$1 million to \$3 million annually.
- Increased number of peer reviewed journal articles from 1 to 3 per tenure track faculty member.
- Increased reserve endowment funds and discretionary overhead funds of the department from approximately \$50k to nearly \$1.5 million.

Director, Sustainable Energy Research Center (SERC), Mississippi State University (2005-2010)

- Created the Sustainable Energy Research Center (SERC) with Dr. Glenn Steele, and organized approximately 50 faculty members in 9 Colleges and Centers and 12 Departments to conduct renewable energy research.

- Developed a strategic plan for the SERC to focus on making transportation fuel from southeastern based feedstocks. This included extensive interactions with individuals within the US Department of Energy and the US Department of Agriculture.
- Established research thrust areas and organized multidisciplinary research teams around these thrust areas focused on making transportation fuel, conducting yield and management trials for feedstocks, and economic process analysis.
- Interacted extensively with staff members in the US Senate, the US House of Representatives, and the US Senate Appropriations committee to develop a funding strategy for the SERC.
- Secured and managed approximately \$40 million in Department of Energy funding to operate the Sustainable Energy Research Center.
- Gave numerous presentations at State and National renewable energy conferences.
- Managed intellectual property issues including patents, licensing, and memorandum of understanding and cooperative agreements with companies and National Laboratories.
- Met with numerous companies on potential partnerships for technology transfer, and developed several temporary partnerships between MSU and public and private companies for the purpose of writing pilot scale renewable energy proposals.
- Provided regular briefings and laboratory tours to Federal and State politicians and their staff members, and State and Federal governmental agency leaders, Department of Energy National Laboratory researchers, and public and private companies.
- Promoted the development of patents for the conversion of biomass into transportation fuel which led to several provisional patents being filed by SERC faculty.
- Established a web site, newsletter, and public communications to promote the work of the SERC.
- Developed plans to construct a new 10,000 ft² facility to house pilot plants for two biomass conversion processes (initiated in 2010, completed in 2011 after I left).
- The SERC developed several processes to create liquid hydrocarbon, gasoline, diesel, cellulosic sugar, and triglycerides from southeastern feedstocks that can serve as a feedstock for petroleum refineries, biorefineries or ethanol plants to make renewable transportation fuel using pyrolysis, gasification and microbial conversion processes.

Director, Energy Institute, Mississippi State University (2008-2010)

- Co-led a committee established by the Vice President of Research to study the feasibility of creating the Energy Institute at MSU in 2006. Submitted a proposal which was approved by the Mississippi Institute of Higher Learning to create the Energy Institute, whose goal was to organize, coordinate, manage and advance energy research at Mississippi State University (approved in 2008). Served as Co-Director of the Energy Institute, which coordinated and directed most of the energy related projects, centers and institutes at MSU. Research groups reporting to the Energy Institute Directors included the Sustainable Energy Research Center, the Combined Heating and Power group, the Institute for Clean Energy Technology, and the Industrial Assessment Center. The Energy Institute consisted of approximately 200 interdisciplinary researchers (faculty, post-docs and graduate students) funded at approximately \$20 million annually, representing approximately 15% of all MSU grant expenditures in FY 2008. From FY05-08, the units within the newly formed Energy Institute received combined grants and contracts totaling over \$59 million, consisted of 104 faculty, 77 MS, 70 Ph.D students, and produced 167 peer reviewed journal articles, 287 conference proceedings and 20 book chapters.
- Managed the day to day operations of the Institute with Dr. Glenn Steele, facilitated collaborations across Institutes, Centers and Departments, sought industrial partnerships and extramural funding opportunities, developed strategies and plans to advance the mission of the Institute, evaluated the annual performance of each unit, and reported to the Dean of the Bagley College of Engineering and the Director of the Mississippi Agricultural and Forestry Experiment Station.

Honors and Awards

- **Inducted** into the Auburn University College of Agriculture Academy of Fellows 2015
- Honored as **Visiting Professor**, Shangdong Peanut Research Institute, Qingdao, China. 2014
- Appointed as **Extraordinary Researcher** at Liaoning Ocean and Fisheries Science Research Institute, Dalian China. 2012
- Named **Honorary Visiting Professor**, Qingdao Agricultural University, Qingdao 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, L.O. Pordesimo, C.W. Herndon and W.D. Batchelor, awarded by the Association of Overseas Chinese Agricultural, Biological and Food Engineers. 7-2008
- **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 2004-2007

modeling and precision farming.

- **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 4/1996

Society of Agricultural Engineers Mid-Central student paper competition for paper entitled "Evaluation of neural network architectures: A case study".

International Experience

- Established research partnerships with researchers at the Chinese Academy of Agricultural Sciences and China Agricultural University in Beijing, China. 9/12/15 – 9/24/15
- Visited Vietnam to renew partnership with Vietnamese Academy of Agricultural Sciences and Can Tho University, and gave keynote address to the Asian Plant Growth Promoting Rhizobacteria conference. 4/28 – 5/7/15
- Met with the Governor of the State of Alagos, Brazil to establish a partnership to restore a river fishery system. 4/21 – 4/25/15
- Visited Turkey to established educational agreements with several Universities. Met with the Deputy Minister of Agriculture to discuss Ph.D student opportunities at Auburn. 2/13 – 2/20/15
- Visited ICRISAT in India to establish research collaboration on peanut genetics. 1/18-1/25/15
- Visited the University of Hohenheim in Stuttgart Germany to establish an educational partnership. 12/14 – 12/20/14
- Visited several Universities in China to review collaborative work and renew educational agreements. 9/11 – 9/19/14
- Gave keynote presentation at the Energy Council in Regina, Canada. 6/19 – 6/23/14
- Visited several Universities in China to renew educational agreements and to visit Auburn students on a study abroad program. 5/5 – 5/16/14
- Visited Hanoi, Vietnam to prepare for the 4th Asian Plant Growth Promoting Rhizobacteria Conference. I serve on the Advisory Board to the Society. 1/17 – 1/24/14
- Visited several Universities in China to renew educational partnerships. 10/29 – 11/08/13
- Visited several Universities in Kenya and Uganda where Auburn has projects and collaborators. Met with the Minister of Fisheries to discuss the impact Auburn projects are having in Kenya. 8/4/13 – 8/12/13
- Attended the Asian Plant Growth Promoting Rhizobacteria conference as an Advisory Board Member in Manila, Philippines. Gave keynote speech. 4/21/13 – 4/26/13
- Visited with Honduran President Lobo and his Vice President and Cabinet Ministers to prepare a World Bank Proposal to eliminate hunger in Honduras. The project was funded in 2014. 7/30/12-8/3/12
- Visited China to renew partnerships with 3 Universities 5/7/12-5/15/12
- Visited India to establish 7 University and 1 Industry partnership with Auburn. 3/7/12-3/19/12
- Visited two Universities in Vietnam to establish and renew collaborative agreements. 1/3/12-1/11/12
- Visit Cuba to give invited presentations and to discuss potential research and student exchange programs with the Agricultural University of Havana. 10/18/11-10/22/11
- Gave invited presentation at the Korean Society of Biotechnology and Bioengineering meeting and led team from the Institute of Biological Engineers (IBE) to establish cooperative agreements between the organizations. I served as President of IBE that year. 10/2/11-10/9/11
- Visited several universities in China to evaluate and renew existing 5/10/11 – 5/21/11

partnerships

- Attended Energy Council conference in Nova Scotia 6/15/10-6/21/10
- Visit to Germany to explore study abroad programs 5/13/10 – 5/21/10
- Attended Energy Council conference as a University Advisory Board Member, Vancouver, Canada. 12/11/08-12/14/08
- Gave invited presentation on crop modeling and precision farming at the University of Thessoloniki in Volos, Greece. 6/14/07-6/23/07
- Gave invited presentation on crop modeling and precision farming at the University of Padova, Padova Italy. 6/21/06-6/27/06
- Invited to give a crop growth modeling workshop (5 days) to 40 graduate students at Beijing Agricultural University, Beijing, China. 3/24/06-4/2/06
- Gave invited presentation at the 3rd International Symposium of Precision Agriculture, Embrapa, Sete Lagoas, Brazil. 8/14/05 – 8/18/05
- 1-week trips to the University of Hohenheim in Stuttgart, Germany to supervise post-docs and work on European Union funded project in precision farming and crop modeling training program as ***Distinguished International Professor.*** 11/3/04 – 11/12/04
12/4/04-12/11/04
1/22/05-1/29/05
3/12/05-3/18/05
5/8/05-5/13/05
10/16/05-10/22/05
6/28/06-7/1/06
- Led a group of 16 Iowa State University students in a study abroad program at the University of Hohenheim in Stuttgart, Germany. 8/1/04-8/19/04
- Visited the University of Hohenheim in Stuttgart, Germany to give an invited presentation at a Precision Agriculture conference and to finalize plans for a study abroad program. 5/11/04 – 5/16/04
- Visited the University of Hohenheim in Stuttgart, Germany to work on a research proposal and finalize plans for a study abroad program. 2/21/03 – 2/26/03
- Attended a Tillage workshop at CIMMYT in El Batan, Mexico, and led a research group to incorporate tillage into the DSSAT4.1 crop growth models. 12/7/03 – 12/11/03
- Visited the University of Hohenheim in Stuttgart, Germany to plan a 3-week study abroad program to be offered in 2004. Also established collaborative research program with Dr. Simone Graeff in the area of precision farming. Invited to present two lectures to Dr. Graef's precision agriculture class. 6/18/03-6/26/03
- Presented a paper and organized and chaired a session at the European Conference on Precision Agriculture, Berlin, Germany. 6/15/03-6/18/03
- Invited to present a 1-day workshop entitled "Simulation models in precision agriculture research" at the European Conference on Precision Agriculture, Berlin Germany. 6/14/03-6/15/03
- Became leader of the Tropical Cereals group for GCTE (Global Change of Terrestrial Ecosystems), and organized international network of scientists to share data and test models for maize, millet and sorghum. 10/02-2004
- Invited to serve as abstract and paper reviewer for the 4th European Conference on Precision Agriculture, Berlin, Germany. 9/02 – 5/03
- Led a group of 22 Iowa State University students in a study abroad program at 8/4/02 – 8/22/02

the University of Hohenheim in Stuttgart, Germany.

- Visited with faculty at the University of Hohenheim, Stuttgart, Germany to set up a study abroad program for agricultural engineering students at Iowa State University. 6/12/02 – 6/20/02
- Invited to give short course on precision farming at the Beijing Normal University, Beijing, China. 5/23/02 – 5/31/02
- Worked with scientists at CIMMYT International Research Center, El Batan, Mexico to develop modular version of the CERES-Maize crop model. 4/13/02 – 4/19/02
- Leader of the “CERES-Maize Group”, an international group of scientists committed to improving and validating the CERES-Maize corn growth model throughout the world. 2001-2005
- Presented paper at the 2nd International Symposium on Modelling Cropping Systems, Florence, Italy. 7/15/01- 7/17/01
- Visited Dr. Bruno Basso, Naples, Italy to develop a strategy for collaborative research in crop modeling and precision farming. 7/9/01 - 7/15/01
- Invited to lead maize subcommittee for GCTE (Global Change of Terrestrial Ecosystems) workgroup, CIMMYT International Research Center, El Batan, Mexico. 4/26/01 - 4/27/01
- Attended meeting at CIMMYT International Research Center, El Batan, Mexico to test and improve temperature response for corn and wheat in the CERES model. 4/22/01 - 4/25/01
- Presented 2 invited papers at a joint International meeting of the American Society of Agricultural Engineers and Canadian Society of Agricultural Engineers, Toronto, Canada. 7/2000
- Visited CIMMYT International Research Center in El Batan, Mexico to work with researchers to improve the CERES-Maize model for tropical conditions. 5/2/98 - 5/6/98

Consulting Experience

- Westervelt Company, Tuscaloosa, AL. 1/08-12/08
- Monsanto Company, St. Louis, MO. 8/97 – 6/00
- Idaho National Engineering & Environmental Laboratory, Idaho Falls, Idaho 1999
- Cargill, Inc. Minneapolis, MN. 1998-1999
- Ag Risk Management of North America, Overland Park, KS. 1997
- McVean Trading and Investing, Memphis, TN. 1996-1997
- Southern Company Services, Inc., Atlanta, GA. 1990-1991

Professional Affiliations

- American Society of Agricultural Engineers (1984 - present)
- Institute of Biological Engineers (1995-2014)
- Agronomy Society of America (1995-2005)
- Iowa Soybean Association (1996 – 2005)
- American Peanut Research and Education Society (1992-1996)
- Certified as Engineer in Training (EIT) by the State of Georgia in 1986
- Sigma Xi
- Gamma Sigma Delta

Professional Committees

Editorial Positions:

- Associate Editor, Journal of Agricultural Engineering (2015-present)
- Editor for the Information and Electrical Technologies Division, American Society of Agricultural and Biological Engineers (2004-2007)
- Associate Editor for the Information and Electrical Technologies Division, American Society of Agricultural and Biological Engineers (1994 – 2007)
- Associate Editor for the Biological Engineering Division, American Society of Agricultural and Biological Engineers (2003 – 2010)
- Editorial Board for the International journal *Agricultural Systems* (2002-2010)

American Society of Agricultural & Biological Engineers Committees:

- IET-01 – Executive steering committee (1999-2005; Secretary 2001, Vice-chair 2002, Chair 2003, Past Chair 2004)
- IET-02 - Steering committee (1999-2005; Secretary 2001, Vice-chair 2002, Chair 2003, Past Chair 2004)
- IET-04 - Publications Review (1995-present, Chair 2004-2007)
- IET-06 - Programs (2000-present; Vice Chair 2001, Chair 2002)
- IET-07 – Forward Planning and Structure (2002-present, Chair 2004)
- IET-20 - Information Technologies Group (Group leader, 2000 – 2002)
- IET-210 - Operations Research and Knowledge Systems (1992-present; Chair, 1997-2000, Vice Chair, 1996, Secretary, 1995)
- IET-216 - Geographic Information Systems (1994-present; Chair, 1997, Vice Chair, 1996, Secretary, 1995)
- IET-217 – Finite Element & Numerical Analysis (2002-present)
- BI-30: Plant Biological Engineering (Secretary, 1996)
- BE-26: Modeling Biological Processes (2000 – present; Co-Chair, 2000-2002)
- Nominating Committee (2001-2003)
- E-10 – Meetings council (2002-2003)
- Meetings Council – 2003
- M-114 – Young Researcher Awards (2003-2006; Chair 2005)
- E-09 – Fellows committee (2009-2012)
- M-131 – Fellows selection committee (2010-2015)

Institute of Biological Engineering:

- Past President (2012)
- President (2011)
- President Elect (2010)
- Membership committee (1996-1998)
- Councilor (2006-2008)

Department, College, and University Committees

Auburn University

- Agricultural Board for the Department of Agriculture and Industries (2010-2015)
- State Soil and Water Conservation Committee (2010-2015)
- Co-Chair of College of Science and Math Dean Search Committee (2010-2011)
- Auburn University Efficiency committee (2011)
- Dean's review committee (2011)
- Budget Steering Committee (2013-2014)
- Energy and Environmental task force (2011-2012)
- Mosley Environmental Awards Steering Committee (2010-2015)

Mississippi State University

- International Planning Committee (2009-2010)
- Mississippi Agricultural and Forestry Experiment Station & MSU Extension Annual Conference Committee (2008)
- Chair of Computer Science and Engineering Department Head search committee (2008-2009)
- Graduate Council (2007-2010)
- MSU Sun Grant representative (2006-2010)
- MSU 25x25 representative (2007-2010)
- Chair of Forest Products Department Head search committee (2007-2008)
- Chair of Electrical and Computer Engineering Department Head search committee (2005-2006)
- Member, Search Advisory Committee for the Executive Director of Extension and Outreach (2006)
- Technical representative for research programs coordinated through the Mississippi Research Council (2005)
- Committee to study formation of an Energy Institute at MSU (2005-2006; Co-Chair)

Iowa State University

- Department honors program advisor (1995 – 2004)
- Department curriculum committee (1994-2004)
- Department scholarship committee (1995-2004; Chair, 1997-2003)
- Department promotion and tenure committee (1996, 1997)
- Department advising committee (1995 – 2004)
- Department biological systems engineering committee (2002-2004; Chair 2002-2003)
- College of Engineering honors program committee (1996-1999)
- College of Engineering Scholarship and Awards committee (1997-2003)
- University planning committee (1996-1999)
- Faculty Senate committee on university planning and budget (1999-2002)
- College of agriculture precision farming issue team (1996-1999)
- University Graduate Council (2001-2004)

Industry and External Committees

- Advisory Board, EnerSysNet (11/09 – 2015).
- Southeastern Sun Grant Advisory Board (2009-2010).
- Appointed to Governor Barbour's Mississippi Energy Policy Institute (8/09 – 2010) and represent Mississippi State University on several committees.
- Represent Dr. Mark Keenum, President of Mississippi State University, on the Mississippi Energy Policy Institute Board of Directors (8/09 – 2010).
- Industrial and Professional Advisory Committee (IPAC), Department of Agricultural and Biological Engineering, Penn State University (2008-2010).
- Appointed as the Mississippi representative to the University Advisory Board which provides guidance to the Energy Council, a group comprised of State Senators and House of Representative members from ten oil producing states in the US, five provinces in Canada, and Venezuela (10/08 – 7/11).
- Advisory committee to the Farm Optimization Project, Monsanto Co. (Jan. 1997 – March 2000).

Technical Reviewer

- Transactions of the American Society of Agricultural Engineers
- Applied Engineering in Agriculture
- Agricultural Systems
- Agronomy Journal
- Crop Science Journal
- Soil Science Journal

- USDA Small Business Grants Program
- USDA-NRI Program
- BARD Program
- Proceedings of the 4th European Conference on Precision Agriculture

RESEARCH ACTIVITIES

Principal Investigator of grants and contracts totaling over \$44 million

1. 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.
2. 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.
3. 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.
4. Development of a user interface for the CEMSA database. **W.D. Batchelor**. Iowa Soybean Association. 3/1/04-6/1/04. \$15,000.
5. 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.
6. 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.
7. Transferring CIFA from Cargill to Iowa State University. **W.D. Batchelor**. Iowa State University. 2002-2004. \$100,000.
8. DSS Integration Plan. **W.D. Batchelor**. Iowa Soybean Association. 10/1/02 - 3/31/03. \$5,000.
9. 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.
10. Evaluating genetic by environment interactions on physiological traits for three corn hybrids. **W.D. Batchelor**. Monsanto. 5/1/99 – 4/30/00. \$98,696.
11. 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.
12. 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.
13. 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.
14. 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.

15. Validation of CERES-Maize for inbred corn lines. **W.D. Batchelor**. Asgrow Seed Co. 6/1/96 - 4/1/97. \$10,600.
16. Validation of corn and soybean models in eastern Iowa. **W.D. Batchelor**. Amana Farms, Inc. 5/1/95 - 12/1/95. \$750.
17. 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. 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.
2. 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.
3. 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.
4. Test and evaluation of coupled climate-ecosystem models. Z. Pan, E. Takle, **W.D. Batchelor**. NIGEC. 7/01/02 - 6/30/05. \$173,702.
5. 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.
6. 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.
7. 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.
8. 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. Lafren, J. Opsomer, M. Tomer. Baker Endowment, Iowa State University. 7/1/01 - 6/30/03. \$292,292.
9. 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.
10. 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.
11. 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.

12. 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.
13. 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.
14. Defining environmental effects on soybean seed composition. M. Westgate and **W.D. Batchelor**. ISU Grain Quality Initiative. 10/98 - 9/99. \$25,000.
15. 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.
16. 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.
17. 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.
18. Modeling crop growth in a nursery. J. Thompson and **W.D. Batchelor**. Missouri Dept. of Conservation. 7/1/97 - 6/30/99. \$16,800.
19. 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.
20. Modeling a shelterbelt agroforestry ecosystem. C.W. Mize, **W.D. Batchelor**, J. Brandle, J. Collettii, R. Cruse et al. USDA-NRI. 10/1/96 - 9/30/00. \$330,000.
21. 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.
22. 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.
23. 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.
24. 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.
25. Integrated pest management for wireworms. L. Pedigo, M. Rice and **W.D. Batchelor**. Leopold Center for Sustainable Agriculture. 7/1/95 - 6/30/98. \$74,850.
26. 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.

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.

Education Grants

Principal or co-principal investigator of grants totaling over \$300K

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. Predicting biological processes using neural networks. **W.D. Batchelor**. Women in Science and Engineering Program, Iowa State University. 6/95-8/95. \$1,500.

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)*

(Note: the term “in press” reflects that the manuscript has been accepted by the editor for publication and is scheduled for publication)

1. 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
2. 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.

3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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
14. 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.
15. 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.
16. 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.

17. 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.
18. 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.
19. 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.
20. 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.
21. 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.
22. 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.
23. 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.
24. 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.
25. 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.
26. 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.
27. Paz*, J.O., **W.D. Batchelor**, P. Pedersen. 2004. WebGro: A web-based soybean management decision support system. *Agronomy Journal* 96:1771-1779.
28. 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.
29. **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.
30. 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.
31. 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.
32. 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

33. Jones, J.W., G. Hoogenboom, C. Porter, K.J. Boote, **W.D. Batchelor**, L.A. Hunt, P. Wilkens, U. Singh, A. Gijssman, and J. T. Ritchie. 2003. DSSAT Cropping System Model. Special Edition of European Journal of Agronomy 18(2003):235-265 (*invited paper*)
34. 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.
35. 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.
36. 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.
37. 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*).
38. 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.
39. 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.
40. 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.
41. 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.
42. **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*).
43. 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.
44. 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.
45. 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.
46. 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.
47. 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.

48. 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.
49. 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.
50. 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.
51. 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.
52. 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.
53. 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.
54. 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.
55. 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.
56. 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.
57. 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.
58. 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.
59. 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.
60. 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.
61. 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.
62. **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.
63. **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.
64. Yang, X.B., and **W.D. Batchelor**. 1997. Modeling plant disease dynamics with neural networks. *AI Applications* 11(3):47-55.

65. 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.
66. **Batchelor, W.D.**, K.J. Boote, and J.W. Jones. 1996. Quantifying pod detachment rate of Florunner peanut. *Peanut Science* 23(1996):23-30.
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60. Paz*, J.O., **W.D. Batchelor**, T.S. Colvin, B.A. Babcock, S.D. Logsdon, and T.C. Kaspar. 1997. Economic evaluation of crop management systems for sustainable agriculture. Poster presented at

the Sustainable Agriculture: Taking Stock, Moving Forward” Conference, Iowa State University, Ames, IA.

61. Edwards, G., **W.D. Batchelor**, J. Fawcett, V. Schmit, J. Yedlik. 1997. Economic and environmental evaluation of crop management systems for sustainable agriculture (conduct on-farm evaluations of the different crop management systems and conduct workshops with farmers to disseminate the results). Poster presented at the Sustainable Agriculture: Taking Stock, Moving Forward” Conference, Iowa State University, Ames, IA.
62. **Batchelor, W.D.**, and J.O. Paz. 1997. The role of water stress in creating spatial yield variability in soybeans. Proceedings of the Integrated Crop Management Conference, Nov. 17-18, 1997. Iowa State University. Pp 157-168.
63. **Batchelor, W.D.**, and E.M. Allen. 1996. Baseline validation of CROPGRO-Soybean and CERES-Maize in Iowa. 26th Crop Simulation Workshop. Fort Collins, CO.
64. Keppler, K.M.*, **W.D. Batchelor**, and X.B. Yang. 1996. Program Abstracts of the 108th Session of the Iowa Academy of Science, Abstract no. 74.
65. **Batchelor, W.D.** 1996. Use of crop models to evaluate crop management. Proceedings of the 8th Annual Integrated Crop Management Conference, Iowa State University Extension, Ames, IA.
66. Sexton*, P.J., R.M. Shibles, and **W.D. Batchelor**. Sulfur Availability and Photosynthesis in Soybean. American Society of Agronomy. Agronomy Society of America Abstracts.
67. Wolfe, M.L., **W.D. Batchelor**, T.A. Dillaha, S. Mostaghimi, and C.D. Heatwole. Modeling the effects of farm management practices on off-site water quality. Paper presented at the International Symposium on Water Quality Modeling, Kissimmee, Florida, April 2-5, 1995.
68. Qi, X., C.W. Mize, **W.D. Batchelor**, R.M. Cruse, and E.S. Takle. 1995. The structure and results of ISTART’s shelterbelt - soybean production model (SBELTS). Fourth North American Agroforestry Conference, “Growing a sustainable future”, July 23-28, 1995. Boise, Idaho.
69. **Batchelor, W.D.** 1994. Using crop growth models for soybean and corn management. Proceedings of the 1994 Integrated Crop Management Conference, Iowa State Extension, Ames, IA 50011.
70. **Batchelor, W.D.**, T.A. Dillaha, S. Mostaghimi, C.D. Heatwole, and M.L. Wolfe. 1994. Evaluating best management practices to improve water quality on farms. Virginia Water Resources Conference Abstracts.
71. Hoogenboom, G., J.W. Jones, K.J. Boote, N.B. Pickering, W.T. Bowen, and **W.D. Batchelor**. 1994. A new and improved soybean simulation model: CROPGRO-SOYBEAN. Proceedings of the World Soybean Research Conference V, Chiang Mai, Thailand, Feb. 20-27.
72. **Batchelor, W.D.**, J.W. Jones, K.J. Boote, and C.S. Barfield. 1992. Incorporating pest effects into crop growth models to predict dynamic IPM thresholds. Poster presented at the National IPM Forum, Arlington, Va. June 17-19, 1992.
73. **Batchelor, W.D.**, J.W. Jones, and K.J. Boote. 1992. Incorporating pest effects in the CROPGRO model. Agronomy Abstracts, CS-14, pp 42. **Invited presentation.**
74. **Batchelor, W.D.**, J.W. Jones, and K.J. Boote. 1992. Incorporating pest effects in the CROPGRO model. Poster presented at the ASA-CSSA-SSSA annual meetings, Minneapolis, MN. Nov 1-6. **Invited presentation.**

75. Hoogenboom, G., J.W. Jones, K.J. Boote, N.B. Pickering, W.T. Bowen, and **W.D. Batchelor**. 1992. Improved IBSNAT grain legume model for dry bean, peanut, and soybean. *Agronomy Society of America Abstracts CS-037*, p 80-81. ***Invited presentation.***
76. Hoogenboom, G., J.W. Jones, K.J. Boote, N.B. Pickering, W.T. Bowen, and **W.D. Batchelor**. 1992. Improved IBSNAT grain legume model for dry bean, peanut, and soybean. Poster presented at the ASA-CSSA-SSSA annual meetings, Minneapolis, MN. Nov 1-6. ***Invited presentation.***
77. **Batchelor, W.D.**, J.W. Jones, K.J. Boote, and H.O. Pinnschmidt. 1992. Assessing pest and disease damage with DSSAT. *Agrotechnology Transfer*, 16:1-8.
78. Boote, K.J., **W.D. Batchelor**, J.W. Jones, H.O. Pinnschmidt, and G. Bourgeois. 1991. Pest damage relations at the field level. *International Symposium on Systems Approaches for Agricultural Development (SAAD)*, AIT, Bangkok, Thailand, December 2-6, 1991.
79. Pinnschmidt, H.O., P.S. Teng, and **W.D. Batchelor**. 1991. Simulation of damage effects of multiple pests and diseases in rice. Poster presented at the *International Symposium on Systems Approaches for Agricultural Development (SAAD)*, AIT, Bangkok, Thailand, December 2-6, 1991.
80. McClendon, R.W., **W.D. Batchelor**, D.B. Adams, J.W. Jones, and J.E. Hook. 1989. Incorporating a crop growth simulation model in an expert system. *Proceedings of the Society for Computer Simulation International*. 20(4):176-179.
81. **Batchelor, W.D.**, R.W. McClendon, J.W. Jones, and D.B. Adams. 1988. An expert system for soybean insect pest management. *Workshop on Crop Simulation. Biological Systems Simulation Group*, Gainesville, Florida. March 1-3. Abstract, p. 38.

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 software. 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.

INVITED PRESENTATIONS

1. 9/26/09 – Invited presentation entitled "Energy Innovation from a Research and Development Perspective", Energy Council, Wichita, KS.
2. 11/12/08 – Invited presentation entitled "Sustainable Energy Research", Mississippi House Agriculture Committee, Jackson, MS.
3. 2/26/08 – Invited presentation entitled "Technology for Producing Energy from Biomass", AgVision Conference, Ag Center, Louisiana State University.

4. 8/1/07 – Invited presentation entitled “Sustainable Energy Research at MSU”, Southeast Bioenergy Conference, Tifton, Ga.
5. 5/18/07 – Invited presentation entitled “Renewable Energy Overview” to the Rotary Club, Winona, MS.
6. 1/23/07 – Invited presentation entitled “Overview of the Sustainable Energy Research Center”, AgVision Conference, Ag Center, Louisiana State University.
7. 9/21/06 – Invited presentation entitled “Renewable Energy”, Delta Conservation Demonstration Center, MS.
8. 6/23/06 – Invited presentation entitled “Crop models for precision farming”, Dipartimento di Agronomia Ambientale e Produzioni Vegetali Università degli Studi di Padova, Padova, Italy.
9. 6/5/06 – Invited to give testimony on renewable energy issues to the Mississippi Senate Committee on Agriculture.
10. 8/16/05 – Invited presentation entitled “Crop models for analyzing precision agricultural systems”, 3rd International Symposium of precision agriculture, Sete Lagoas, Brazil.
11. 5/10/05 – Invited presentation entitled “The role of crop growth models in Precision Farming”, Precision Farming Workshop, Universität Hohenheim, Tagungsband, S. 11-16, Stuttgart, Germany.
12. 11/1/04 – Invited presentation entitled “Soil Parameter Estimation and Uncertainty Analysis for Precision Farming Applications”, Agronomy Society of America annual meeting, Seattle, WA.
13. 5/13/04 - Invited presentation entitled “The role of crop growth models in precision farming” at the Conference on Precision Farming, GIS and Crop Modeling, University of Hohenheim, Stuttgart, Germany.
14. 4/21/04 – Invited presentation entitled “Human dimension of plants in biogeochemical processes”, presented as part of panel to the University Relations committee of the University Corporation of Atmospheric Research (UCAR), Dept. of Atmospheric and Geological Sciences, Iowa State University, Ames, IA.
15. 2/12/04 – Invited to present seminar entitled “Environmental and Natural Resource Engineering in a Biologically-Driven World”, Visions for the 21st Century Lecture Series, Agricultural and Biological Engineering Department, Purdue University.
16. 2/12/04 – Invited to present seminar entitled “Biological Systems Engineering at Iowa State University”, Visions for the 21st Century Lecture Series, Agricultural and Biological Engineering Department, Purdue University.
17. 1/13/04. Invited presentation entitled “The role of crop growth models in precision farming” at the Conference on Precision Farming, GIS and Crop Modeling, University of Hohenheim, Stuttgart, Germany.
18. 6/25/03. Invited presentation entitled “Crop Model Applications in Precision Agriculture”, University of Hohenheim, Stuttgart, Germany.
19. 6/23/03. Invited presentation entitled “Introduction to DSSAT Crop Models”, University of Hohenheim, Stuttgart, Germany.
20. 6/14/03-6/15/03. Invited to present a 1-day workshop entitled “Simulation models in precision agriculture research” at the European Conference on Precision Agriculture, Berlin Germany

21. 6/6/03. Invited presentation entitled "Performance-based systems and implications for water quality." Iowa AgSTATE Meeting With Iowa Environmental Council Board
22. 4/11/03. Invited presentation entitled "What is a performance-based approach, how would it work, and what is needed?" AgState meeting, Iowa Institute of Cooperatives, Ames, IA.
23. 12/9/02. Invited to give several lectures at the DSSAT 4.0 Crop modeling Workshop, Griffin, GA.
24. 5/28/02. Invited to give 4 hour short course entitled "Role of Crop Models in Precision Farming", Beijing Normal University, Beijing, China
25. 3/1/02. Invited presentation entitled "Introduction to Crop Models" to the Iowa Independent Crop Consultants Association, Ames, IA.
26. 10/27/01. Invited presentation entitled "Using crop models to improve our understanding of yield variability", Annual Meeting of the Agronomy Society of America
27. 11/7/00. Invited presentation entitled "Extending point based models for use in precision agriculture", American Society of Agronomy meeting, Minneapolis, MN.
28. 7/28/00. Invited presentation entitled "How to evaluate research projects", Regional Leadership Training Program, Indianapolis, IN.
29. 7/28/00. Invited presentation entitled "The Yields Project: Providing Information to Soybean Producers", Midwest Soybean Conference, Indianapolis, IN.
30. 2/16/00. Invited presentation entitled "Using crop growth models to analyze causes of spatial yield variability", Soil Science Seminar. Agronomy Department, Iowa State University.
31. 8/10/99. Invited presentation entitled "Application of crop growth models and decision support systems to precision agriculture", InfoAg99 Conference, Purdue University.
32. 8/7/99. Invited presentation entitled "Production Research to Increase Soybean Yields". Global Soy Forum, Chicago, IL.
33. 7/13/99. Invited presentation entitled "Production Research to Increase Soybean Yields", Illinois Soybean Checkoff Board Research Tour, Urbana, IL.
34. 2/23/99. Invited presentation entitled "How interactive stresses affect soybean yields". Breeders Workshop, St. Louis, MO. Invited talk.
35. 2/3/99. Invited presentation entitled "Using crop growth models to analyze yield variability". Agronomy Department Seminar Series, Kansas State University, Manhattan, KS.
36. 1/12/99. Invited presentation entitled "How interactive stresses affect soybean yields". 1999 Crop Management Fair sponsored by the Iowa Soybean Association.
37. 8/31/98. Invited presentation entitled "How to manage data for precision farming", Iowa Soybean Promotion Board, Boone, IA.
38. 8/8/98. Invited presentation entitled "How Interactive Stresses Affect Yields", Midwest Soybean Conference, Davenport, IA. August 7-9, 1998.
39. 8/7/98. Invited poster entitled "The Yields Project", presented at the Midwest Soybean Conference, Davenport, IA. Aug. 7-9, 1998.

40. 5/30/98. Invited presentation entitled "Process oriented crop growth models as a tool to evaluation spatial yield variability" given at the 1st International Conference on Geospatial Information in Agriculture and Forestry, Orlando, FL.
41. 4/98. Invited presentation entitled "Using Crop Models to Analyze Spatial Yield Variability", Meteorology Department, ISU.
42. 12/12/97. Invited presentation to demonstrate crop growth models as advanced technology in agriculture at the AG Computer/Technology Fair, Johnson County Extension, Cedar Rapids, IA. 75 people attended.
43. 12/10/97. Invited presentation entitled "Using computer modeling to predict growth and yield", 1997 Iowa Soybean Association Agricultural Technology Trade Show and Conference, Sioux City, IA. 22 people attending.
44. 12/8/97. Invited presentation entitled "Modeling stress physiology in corn", Koch Industries, Inc., Wichita, KS.
45. 11/19/97. Invited presentation entitled "Interpreting Yield Maps using Computer Modeling Approaches", Iowa Seed Association.. 120 people. Ames, IA.
46. 5/8/97. Invited presentation entitled "Using Crop Growth Models for Precision Farming", University of Florida Crop Modeling Seminar Series. Gainesville, FL.
47. 8/20/96. Invited presentation entitled "Role of crop models for predicting crop yields in the corn belt", to thirteen representatives from McVean Trading and Marketing.
48. 7/8/96. Invited presentation entitled "Baseline validation of CROPGRO-Soybean and CERES-Maize in Iowa", Iowa Soybean Promotion Board concerning current and future soybean production research in Iowa. Ames, IA.
49. 5/30/96. Invited presentation entitled "Role of crop models for predicting optimum variable management practices", Rockwell Inc., Cedar Rapids, IA.
50. 5/23/96. Invited presentation entitled "Integrating corn and soybean models into precision farming packages", to Case Corporation.
51. 5/21/96. Invited presentation entitled "Predicting inbred corn growth using crop growth models", Pioneer HI-Bred, Inc. Johnson, IA.
52. 5/7/96. Invited presentation entitled "Development of genetic coefficients for a corn growth model", Land O'Lakes, Eagle Grove, IA.
53. 1/17/96. Invited presentation entitled "Optimum planting location for seed corn - A modeling approach", Asgrow Seed Company, Chicago, IL.
54. 4/26/95. Invited presentation entitled "Applications of crop models in the agribusiness community", Hertz Land Management, Ames, IA.
55. 3/17/95. Invited presentation entitled "Using crop growth models for corn and soybean management", Iowa Independent Crop Consultants Conference, Ames, IA.

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. Hiatt, 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.

Short Courses

1. Use of crop growth models in precision farming. Presented short course entitled "Precision Farming". 3/17/97. Sixty people attending. Iowa State University, Ames, IA.
2. Developed and conducted workshop entitled "Using Crop Models to Analyze Spatial Yield Variability", presented to 12 seed company members, Ames, IA. 6/7/99 – 6/8/99
3. WebGro: Web-based soybean yield gap analysis software. Presented this 2-hour short course to farmers at 6 locations around Iowa (12/03-1/04).

Extension Presentations

1. 7/27/00. Gave several radio and magazine interviews for the Media Fly-by tour of Iowa and Illinois, sponsored by the Soybean Research and Development Council.
2. 8/27/99. Effect of SCN on soybean growth and development. Presentation at the ISU Soybean Cyst Nematode (SCN) Field Day, Bruner Farm, Ames, IA. 30 attendees.
3. 8/26/99. Presentation entitled "Effect of SCN on soybean growth and development", ISU Soybean Cyst Nematode (SCN) Field Day, Bruner Farm, Ames, IA. 30 attendees.
4. 3/26/99. 2-minute radio interview discussing the Yields Project. Iowa Soybean Network.

5. 6/7/99-6/8/99. Developed and presented workshop entitled "Using Crop Models to Analyze Spatial Yield Variability", to 12 seed company employees, Ames, IA.
6. 9/10/98. Presented poster at Agronomy Days '98 entitled "Crop Model Approach to Analyze Spatial Yield Variability".
7. 9/3/98. Field Day presentation entitled "Crop Modeling", Armstrong Research Farm, Lewis, IA.
8. 8/27/98. Field Day presentation entitled "Important data to collect for precision farming", Keiper Farm, Cedar Rapids, IA.
9. 8/26/98. Field Day presentation entitled "Important data to collect for precision farming", Heck Farm, Ogden, IA.
10. 8/24/98. Field Day presentation entitled "Important data to collect for precision farming", Kusel Farm, Manning, IA.
11. 8/7/98. Three radio interviews at the Midwest Soybean Conference.
12. 6/22/98. Field day presentation, Urbana, Ill. 3 Radio interviews.
13. 3/27/98. Conducted extension training for 10 people, to teach them how to use the PCYield soybean and corn yield forecasting program. Ely, IA.
14. 1/7/98. Radio Interview on the Iowa Soybean Network. 4 minute interview.
15. 12/12/97-12/13/97. Poster entitled "Soybean Decision Support System Demonstration", Agriculture Computer and Technology Fair. Kirkwood Community College, Cedar Rapids, IA.
16. 11/17/97. Presentation entitled "The role of water stress in creating spatial yield variability in soybeans", Integrated Crop Management Conference. Ames, IA. 150 people in attendance.
17. 6/18/97. Presentation entitled "Crop Modeling Field Research", Spring Field Day, Northern Research and Demonstration Farm, Kanawha, IA. 150 people attending.
18. 3/17/97. Presentation entitled "Use of crop growth models in precision farming", ISU Short Course entitled Precision Farming. 60 people attending. Ames, IA.
19. 8/20/96. Presentation entitled "Role of weather data in precision farming" at the Heck Farm field day, Perry, IA.
20. 3/25/96. Presentation entitled "Crop Growth Models", to Field Crop Specialists, Agronomy Dept., Iowa State University.
21. 2/21/96. Presentation entitled "Estimating crop yield using crop growth models", Agronomy Day 96, North Iowa Area Community College, Mason City, IA.
22. 2/20/96. Presentation entitled "Role of crop models in precision agriculture", Agriculture Global Positioning Systems Meeting, Griswold, IA. 100 people attended.
23. 11/30/95. Presentation entitled "Role of crop models In site-specific agriculture", Integrated Crop Management Conference, Ames, IA. 125 people attended.
24. 9/14/95. Presentation entitled "Estimating yields from crop growth models", Agronomy Day '95, Ames, IA.

TEACHING ACTIVITIES

Courses Taught at the University of Georgia (1987-1990)

Position: Temporary Instructor

Courses Taught

Course Number/Credits	Course Title	Quarters Taught
AGE 109 - 5 credits	Engineering Graphics	F 1987; F,W 1988; F,W 1989; W 1990
AGE 121 - 3 credits	Engineering Measurements	S,SU,F 1988; SU,F 1989; S 1990
AMT 331 - 3 credits	Structures and Environments	W 1988; W 1989
AMT 341 - 3 credits	Processing	S 1988; S 1989
ET 210 – 5 credits	Surveying	S,SU,F 1989; S,SU 1990

Curriculum Development

- Developed and presented a 10-hour short course entitled "AutoCAD". Students consisted of faculty and staff in the Agricultural Engineering Dept. University of Ga., Athens, Ga. 4/1/88 - 5/30/88.
- Developed and presented a 10-hour short course entitled "AutoCAD". Students consisted of faculty and staff in the Agricultural Engineering Dept., Coastal Plain Experiment Station, Tifton, Ga. 8/15/88 - 9/15/88.

Courses Taught at the University of Florida (1990-1993)

Position: USDA Fellow, Ph.D. Student

Short Course Presentations

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

Curriculum Development

Developed and presented a four hour short course for the Agricultural Decision Systems class (AGE 6644) entitled "Introduction to Neural Networks", Agricultural Engineering Dept. University of Florida, Gainesville, Fl. Students consisted of agricultural engineering and agricultural operations management graduate students. 4/16/91 - 4/18/91 and 3/24/92-3/26/92.

Courses Taught at Iowa State University (1994-2004)

Position: Assistant, Associate and Professor (25% teaching appointment)

Courses Taught

Course Number	Course Title	Semester	Number of Students	Instructor's Rating (out of 5)
AE 203	Computer Applications and Systems Modeling	SS04	16	SA***
AE 214	Environmental Engineering for Grain and Animal Systems (3 credits, 50% responsibility)	S 95	28	4.10
		S 96	30	4.41
		S 97	30	4.36
		S 98	23	3.71
		S 99	26	4.33
AE 216	Fundamentals of Agricultural and Biosystems Engineering II (3 credits, responsible for 0.4 credits of material)	S 00	35	NES
		S 01	43	NES
		S 02	38	4.78
		S 03	42	4.56
AE 409	Engineering Quantification of Biological Processes (3 credits)	S 98	5	NE*
		S 02	9	4.25
		S 03	5	5.00
AE 421/521	Natural Resource Conservation Engineering (3 credits)	F 04	22	
AE 303	Computer Applications and Systems Modeling	F 99	12	4.40
		F 00	19	4.35
		F 01	23	4.17
		SS 02	22	SA****
		F 02	9	3.78
		SS 04	16	SA****
Ust 322R	Honors Seminar: Introduction to Neural Networks (1 credit)	S 96	13	4.8
AE 510	Applied Crop Growth Modeling (3 credits)	F 95	8	NE*
		F 96	3	4.67
		F 98	9	4.13
AE 590B	Independent Study	S 99	2	NA**
AE 490B	Independent Study (variable credits)	S 96	1	NA**
		S 97	1	NA**
AE 699B	Research (variable credit)	S95-pres.	Variable	NA**

* NE – not evaluated ** NA – not applicable or available ***NES – not evaluated separately from primary instructor ****SA – Study Abroad course taught at the University of Hohenheim, Stuttgart, Germany (not evaluated with numeric scale).

Curriculum Development

- Developed and taught a 1 credit honors seminar entitled "Introduction to Neural Networks" (UST 322R).
- Developed and taught 3 credit graduate course entitled "Applied Crop Growth Modeling" (AE 510).
- Developed 3 credit undergraduate course entitled "Engineering Quantification of Biological Processes" (AE 409).
- Developed and presented guest lectures given in AE 101, AE 110, AE 422
- Chair of committee to develop a Biological Systems Engineering degree.

- Developed a modified version of AE303 and taught it as a study abroad course to 22 Iowa State University Agricultural Engineering Students in Stuttgart, Germany 8/4/02-8/22/04.
- Developed a modified version of AE203 (same as AE303) and taught it as a study abroad course to 16 Iowa State University Agricultural Engineering Students in Stuttgart, Germany. 8/1/04-8/19/04.
- Developed a curriculum and proposal for a degree in Biological Systems Engineering

ACADEMIC ADVISING

Iowa State University (1994-2004)

Undergraduate Advising

Academic Year	Number of Advisees (approximate)
1994-1995	3
1995-1996	10
1996-1997	20
1997-1998	20
1998-1999	20
1999-2000	20
2000-2001	20
2001-2002	20
2002-2003	20
2003-2004	0 (Faculty Improvement Leave)
2004-2005	25

Honors Student Advising

- Served as departmental undergraduate Honors advisor. This involved assisting academic advisors and students in establishing an appropriate curriculum that demonstrates honors character, more challenging than the standard curriculum, and acceptable to the College of Engineering Honors committee and supervising honors independent study projects.

Graduate Student Advising

Served as major professor for the following students:

Name	Degree/Award	Major	Current Employment
Edwards M. Allen	M.S. awarded 8/96	Agricultural Engineering	Researcher, Dept. of Biotechnology, Monsanto Company
Mark V. Garrison	M.S. awarded 5/98	Agricultural Engineering	Iowa Department of Natural Resources
Allan Andalles	Ph.D awarded 12/98	Double Major in Agricultural Engineering and Water Resources	Associate Professor, Colorado State University
Jay Fallick	M.S. awarded 12/99	Agricultural Engineering	Project Engineer, JEO

			Consulting Group, Lincoln, NE
Joel O. Paz	Ph.D awarded 5/00	Double Major in Agricultural Engineering and Water Resources	Associate professor, Mississippi State University
Matt Seidl	M.S. awarded 5/00	Agricultural Engineering	Manager, GIS Support, Black Hills Corporation, Rapid City, SD
Mohammud Egeh	Ph.D awarded 5/04	Water Resources	Faculty of Agriculture, Amoud University, Somalia
Kelly Thorpe	Ph.D awarded 5/2004	Agricultural Engineering	Agricultural Engineer, USDA-ARS, Maricopa, AZ
Brian Gelder	Ph.D awarded 2007	Double major in Agricultural Engineering and Agronomy	Associate Scientist, Iowa State University
Brian Copeland	MS began 8/05	Biological Engineering	Entergy Mississippi
Wei Lin	MS awarded 2005	Biological Engineering	
Wei Lin	Ph.D awarded 12/09	Biological Engineering	Assistant Professor South Dakota State University
James Wooten	Ph.D	Biological Engineering	Extension Associate II, Mississippi State University

Served on graduate program of study committee for the following students:

No.	Name	Degree	Major
1	Ndeye Marie Njie	MS awarded (1996)	Water Resources
2	Steve Lefko	MS awarded (1996)	Entomology
3	Kelley Christensen	MS awarded (1996)	Agronomy
4	Chuck Nicholson	Ph.D. awarded (1997)	Agricultural Economics
5	Samiha Ouda	Ph.D. awarded (1997)	Agronomy
6	Ruta Waghmare	Ph.D. awarded (1999)	Chemical Engineering
7	Nanchang Yang	Ph.D. awarded (1999)	Agronomy
8	Pipat Reungsang	MS awarded (1998)	Agricultural Engineering
9	Xiaoming Qi	Ph.D. awarded (1998)	Forestry
10	Tamisa Rigby-Williams	MS (withdrew)	Water Resources
11	Alka Bhatai	MS awarded 2000	Plant Pathology
12	Loren Steenhoek	Ph.D awarded (1998)	Agricultural Engineering
13	Ramsel, Phil	MS awarded (2001)	Agronomy
14	Ayse Irmak	Ph.D awarded (2002)	Agric. Eng., Univ. of Florida
15	Eric Argotsinger	MS awarded (2003)	Agronomy
16	Paul Pierce	Ph.D awarded (2003)	Plant Pathology
17	Kwang-Soo Kim	Ph.D awarded (2003)	Agronomy/Meteorology
18	Johanna Link	Ph.D awarded (2005)	Agronomy, Univ. of Hohenheim, Stuttgart, Germany
19	Brian Copeland	MS (degree not completed)	Biological Engineering, MSU
20	Amy Schmidt	Ph.D awarded 2010	Extension specialist, Biological Engineering, MSU

CONSULTING ACTIVITIES

Monsanto Company, St. Louis, MO (1997-2000)

- Provide advice on experimental design and physiological response of corn to environmental and management conditions
- Develop computer based methods to analyze corn production systems
- Provide advice to the precision farming project, resulting methods to interpret yield maps.

Cargill, Inc., Minneapolis, MN (1998- 1999)

- Provide advice on using crop models to forecast yields

Ag Risk Management of North America, Overland Park, KS (1997)

- Develop methods to assess risk associated with achieving target yield levels as a function of weather and management
- Instruction and training individuals how to use and interpret results from crop growth models

McVean Trading and Investing, Memphis, TN (1996-1997)

- Development of methods to predict soybean yields
- Interpretation of weekly crop reports in Iowa
- Interpret weather related stresses on crop yields around the world

Southern Company Services, Inc., Atlanta, GA (1990-1991)

Curriculum Development

- **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.
- **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.

Short Course Presentations

- Developed and presented a 40 hour short course entitled "Expert system development using intelligence Compiler" at the Southern Company Services, Atlanta, Ga. Students consisted of electrical, industrial, and mechanical engineers, accountants, and managers from five power companies in the southeast. Supported by a contract from the Southern Company Services. Dates of the course were: 7/23/90-7/26/90; 10/16/90-10/20/90; 1/14/91-1/18/91
- Developed and presented a four our tutorial entitled "Expert systems in the power industry" at the IEEE Southeastern Conference, Birmingham, AL. Students consisted of electrical engineers, middle level managers and co-op students from power companies in the southeast. 4/12/92