

# CURRICULUM VITAE

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## Academic Degrees

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Ph.D. 1998: University of Illinois at Urbana-Champaign - Agricultural Engineering  
M.S. 1991: The Pennsylvania State University - Agricultural and Biological Engineering  
B.S. 1989: The Pennsylvania State University - Agricultural Engineering

## Licensure

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Professional Engineer - #23424 (Kentucky)

## Professional Positions

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2006 - Present	Associate Extension Professor, Biosystems and Agricultural Engineering, University of Kentucky, Lexington, KY <i>50% Extension, 35% Research, 15% Teaching</i>
2000 - 2006	Assistant Extension Professor, Biosystems and Agricultural Engineering, University of Kentucky, Lexington, KY <i>50% Extension, 35% Research, 15% Teaching</i>
1998 - 2000	Assistant Professor, Food, Agricultural and Biological Engineering, The Ohio State University, Columbus, OH
1991 - 1998	Visiting Instructor, Agricultural Engineering, University of Illinois at Urbana-Champaign, Urbana, IL
1989 - 1991	Research Assistant, Agricultural and Biological Engineering, The Pennsylvania State University, University Park, PA

## Funding History

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### Pending

### Externally Competitive

#### *Current*

9. Food and Energy Production: Internationalized Agricultural and Engineering Programs.  
2009. **T.S. Stombaugh**, S.R. Workman, B. Steward, M. Darr, and D. Queiroz. USDE Fund  
for the Improvement of Post Secondary Education, \$239,967. 10/09 – 9/13.

8. International Education and Training for Food, Fiber, and Energy Production. 2006. S.R. Workman, R.S. Gates, **T.S. Stombaugh**, and J. Roccanova. USDA/CSREES International Science and Education Program, \$100,000. 9/08 – 8/11.

### ***Completed***

7. Low Cost Yield Monitor for Edible Bean Harvesters. 2006. Columbo Manufacturing, Brazil. \$11,243.75. (Gift)
6. A Wireless Electronic Monitoring System for Securing Milk from Farm to Processor. 2005. F.A. Payne, BAE, C.D. Thompson, UK Regulatory Services, **T.S. Stombaugh**, BAE, P.C. Womble, Applied Physics Institute, Western Kentucky University, S.M. Alexander, Dept. of Industrial Engineering, Univ. of Louisville, and W.L. Crist, Department of Animal and Food Sciences, UK. 2005. National Institute for Homeland Security, \$1,500,000 (\$800,000 to BAE). 10/05 – 9/08.
5. Precision Agriculture Decision Aids for Risk Reduction. 2005. C.R. Dillon, **T.S. Stombaugh**, S.G. Isaacs, and J. Salim. 2005. Southern Region Risk Management Center, \$29,976. 2005 – 2006.
4. Using GPS and Spatial Technologies in Agriculture. **T.S. Stombaugh**, B.K. Koostra, and S.A. Shearer. 2005. Office of Career and Technical Education, Training Workshop for Agriculture Teachers, \$4600. 6/05 – 7/05.
3. CAN-based Precision Seed Placement and Tracking of Genetically Modified Grain Crops. S.A. Shearer, M.D. Montross, and **T.S. Stombaugh**. 2004 KSEF R&D Excellence Award, \$14,986. 9/04 – 8/05.
2. Sensors for Delineation of Spatial Management Zones. **T.S. Stombaugh** and T.G. Mueller. 2001 USDA-NRICGP, \$129,632. 12/01 – 12/04.
1. Post-Harvest Physical Properties of Corn Stover. M. D. Montross, S. G. McNeill, S. A. Shearer, and **T.S. Stombaugh**. Oak Ridge National Laboratory, \$139,674. 10/01 – 10/03.

### **Internally Competitive**

5. Precision Agriculture: Precision Resources Management Phase VI. **T.S. Stombaugh**, T. Coolong, M. Sama, B. Lee, J. Shockley, S. Shearer, T. Mueller, R. Warner, J. Grove, J. Bewley, T. Dowdy, S. Pitla, S. Neelakantan, C. Barton, J. Luck, C. Agouridis, R. McCulley, J. Wilhoit, C. Dillon, M. Arthur, R. Zandonadi. USDA/CSREES Special Grant. Sept. 1, 2010 to Aug. 31, 2013. **\$593,505**.
4. Precision Agriculture: Precision Resources Management Phase V. **T.S. Stombaugh**, M. Arthur, C.T. Agouridis, C. Barton, S. Fei, J.H. Grove, B.D. Lee, B. Lee, T.G. Mueller, L. Murdock, G.J. Schwab, and S.A. Shearer. USDA/CSREES Special Grant. Sept. 1, 2009 to Aug. 31, 2012. **\$439,109**.
3. Precision Agriculture: Precision Resources Management Phase IV. S.A. Shearer, **T.S. Stombaugh**, C.R. Dillon, B.D. Lee, J.H. Grove, J.D. Green, J.J. Cox, M.R. Dzialak, and S. Fei. USDA/CSREES Special Grant. Sept. 1, 2009 to Aug. 31, 2012. **\$468,117**.
2. Precision Agriculture: Precision Resource Management – Phase II. 2005. **T.S. Stombaugh**, T.G. Mueller, and R.A. Fleming. USDA/CSREES Special Research Grants Program, **\$629,672**. 10/05 – 9/08.

1. 4-H GPS Youth Project. T. Rose, T. Gentry, and **T.S. Stombaugh**. 2003 Kentucky 4-H Venture Grant, **\$9465**. 10/03 – 9/05.

**USDA Special Grant Projects with Primary Responsibility (Internally Competitive)**  
**(\$609,744)**

***Current***

17. Scalable Control and Data Acquisition for Variable-Rate Application. *M.P. Sama*, **T.S. Stombaugh**, J.D. Luck. 2010 USDA-CSREES Special Grants Program, \$44,210. 09/10 – 08/13
16. Automated Guidance for Improved Plasticulture Production Systems. J.H. Wilhoit, T.W. Coolong, **T.S. Stombaugh**. 2010 USDA-CSREES Special Grants Program, \$45,501. 09/10 – 08/13
15. Impact of Animal Position within Dairy Compost Bedded Pack Barns on Barn Performance. J.M. Bewley, **T.S. Stombaugh**, R.S. Vanzant, J.L. Taraba. 2010 USDA-CSREES Special Grants Program, \$49,928. 09/10 – 08/13.
14. Reduced Equipment Set for Multiple Vehicle Guidance. *R.S. Zandonadi*, **T.S. Stombaugh**, and *M.P. Sama*. 2009 USDA-CSREES Special Grants Program, \$66,644. 10/09 – 10/12.
13. A System for Implementing Dynamic Accuracy Standards for Machine Guidance Technology in Agriculture. *M. Sama*, **T.S. Stombaugh**, and S.A. Shearer. 2008 USDA-CSREES Special Grants Program, \$69,007. 10/08 – 10/11.
12. Tools for Increasing Machine Efficiency in Irregular Fields. **T.S. Stombaugh**, *R.S. Zandonadi*, S.A. Shearer, and C.R. Dillon. 2008 USDA-CSREES Special Grants Program, \$73,627. 10/08 – 10/11.

***Completed***

11. Mechanical Harvesting of Edamame. **T.S. Stombaugh**, T. Pfeiffer, and T. Woods. 2007 USDA-CSREES Special Grants Program, \$69,175. 10/07 – 10/08.
10. High Precision Dynamic Evaluation of Machine Guidance Technology. **T.S. Stombaugh**, C.R. Dillon, and B.K. Koostra. 2006 USDA-CSREES Special Grants Program, \$73,322. 10/06 – 10/09.
9. Strip Till for Precision Agriculture: Implementation of a Strip Tillage System with Autosteer Technology. G.J. Schwab, **T.S. Stombaugh**, C.R. Dillon, and S.A. Shearer. 2004 USDA-CSREES Special Grants Program, \$78,525. 10/04 – 10/07.
8. GIS Outreach Training. **T.S. Stombaugh**, B.K. Koostra, G. Henson, and T.C. Dowdy. 2004 USDA-CSREES Special Grants Program, \$16,357. 10/04 – 10/07.
7. A Low-Cost Remote Sensing Platform for Agriculture. **T.S. Stombaugh** and T.G. Mueller. 2003 USDA-CSREES Special Grants Program, \$76,283. 9/03 – 9/06.
6. Standardized Accuracy Tests for GPS Receivers. **T.S. Stombaugh**, S.A. Shearer, and J.P. Fulton. 2002 USDA-CSREES Special Grants Program, \$73,762. 9/02 – 9/05.
5. Polarization Techniques to Enhance Remote Sensed Imagery. **T.S. Stombaugh**, M.P. Menguc, and S.A. Shearer. 2002 USDA-CSREES Special Grants Program, \$69,448. 9/02 – 9/05.

4. Real-Time Soil Sampler and Analyzer Using Mobile Near-Infrared Spectroscopy. M.D. Montross, **T.S. Stombaugh**, S.A. Shearer, T.G. Mueller, and S.G. McNeill. 2002 USDA-CSREES Special Grants Program, \$59,916. 9/02 – 9/05.
3. Outreach Education for Precision Agriculture. **T.S. Stombaugh**, S.A. Shearer, J.P. Fulton, T.G. Mueller, and C.R. Dillon. 2001 USDA-CSREES Special Grants Program, \$63,446. 9/01 – 9/04.
2. Sensors and Variable Rate Management. T.G. Mueller, **T.S. Stombaugh**, S.A. Shearer, R.I. Barnhisel, and C.R. Dillon. 2001 USDA-CSREES Special Grants Program, \$118,601. 9/01 – 9/04.
1. Low Cost GPS-Based Sensors for High Speed Agricultural Vehicle Guidance. **T.S. Stombaugh**, L.G. Wells, and S.A. Shearer. 2000 USDA-CSREES Special Grants Program, \$40,000. 3/00 – 3/03.

**USDA Special Grant Projects with Collaborative Responsibility (Internally Competitive)**  
**(\$727,266)**

12. Development of a GIS-Based Model for the Generation of Pesticide and Nutrient Distribution Maps. J.D. Luck, S.A. Shearer, **T.S. Stombaugh**, and C.R. Dillon. 2008 USDA-CSREES Special Grants Program, \$48,400. 10/08 – 10/11.
11. Measuring Soil Properties with Near-Infrared Spectral Sensors. T.G. Mueller, **T.S. Stombaugh**, L. Wells, T. Karathanasis, and C. Matocha. 2007 USDA-CSREES Special Grants Program, \$75,000. 10/07 – 10/08.
10. Optical Sensors for Variable Rate Nitrogen. L.W. Murdock, G.J. Schwab, and **T.S. Stombaugh**. 2003 USDA-CSREES Special Grants Program, \$76,973. 9/03 – 9/06.
9. Post-Processing of Yield Monitor Data to Improve Yield Map Quality. S.A. Shearer, T.G. Mueller, C.R. Dillon, **T.S. Stombaugh**, J.P. Fulton, D.W. Hancock, and S.F. Higgins. 2003 USDA-CSREES Special Grants Program, \$56,999. 9/03 – 9/06.
8. Evaluating Implement Draft as an Indicator Excessive Soil Compaction. L.G. Wells, S.A. Shearer, **T.S. Stombaugh**, and T.G. Mueller. 2003 USDA-CSREES Special Grants Program, \$58,790. 9/03 – 9/06.
7. Variable Rate Technology Risk Management. C.R. Dillon, R.A. Fleming, J.P. Fulton, T.G. Mueller, S.A. Shearer, and **T.S. Stombaugh**. 2003 USDA-CSREES Special Grants Program, \$79,499. 9/03 – 9/06.
6. Developing and Demonstrating Identity-Preserved Protocols for Grain Production. S.G. McNeill, M.D. Montross, **T.S. Stombaugh**, and S. Riggins. 2002 USDA-CSREES Special Grants Program, \$36,000. 7/03 – 6/05.
5. Spatial Applications for Agriculture: Educational Case Studies – Phase II. T.G. Mueller, **T.S. Stombaugh**, S.A. Shearer, and H. Cetin. 2002 USDA-CSREES Special Grants Program, \$40,435. 9/02 – 9/05.
4. Variable Rate Nitrogen Management. T.G. Mueller, R.I. Barnhisel, H. Cetin, C.R. Dillon, L.W. Murdock, S.A. Shearer, and **T.S. Stombaugh**. 2002 USDA-CSREES Special Grants Program, \$139,414. 9/02 – 9/05.

3. Tracking Field Operations for Economic Analysis and Identity-Preservation. C.R. Dillon, R. Morgan, J.P. Fulton, S.G. Isaacs, S.G. McNeill, M.D. Montross, S.A. Shearer, and **T.S. Stombaugh**. 2002 USDA-CSREES Special Grants Program, \$112,494. 9/02 – 9/05.
2. Assessment of Alternative Methods of Applying Precision Deep Tillage. L.G. Wells, **T.S. Stombaugh**, C.R. Dillon, and T.G. Mueller. 2001 USDA-CSREES Special Grants Program, \$63,000. 9/01 – 9/04.
1. Equipment Enhancement to Support Variable-Rate Response Surface Development. S.A. Shearer, S.F. Higgins, T.G. Mueller, **T.S. Stombaugh**, C.R. Dillon, and J.P. Fulton. 2001 USDA-CSREES Special Grants Program, \$63,662. 9/01 – 9/04.

## Major External Proposals Not Funded

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Automation of Dairy Cattle Body Condition Scoring through Image Processing. J.M. Bewley, I. Halachmi, D. Lau, and **T.S. Stombaugh**. Binational Agricultural Research and Development Fund. \$172,000.

A Systems Approach to Sustainable Weed Management in Vegetable Crops. F.J. Pierce, R. Boydston, S. Fennimore, R. McReynolds, E. Peachey, J. Schueller, C.F. Seavert, D. Slaughter, S. Shearer, **T. Stombaugh**, K. Sudduth, L. Tang, S. Upadhyaya, S.L. Young, and Qin Zhang. Weed SCRI, \$4,455,472.

## Peer-Reviewed Publications

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### Completed

35. Gomez-Gil, J., S. Alonso-Garcia, F.J. Gómez-Gil 2 and T.S. Stombaugh. 2011. A simple method to improve autonomous GPS positioning for tractors. *Sensors*, 11:5630-5644
34. Zandonadi, R.S., J.D. Luck, **T.S. Stombaugh**, M.P. Sama, S.A. Shearer. 2011. A computational tool for estimating off-target application areas in agricultural fields. *Trans. of ASABE*, 54(1): 41-49.
33. Shockley, J., C.R. Dillon, **T.S. Stombaugh**. 2011. A whole farm analysis of the influence of auto-steer navigation on net returns, risk, and production practices. *Journal of Agricultural & Applied Economics*, 43(1).
32. Zandonadi, R.S., **T.S. Stombaugh**, S.A. Shearer, D.M. Queiroz, and M.P. Sama. 2009. Laboratory performance of a mass flow sensor for dry edible bean harvesters. *Applied Engineering in Agriculture*, 26(1): 11-20.
31. Zandonadi, R.S., **T.S. Stombaugh**, D.M. Queiroz, and S.A. Shearer. 2009. Mass flow sensor for combines with bucket conveyors. In *Proc. of the Seventh European Conference on Precision Agriculture*, pp. 373-380. Wageningen, Netherlands. July 5-8.
30. **Stombaugh, T.S.**, R.S. Zandonadi, and C.R. Dillon. 2009. Assessing the Potential of Automatic Section Control. In *Proc. of the European Federation for Information Technology in Agriculture*, pp. 759-766. Wageningen, Netherlands. July 5-8.
29. Shockley, J.C. R. Dillon, and **T.S. Stombaugh**. 2009. Auto-steer navigation profitability and its influence on management practices: a whole farm analysis. In *Proc. of the Seventh*

- European Conference on Precision Agriculture*, pp. 751-7757. Wageningen, Netherlands. July 5-8.
28. **Stombaugh, T.S.**, B.K. Koostra, C.R. Dillon, T.G. Mueller, and A.C. Pike. 2007. Implications of topography on field coverage when using GPS-based guidance. In *Proc. of the Sixth European Conference on Precision Agriculture*, pp. 465-471. Skiathos, Greece. June 3-6.
  27. Dillon, C.R., **T.S. Stombaugh**, B. Kayrouz, J. Salim, and B.K. Koostra. 2007. An educational workshop on the use of precision agriculture as a risk management tool. In *Proc. of the Sixth European Conference on Precision Agriculture*, pp. 861-867. Skiathos, Greece. June 3-6.
  26. Fulton, J., S. Shearer, S. Higgins, T. McDonald, C.R. Dillon, and **T. Stombaugh**. 2007. Variable-Rate fertilizer application Assessment Using an As-Applied Methodology *Proceedings of the 6<sup>th</sup> European Conference on Precision Agriculture*. J. Stafford, ed. Skiathos, Greece. June 3-6, 2007. 681-687.
  25. *Darr, M.J., T.S. Stombaugh, S.A. Shearer, and R.S. Gates. 2007. A new course to teach microcontrollers and embedded networking to biosystems and agricultural engineers. International Journal of Engineering Education 23(4).*
  24. Prewitt, R.M., M.D. Montross, S.G. McNeill, **T.S. Stombaugh**, S.A. Shearer, S.F. Higgins, and S. Sokhansanj. 2007. Corn stover availability and collection efficiency using typical hay equipment. *Trans. ASAE. 50(3):705-711.*
  23. Gandonou, J.M., C.R. Dillon, S.A. Shearer, and **T.S. Stombaugh**. 2006. Precision agriculture equipment ownership versus custom hire: a break-even land area analysis. *Journal of the American Society of Farm Managers and Rural Appraisers, 69(1):106-116.*
  22. Wells, L.G., **T.S. Stombaugh**, and S.A. Shearer. 2005. Crop yield response to precision deep tillage. *Applied Engineering in Agriculture, 48(3):895-901.*
  21. Purswell, J.L., R.S. Gates, L.M. Lawrence, J.D. Jacob, **T.S. Stombaugh**, and R.J. Coleman. 2005. Air exchange rate in a horse trailer during road transport. *Trans. of the ASABE, 49(1):193-201.*
  20. Fulton, J.P., S.A. Shearer, S.F. Higgins, D.W. Hancock, and **T.S. Stombaugh**. 2005. Distribution pattern variability of granular VRT applicators. *Trans. ASAE, 48(6):2053-2064.*
  19. Fulton, J.P., S.A. Shearer, S.F. Higgins, M.J. Darr, and **T.S. Stombaugh**. 2005. Rate response assessment from various granular VRT applicators. *Trans. ASAE, 48(6):2095-2013.*
  18. **Stombaugh, T.S.**, J. Cole, S.A. Shearer, and B.K. Koostra. 2005. A test facility for evaluating GPS dynamic accuracy. In *Proc. of the Fifth European Conference on Precision Agriculture*, pp. 605-612. Uppsala, Sweden, 8-10 June.
  17. Schwab, G.J., E.M. Pena-Yewtukhiw, O. Wendroth, L.W. Murdock, and **T.S. Stombaugh**. 2005. Wheat yield population response to variable rate N fertilization strategies using active NDVI sensors. In *Proc. of the Fifth European Conference on Precision Agriculture*, pp. 235-242. Uppsala, Sweden, 8-10 June.
  16. Pena-Yewtukhiw, E.M., G.J. Schwab, O. Wendroth, L.W. Murdock, and **T.S. Stombaugh**. 2005. Change in spatial variability structure of NDVI readings related to observation scale.

In *Proc. of the Fifth European Conference on Precision Agriculture*, pp. 353-359. Uppsala, Sweden, 8-10 June.

15. Wendroth, O., A. Giebel, E. Pena-Yewtukhiw, K.C. Kersebaum, G.J. Schwab, H.I. Reuter, L.W. Murdock, and **T.S. Stombaugh**. 2005. Spatial relation between NDVI and grain yield: impact of spatial resolution and measurement device. In *Proc. of the Fifth European Conference on Precision Agriculture*, pp. 731-739. Uppsala, Sweden, 8-10 June.
14. Darr, M.J., **T.S. Stombaugh**, and S.A. Shearer. 2005. Controller Area Network Based Distributed Control for Autonomous Vehicles. *Trans. ASAE* 48(2):479-490.
13. Wells, L.G., S.A. Shearer, and **T.S. Stombaugh**. 2004. Crop yield response to precision deep tillage. *Trans. ASAE* 48(3):895-901.
12. Mueller, T.G., B. Mijatovic, B.G. Sears, N. Pusuluri, and **T.S. Stombaugh**. 2004. Soil electrical conductivity map quality. *Soil Science* 69(12):841-851.
11. Agouridis, C.T., **T.S. Stombaugh**, S.R. Workman, B.K. Koostra, D.R. Edwards, and E.S. Vanzant. 2004. Examination of GPS collar capabilities and Limitations for Tracking Animal Movement in Small Grazing Studies. *Trans. ASAE* 47(4):1321-1329.
10. **Stombaugh, T.S.**, A. Simpson, J.D. Jacobs, T.G. Mueller. 2003. A low cost platform for obtaining remote sensed imagery. In *Proc. of the Fourth European Conference on Precision Agriculture*, pp. 665 - 670. Berlin, Germany, 16-19 June.
9. Fulton, J.P., S.A. Shearer, **T.S. Stombaugh**, M.E. Anderson, T.F. Burks, and S.F. Higgins. 2003. Simulation of Fixed and Variable-Rate Application of Granular Materials. *Trans. ASAE* 46(5):1311-1321.
8. Mueller, T.G., N.J. Hartsock, **T.S. Stombaugh**, S.A. Shearer, P.L. Cornelius, and R.I. Barnhisel. 2003. Soil electrical conductivity map variability in limestone soils overlain by loess. *Agronomy Journal* 95:496-507.
7. **Stombaugh, T.S.** and S.A. Shearer. 2001. DGPS-based automatic guidance of agricultural vehicles. In *Proc. of the Third European Conference on Precision Agriculture*, 1:121-126. Montpellier, France, 18-20 June.
6. **Stombaugh, T.S.** and S.A. Shearer. 2000. Equipment technologies for precision agriculture. *Journal of Soil and Water Conservation* 55(1):6-11.
5. Atherton, B.C., M.T. Morgan, S.A. Shearer, **T.S. Stombaugh**, and A.D. Ward. 1999. Site-specific farming: a perspective on information needs, benefits, and limitations. *Journal of Soil and Water Conservation* 54(2):455-461.
4. **Stombaugh, T.S.**, E.R. Benson, and J.W. Hummel. 1999. Guidance control of agricultural vehicles at high field speeds. *Trans. ASAE* 42(2):537-544.  
\*\*ASAE Honorable Mention Paper Award\*\*
3. Goering, C.E., C.R. Newman, **T.S. Stombaugh**, and N.A. Mariman. 1997. Total engine performance monitor. *Applied Engineering in Agriculture* (13)1:27-30.
2. Heinemann, P.H., C.T. Morrow, **T.S. Stombaugh**, B.L. Goulart, and J. Schlegel. 1992. Evaluation of an automated irrigation system for frost protection. *Applied Engineering in Agriculture* 8(6):779-785.

1. **Stombaugh, T.S.**, P.H. Heinemann, C.T. Morrow, and B.L. Goulart. 1991. Automation of a pulsed irrigation system for frost protection in strawberries. *Applied Engineering in Agriculture* 8(5):597-602.

### ***In Review***

#### *Luck paper*

Zandonadi, R.S., J.D. Luck, **T.S. Stombaugh**, M.P. Sama, S.A. Shearer. 2011. A computational tool for estimating off-target application areas in agricultural fields. Submitted for publication in *Applied Engineering in Agriculture*.

Shockley, J., C.R. Dillon, T.S. Stombaugh, S.A. Shearer. 2011. An economic optimization model to guide the development of autonomous machinery by identifying dominant equipment. Submitted to *Computers and Electronics in Agriculture*.

Shockley, J.M., C.R. Dillon, and T.S. Stombaugh. 2011. The Influence of auto-steer on machinery selection and land acquisition. Submitted to *Journal of the American Society of Farm Managers and Rural Appraisers*.

#### A SINGLE NOZZLE HIGH PRESSURE LIQUID PESTICIDE METERING AND INJECTION SYSTEM FOR PRECISION CHEMICAL APPLICATION

Luck, B.D., S.A. Shearer, **T.S. Stombaugh**, T.G. Mueller. 2011. A single nozzle high pressure liquid pesticide metering and injection system for precision chemical application. Submitted for publication in Transactions of the ASABE.

### **Software**

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FieldCAT – Field Coverage Analysis Tool. Software tool to predict off-target input application due to large machinery and irregular field shapes. Developed by R.S. Zandonadi under the advisement of **T.S. Stombaugh**. Distributed for free use.

UK CORS Ntrip Client. Software tool to access KY CORS RTK base station network. Developed by M.P. Sama under the advisement of **T.S. Stombaugh**. Distributed for free use.

### **Extension Publications**

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14. **Stombaugh, T.S.**, 2008. GPS changes: how to be prepared. University of Kentucky Cooperative Extension Service, AEN-95.
13. **Stombaugh, T.S.**, S.A. Shearer, J. Wilhoit, and S. McNeill. 2008. Saving fuel in the field. University of Kentucky Cooperative Extension Service, AEN-94.
12. **Stombaugh, T.S.**, S.A. Shearer, J. Wilhoit, and S. McNeill. 2008. Proper ballast and tire inflation. University of Kentucky Cooperative Extension Service, AEN-93.
11. Adamchuk, V.I., **T.S. Stombaugh**, and R.R. Price. 2008. GNSS-based auto-guidance in agriculture. Site-Specific Management Guidelines, SSMG-46. International Plant Nutrition Institute in cooperation by the Foundation for Agronomic Research.



10. Crofcheck, C., **T.S. Stombaugh**, and M. Montross. 2006. Biodiesel basics. University of Kentucky Cooperative Extension Service AEN-89.
9. **Stombaugh, T.S.**, C. Crofcheck, and M. Montross. 2006. Biodiesel FAQ. . University of Kentucky Cooperative Extension Service AEN-90.
8. **Stombaugh, T.S.**, D. McLaren, and B.K. Koostra. 2005. The Global Positioning System. Extension Fact Sheet AEN-88, University of Kentucky CES.
7. **Stombaugh, T.S.** and B.K. Koostra. 2005. Implementing Precision Agriculture: Connecting a GPS to Other Devices. Extension Fact Sheet PA-7, University of Kentucky CES.
6. **Stombaugh, T.S.**, C.R. Dillon, and S.A. Shearer. 2003. Implementing Precision Agriculture: What Will This Investment Cost? Extension Fact Sheet PA-6, University of Kentucky CES.
5. **Stombaugh, T.S.** 2002. Elements of Precision Agriculture: Lightbar Guidance Aids. Extension Fact Sheet PA-3, University of Kentucky CES.  
\*\*ASAE Blue Ribbon Award\*\*
4. **Stombaugh, T.S.** 2002. Implementing Precision Agriculture: Choosing the Right Lightbar. Extension Fact Sheet PA-4, University of Kentucky CES.
3. **Stombaugh, T.S.**, S.A. Shearer, and J.P. Fulton. 2002. GPS Simplified. Extension Fact Sheet PA-5 University of Kentucky CES.
2. **Stombaugh, T.S.**, T.G. Mueller, S.A. Shearer, C.R. Dillon, and G.T. Henson. 2001. Guidelines for adopting precision agricultural practices. Extension Fact Sheet PA-2, University of Kentucky CES.
1. **Stombaugh, T.S.** and B.R. Clement. 1999. Unraveling the GPS mystery. Extension Fact Sheet AEX 560-99, The Ohio State University CES.

## Conference and Other Papers

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- Sama, M.P.*, R.S. Zandonadi, J.D. Luck, T.S. Stombaugh, S.A. Shearer. 2011. *A Static Evaluation of Continuously Operating Reference Stations*. 2011 ASABE Annual Meeting.
- Sama, M.P.*, R.S. Zandonadi, J.D. Luck, **T.S. Stombaugh**, S.A. Shearer. 2010. Development of a scalable control system for variable-rate applications. ASABE Paper No. 1009623, St. Joseph, MI:ASABE
- Zandonadi, R.S.*, J.D. Luck, **T.S. Stombaugh**, J.P. Fulton, E.A. Anastacio. Evaluating field shape descriptors for estimating double coverage areas in agricultural fields. ASABE Paper No. 1009790, St. Joseph, MI:ASABE
- Luck, B.D., S.A. Shearer, **T.S. Stombaugh**, T.G. Mueller, E.A. Alves. 2010. A single nozzle high pressure liquid pesticide metering and injection system for precision chemical application. ASABE Paper No. 1009403, St. Joseph, MI:ASABE
- Luck, B.D., S.A. Shearer, **T.S. Stombaugh**, T.G. Mueller. 2010. A single nozzle high pressure liquid pesticide metering and injection system for precision chemical application. ASABE Paper No. 1009400, St. Joseph, MI:ASABE
- Veal, M.W., S.A. Shearer, **T.S. Stombaugh**, J.D. Luck, and B.J. Koostra. 2009. Automated tractor guidance and implement tracking error assessment. In *Proc. Of VDI-MEG*

*Conference: Agricultural Engineering (Nr.2060) 67th International Conference Land.Technik – AgEng, 193-198. Hannover, Germany: VDI verlagGmbH.*

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1. **Stombaugh, T.S.**, C.T. Morrow, P.H. Heinemann, and B.L. Goulart. 1989. A microcomputer controlled irrigation system for frost protection of strawberries. ASAE Paper No. 90-2584. St. Joseph, MI:ASAE.

## **Out-of-State Invited Presentations**

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- Precision Agriculture Principles. Presentation at University of Nebraska Practicum, Mead, NE, September 1, 2010. 20 participants.
- GPS, Autosteer, and RTK Networks. Presentation at Central Ohio Agronomy Day, Millersport, OH, August 25, 2010. 75 attendees.
- New Technology to achieve Greater Efficiency in Crop Production. Presentation at Virginia Crop Production Association Meeting, Richmond, VA, May 25, 2010. 150 attendees.
- Introduction to RTK Systems. Presentation at Conservation Tillage and Technology Conference, Ada, OH, February 26, 2010. 75 attendees
- International Standards for GNSS and Autosteer Accuracy. Presentation at Agricultural Machinery Conference, Cedar Rapids, IA, May 5, 2009. 50 attendees.
- Autosteer and GPS: Past and Future. Presentation at Conservation Tillage and Technology Conference, Ada, OH, February 27, 2009. 75 attendees.

- Squeezing Dollars out of GPS. Presentation at Southwest Agricultural Conference, Ridgetown, Canada. January 6, 2009. 150 attendees.
- GPS: Making the Right Decisions. Presentation at Journee Grandes Cultures (Cash Crop Meeting, Montreal, Quebec, Canada. December 2, 2008. 110 attendees.
- Precision Agriculture: What Will Work and What Won't. Presentation at Eastern Ontario Crop Conference, Kemptville, Ontario, Canada. February 21, 2008. 250 attendees.
- Low Cost Remote Sensing Platform. Presentation at International Conference on Precision Agriculture, Vicosa, Brazil. October 24, 2007. 500 attendees.
- Autosteer Systems for Strip Tillage. Presentation at Midwest Strip Tillage Expo, Waterloo, IA, July 31, 2007. 350 attendees.
- Enhanced Profitability with Advanced Precision Management Technologies. Presentation at 2007 Husker Harvest Days field day, Grand Island, NE, September 11-13, 2007. 40 attendees.
- Precision Agriculture: Is it for Real? Presentation at the 2007 Conservation Tillage and Technology Conference, Ada, OH, February 23, 2007. 55 attendees.
- Precision Farming with Planter Units and Sprayer Nozzles. Presentation at Central Ohio Agronomy Day, December 18, 2007. 75 attendees.
- Fertilizer Application Accuracy: Field Studies on In-Field Dry Application. Presentation at Central Ohio Agronomy Day, December 18, 2007. 275 attendees.
- Recent Advances in Commercial Automated Guidance Systems. Panel member for discussion at ASABE International Meeting, June 18, 2007. 75 attendees.
- Implications of GPS Accuracy on Field Operations. Presentation at Agricultural Machinery Conference, Cedar Rapids, IA, February 24, 2006. 40 attendees.
- Implications of GPS Accuracy on Field Operations. Presentation at the 2006 Conservation Tillage and Technology Conference, Ada, OH, February 24, 2006. 75 attendees.
- Precision Agriculture Activities at the University of Kentucky. Invited presentation at the University of Viçosa, Brazil, March 17, 2005. 120 attendees.
- GPS Accuracy. Presentation at the 2005 Conservation Tillage and Technology Conference, Ada, OH, February 25, 2005. 80 attendees.
- Sensors for Nutrient Management. Presentation at the 2005 Conservation Tillage and Technology Conference, Ada, OH, February 25, 2005. 80 attendees.
- Autosteer and Driverless Technologies for Agriculture. Invited presentation at Ohio Info. Ag. Conf., August 16-17, 2004.
- Updates on Fertilizer Application Accuracy, Yield Monitor Accuracy, and Biomass Harvesting. Presentation at the 2004 Conservation Tillage and Technology Conference, Ada, OH, February 27, 2004. 80 attendees.
- Potential of CAN Bus in Agricultural Equipment. Presentation at NCR-180 Committee on Precision Agriculture, St. Louis, MO, January 8, 2004.
- Using EC for Management Decisions. Presentation at the 2003 Conservation Tillage and Technology Conference, Ada, OH, March 4, 2003. 120 attendees.
- Is a Picture Worth a Thousand Bucks? Presentation and abstract at the National Conservation Tillage Cotton and Rice Conference, Houston, TX, Jan. 24, 2003.
- Is a Picture Worth a Thousand Bucks? Remote sensing presentation at the 2002 Conservation Tillage Conference, Ada, OH, February 26, 2002. 100 attendees.

- Demonstration of Prototype Autosteer system at Midwest Ag. Industry Exposition (MAGIE), Danville, IL, August 16 & 17, 2001.
- Errors in Variable Rate Application. Presentation at the 2001 Conservation Tillage Conference, Ada, OH.
- Yield Monitor Testing and Standards. Presentation at the 2001 Conservation Tillage Conference, Ada, OH.
- Unraveling the Precision Agriculture Mystery. Presentation at the annual banquet of the Pennsylvania Farm Bureau, Blair County, Williamsburg, PA. September 23, 2000.

## **In-State Extension Presentations**

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- The Future of Precision Agriculture. Presentation at Ohio Valley Farm Business Analysis Annual Meeting, November 16, 2010. 45 attendees.
- New Opportunities in Precision Agriculture. Presentation at Agribusiness Association of Kentucky Spray School, March 2, 2011. 50 attendees.
- Guidance and Autosteer Options. Presentation at KY Corn Growers CORE program, February 11, 2010. 18 attendees.
- New Opportunities in Precision Agriculture. Presentation at Agribusiness Association of KY Pesticide Management Workshop, February 9, 2010. 75 attendees.
- Engineering Basics. Presentation at Grain Crops Academy, February 19, 2010. 45 attendees.
- Precision Agriculture. Presentation at Grain Crops Academy, February 19&28, 2010. 80 attendees.
- New Opportunities in Precision Agriculture for Nutrient and Input Management. Presentation at the Kentuckiana conference, Evansville, KY, December 2, 2009. 100 attendees.
- GPS for Agricultural and Natural Resource Management. Presentation at Soil and Water Conservation Society Meeting, November 18, 2009. 20 attendees.
- The Future of Precision Agriculture. Presentation at Pennyrile Farm Business Analysis Annual Meeting, November 12, 2009. 20 attendees.
- Precision Agriculture. Presentation at Grain Crops Academy, February 4, 2009. 40 attendees.
- Remote Sensing: The Production Ag Perspective. Presentation at the Mapping and Monitoring Land Resource Change: Bridging the Geospatial Divide for Decision Making. May 21, 2008. 10 attendees.
- Precision Agriculture. Presenter at Grain Crops Academy, Princeton, KY, January 31, 2008. 15 attendees.
- Agricultural Equipment Technology Update. Presentation at AG EXPO, Owensboro, KY, January 30, 2008. 30 attendees.
- GPS for Agricultural and Natural Resource Management. Presentation at SWCS GIS and Remote Sensing Workshop, Lexington, KY, May 24, 2007.
- Lightbar Selection and Service. Presentation at AG EXPO, Owensboro, KY, January 25, 2006. 35 attendees.
- GPS and Precision Agriculture. In-Service training for KCTCS field agents. November 4, 2005. 18 attendees.
- Using GPS and Spatial Technologies in Agriculture. In-service training for Agriculture Teachers, June 2, 2005. 20 attendees.



- Marking, Mapping, and Meandering with GPS. Workshop at the SWCS GIS and Remote Sensing Applications to Natural Resource Management Workshop, February 24, 2005, Madisonville, KY. 30 attendees.
- Remote Sensing Brought Down to Earth. Presentation at National Farm Machinery Show, February 18, 2005. 50 attendees.
- Precision Guidance and Autosteering Systems. Presentation at National Farm Machinery Show, February 18, 2005. 50 attendees.
- Impacts of Height Modernization on Agriculture. Presentation at Kentucky Height Modernization Forum, October 25, 2004. 200 attendees.
- Low Cost GPS for Precision Agriculture. Presentation at the UK Precision Ag conference held in conjunction with the 2004 National Farm Machinery Show in Louisville, February 12, 2004. 50 attendees.
- Satellite Positioning Systems in Agriculture. Presentation to Berea College GIS class, January 27, 2004. 15 attendees.
- Using GPS for Spatial Data Collection. SWCS Regional training, Aug. 25, 2003. 40 attendees.
- GIS Basics. Kentucky Landscape Project Workshop, McClean Co., June 30, 2003.
- Performance and Applications of GPS in Agriculture. Presentations at UK Precision Agriculture conference held in conjunction with the 2003 National Farm Machinery Shows in Louisville. 100 total attendees.
- Using Yield Monitor Data. Presentation at Kentuckiana CCA training, Dec. 10, 2002.

## **Agent Training**

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- Precision Agriculture Update. Update training for ANR agents, October 29, 2010.
- Biofuel Use and Performance. Update training for ANR agents. January and February, 2008 regional meetings.
- Trends in GPS and Machinery Technology. Update training for western region ANR agents, November 13, 2007.
- Trends in GPS and Machinery Technology. Update training for central region ANR agents, November 29, 2007.
- Creative Use of GPS Technology. Update training for eastern region ANR agents, July 9, 2007.
- Precision Agriculture and Engineering Basics. Training for ANR agents, December, 2006. 110 participants.
- Managing Risk with Precision Agriculture. Joint training for county agents, farmers, and FSA agents. Dec. 12-13, 2005; Dec. 19-20, 2005; January 9-10, 2006.
- Engineering Basics. ANR basic training, Feb. 6 – 10, 2006.
- Precision Agriculture Update. ANR agent update training, Nov. 28 - Dec. 2, 2005.
- Asian Soybean Rust: Fungicide Application Considerations. Presentation at State Extension Conf., Lexington, KY, February 10, 2005.
- GPS and GIS in Agriculture. Eastern District ANR Agent Training, April 2, 2004.
- Critical PA Issues Farmers Face. In-Service Training for Purchase Area Agents, Jan. 22, 2004.
- GPS for Scouting and Mapping. In-Service Training, Repeated Oct. 15 and 22, 2003.

- Basics of GPS and Precision Agriculture, In-Service Training, Repeated Oct. 16 and 23, 2002.
- Using GPS for Soil Sampling and Scouting. In-Service Training, Oct. 24, 2002.
- Precision Agriculture Basics. In-Service Training, October 5, 2000.

## **County-Level Farmer Meetings**

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- The Future of Precision Agriculture. Todd Co. Grower Workshop, February 16, 2010. 20 attendees.
- Precision Agriculture Update. Lyon County Grower Workshop, February 2, 2010. 8 attendees.
- Precision Agriculture Update. Carlisle County Grower Workshop, February 1, 2010. 10 attendees.
- Technology Update: Saving Money. Fulton Co. Grower Workshop, January 13, 2009. 20 attendees.
- Precision Ag: What's New? Hopkins Co. Grower Workshop, August 7, 2008. 12 attendees.
- Precision Ag: What's New? Simpson Co. Grower Workshop, June 3, 2008. 25 attendees.
- Agricultural Equipment Technology Update. Butler Co. Grower Workshop, March 25, 2008. 30 attendees.
- Precision Ag: What's New? Union Co. Grower Workshop, March 24, 2008. 35 attendees.
- Precision Ag: What's New? Henderson Co. Grower Workshop, March 18, 2008. 20 attendees.
- Precision Ag: What's New? Todd Co. Grower Workshop, February 19, 2008. 25 attendees.
- Precision Ag: What's New? Ballard Co. Grower Workshop, December 12, 2007. 40 attendees.
- Agricultural Equipment Maintenance. Estill Co. Grower Workshop, April 24, 2007. 5 attendees.
- Precision Agriculture: Is it for Real? Calloway Co. Grower Workshop, March 7, 2007. 35 attendees.
- Precision Agriculture: Is it for Real? Taylor Co. Grower Workshop, February 19, 2007.
- Technology for Agriculture. Larue Co. Grower Workshop, December 7, 2006. 35 attendees.
- Guidance Systems: Toys or Tools? Daviess Co. Grower Workshop, August 30, 2006. 90 attendees.
- Technology for Agriculture. Caldwell Co. Grower Workshop, August 28, 2006. 45 attendees.
- GPS and Spatial Data. Mason Co. Grower Workshop, March 30, 2006. 15 attendees.
- Precision Agriculture Basics. Warren Co. Young Farmer Workshop, February 27, 2006. 15 attendees.
- Technology for Precision Agriculture. Daviess Co. Grower Workshop, September 21, 2005. 28 attendees.
- Technology for Precision Agriculture. Ohio Co. Grower Workshop, September 20, 2005. 15 attendees.
- Technology for Precision Agriculture. Graves Co. Grower Workshop, July 26, 2005. 17 attendees.
- Making Money with Precision Agriculture. Todd Co. Grower Meeting, March 24, 2005. 20 attendees.

- Remote Sensing: On-farm Applications. Hardin Co. Precision Ag. Conference, February 2, 2005. 45 attendees.
- Accuracy of GPS-Based Information. Hardin Co. Precision Ag. Conference, February 2, 2005. 45 attendees.
- Choosing a Lightbar. Hardin Co. Precision Ag. Conference, February 2, 2005. 45 attendees.
- Asian Soybean Rust: Fungicide Application Considerations. Fulton Co. Grower Meeting, January 25, 2005. 75 attendees.
- Precision Agriculture Software. Fulton Co. Grower Meeting, January 18, 2005. 15 attendees.
- Making Money with Precision agriculture. Fulton Co. Grower Meeting, January 11, 2005. 15 attendees.
- Making Money with Precision Agriculture. Green Co. Grower Meeting, October 19, 2004. 15 attendees.
- Precision Agriculture Software and Spatial Data. Green Co. Grower Meeting, October 18, 2004. 15 attendees.
- Making Money with GPS and Lightbar Technologies. Hopkins Co. Grower Meeting, April 1, 2004. 35 attendees.
- Making Money with Precision Agriculture. Hickman Co. Grower Meeting, January 23, 2004.
- Precision Agriculture Software. Graves Co. Grower Meeting, January 22, 2004.
- Making Money with Precision Agriculture. Fulton Co. Grower Meeting, January 7, 2004.
- Precision Farming Hands On Workshop. McClean Co. Grower Meeting, July 1, 2003.
- Making Money with Precision Agriculture. Graves Co. Grower Meeting, November 25, 2003.
- Yield Monitors: Getting the Most from Your Data. Ballard Co. Grower Meeting, Feb. 28, 2003.
- Making Money with Precision Agriculture. Fulton Co. Grower Meeting, February 27, 2003.
- Lightbars for Agriculture. Winter Wheat Meeting, Bowling Green, KY, Jan. 9, 2002.
- Low-Cost Technology for Precision Agriculture. Louisville Area Grain Growers Mtg., Shelby Co., Jan. 18, 2002.

## **Field Day Participation**

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- Lightbar and Autosteer Demonstration. Lewis Co. Field Day, Oct. 1, 2009.
- Strip Tillage. Princeton Field Day, July 23, 2009. 50 participants.
- Equipment Maintenance. Estill Co. Field Day, September 30, 2008. 160 attendees.
- Biofuel Issues for Producers. Spencer Co. Field Day, September 8, 2008.
- Autosteer and Lightbar Technology for Pasture Maintenance. Muhlenberg Co. Field Day, August 7, 2008. 75 attendees.
- Autosteer and Lightbar Technologies. Demonstration at Meade Co. Farm Field Day, August 3, 2007. 65 attendees.
- Autosteer Technologies. Demonstration at Warren Co. Young Farmers Field Day, July 20, 2007. 75 attendees.
- Autosteer and Lightbar Technology. Demonstration at Princeton Field Day, July 26, 2007. 150 participants.
- Lightbars and Autosteer Technology. Robinson Station Field Day, September 28, 2006 (Rained Out)

- Constructing Corn Mazes with GPS. Morehead State University Field Day, September 21, 2006 (involved field preparation in July). 15 attendees.
- Lightbars and Autosteer Systems. Hardin Co. Ag Expo, Sonora, KY, August 31, 2006. 300 attendees.
- Strip Till and Autosteer. National Farm Machinery Show, Louisville, KY, February 15-18, 2006.
- Autosteer and Lightbar Guidance Aids. UKREC Field Day at Princeton, July 28, 2005. 50 participants.
- Lightbars, Autosteer, and Driverless Tractors for Agriculture. Kentucky Farm Expo, September 2, 2004. 250 attendees.
- Lightbars for Field Application. Presentation at Turf Field Day, July 8, 2004.
- Autonomous vehicles, Presented at Lexington Home and Garden Show, April 3-6, 2003.
- Remote Sensing in Agriculture. Princeton Field Day, July 18, 2002.
- Driverless Tractors: The Future of Agriculture. Owen Co., April 27, 2002. 240 attendees.

## **Youth Outreach Presentations**

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- Engineering Fundamentals. Workshop for Webelos Cub Scouts at Pallisades District Twilight Camp, June 17-19, Lexington, KY. 60 attendees.
- Mapping Using GPS and GIS. 2-day workshop during 4-H Teen Conference, Lexington, KY, June 12-13, 2007. 25 participants.
- GPS Technology in Agriculture. Workshop for high school students at Robinson Station Field Day, September, 28, 2006. 75 attendees.
- GPS Technology in Agriculture. Field day presentation at Hardin Co. Ag Expo for middle school students, August 29-30, 2006. 625 attendees.
- Mapping with GPS and GIS. 2-day workshop during 4-H Teen Conference, Lexington, KY, June 13-14, 2006. 25 attendees.
- GPS and GIS. Workshop for Jefferson Co. Middle School Camp, June 12, 2006. 15 attendees.
- The Global Positioning System in Agriculture. Workshop for Warren East High School Ag Students, Warren Co., February 28, 2006. 60 students and teachers.
- The Global Positioning System in Agriculture. Workshop for Warren Central High School Ag Students, Warren Co., February 27, 2006. 30 students and teachers.
- Mapping with GPS. Workshop for Jefferson Co. Middle School Camp, May 31, 2005. 25 attendees.
- Spatial Technologies in Agriculture. Presentation and driverless tractor demonstration at Jefferson Co. Public School GIS Poster Showcase, May 10, 2005. 60 high school students and teachers.
- Driverless Tractors – The future of agriculture. Kentucky Farm Expo presentation for fifth grade students, August 31 – September 1, 2004. 475 total attendees.
- Mapping with GPS and GIS. One-day workshop for Jefferson Co. Middle School Camp, June 9, 2004. 20 attendees.
- GPS in Agriculture. Presentation to Pleasure Ridge Park High School Ag Students, Jefferson Co., April 6, 2004. 75 attendees.

- GIS in Agriculture. Presentation to Jefferson Co. High School GIS class, March 18, 2004. 25 attendees.
- GPS and GIS in Agriculture. One-day workshop for 4-H technology camp, June 29, 2004. 25 junior high students.
- The Global Positioning System in Agriculture. Hands-on workshop for Spencer Co. Middle School, April 17&18, 2003. 250 total attendees.
- GIS in Agriculture. Presentation to Spencer County High School students. April 17, 2003. 20 students.
- Unraveling the GPS Mystery. Presentation to Garrard County High School students. May 10, 2001. Total contact: 250 high school students and teachers.
- Using Unmanned Aerial Vehicles for Remote Sensing. Presentation to West Jessamine High School Technology Club. November 15, 2001. Total contact: 60 students and teachers.
- Mentored 2 Seniors from West Jessamine High School for a 7-week internship experience at UK.

## Media Outlets

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- UK College of Agriculture Radio News Releases
  - Creating Corn Mazes. December 2006.
  - Saving Fuel in Field Operations. March 2006.
  - Youth Opportunities with GPS. April 2005.
  - Yield Monitor Maintenance. September 2004.
  - CAN Bus for Agricultural Equipment. July 2004.
  - On-Farm Experimentation Using Precision Agriculture. April 2004.
  - Backing Up Your Data. October 2003.
  - Variable Depth Tillage. May 2003.
  - Geographic Information Systems. January 2003.
  - Low Cost GPS Receivers. April 2002.
  - Choosing a Lightbar. December 2001.
  - Remote Sensing. August 2001.
  - Automatic Guidance. May 2001.
  - Precision Agriculture and the Kentucky Precision Agriculture Network. March 2001.
- Automatic Section Control. Videotaped interview for WBKO-TV, Bowling Green, KY, September 22, 2009.
- The Ultimate Sprayer. Videotaped interview for WBKO-TV, Bowling Green, KY, September 22, 2009.
- Saving Fuel in Field Operations. Videotaped interview for WBKO-TV, Bowling Green, KY, February 28, 2006.
- Biodiesel Basics. Videotaped interview for WBKO-TV, Bowling Green, KY, February 28, 2006.
- The Future of Agricultural Machinery. interview for WBKO-TV, Bowling Green, KY, February 28, 2006.
- Students Map Bright Future. Louisville Courier-Journal article by Patti Smith, May 23, 2005.
- Students Get to Map Possible Career Paths. Louisville Courier-Journal article by Patti Smigh, June 21, 2004.
- Precision Agriculture. Interview on WKYT-TV, Lexington, KY, October 28, 2004.

- Precision Agriculture. Videotaped interview for WBKO-TV, Bowling Green, KY, March 30, 2004.
- Remote Sensing. Videotaped interview for WBKO-TV, Bowling Green, KY, March 30, 2004.
- UK Develops Blueprint for Driverless Tractor. Farmer's Pride article by Liv Christianson, April 16, 2003.
- **Stombaugh, T.S.** and S.A. Shearer. 2002. Automatic Pilot. *Resource* 9(2):7-8.
- Sailplane may help out farmers. Louisville Courier-Journal Article, August 17, 2002.
- Remote Sensing with UAV's. Kentucky Farm Bureau Newsletter, August 2002.

## Visiting Scholars

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Luciano Baiao, Professor, Federal University of Vicosa, Vicosa, Brazil

Rodrigo Baldo, Sandwich Scholar, UNICAMP, Campinas, Brazil, 3/09-9/09

Jaime Gómez Gil, Lecturer, University of Valladolid, Department of Theory Signal, Communications and Telematic, 3/10 – 6/10

## Graduate Advising (Primary Advisor)

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Brian Clement, M.S. The Ohio State University, Completed Dec. 1999. *Development of a Continuously Measuring Soil Compaction Sensor.*

Andrew Simpson, M.S. Completed Dec. 2003. *Development of an Unmanned Aerial Vehicle for Low-Cost Remote Sensing and Aerial Photography.*

Matt Darr, M.S. Completed May 2004. *Development and Evaluation of a Controller Area Network Based Autonomous Vehicle.*

John Cole, M.S. Completed Dec. 2004. *Development of a Test Track for the Evaluation of GPS Receiver Dynamic Performance as Related to Agricultural Field Operations.*

Morgan Hayes, M.S. May 2009. *Potential for Pulse Oximetry on a Bovine Ear Tag.*

Michael Sama, M.S. August 2008. *Low Cost System for Remote Sensing in Agriculture.*

Rodrigo Zandonadi, M.S. August 2008. *Development of a Torque-Based Grain Mass Flow Sensor for Edible Bean Harvesters.*

Michael Sama, Ph.D. Expected May 2012.

Rodrigo Zandonadi, Ph. D. Expected December, 2011.

## Graduate Committee Service

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John Fulton, Ph.D. in Engineering. Completed May 2004

Jody Purswell, Ph.D. in Engineering. Completed Dec. 2004

Nagarajan Ramalingam, Ph.D., The Ohio State University. Completed Dec. 2004

Grace Danao, Ph.D. in Engineering. Completed May 2005

Adam Garrison, M.S. in BAE. Completed May 2005

Jonah Johnson, M.S. in Agronomy. Completed August 2006  
 Matthew Veal, Ph.D. in BAE. Completed August 2006  
 Blazan Mitajovic, M.S. in Agronomy. Completed August 2006  
 Paul Stiglbauer, Ph.D. in Engineering. Completed August 2008  
 Andrew Simpson, Ph.D. in Mechanical Engineering. Completed May 2008  
 Brian Luck, M.S. in BAE, Completed December, 2009  
 Dennis Hasty, M.S. in Agricultural Education, Completed August, 2010  
 Robert Sperry, M.S. Student in BAE. Expected Dec. 2010  
 Jordan Shockley, M.S. Student in Ag. Econ. Expected May 2008  
 Jordan Shockley, Ph.D. Student in Ag. Econ. Expected May 2008  
 Joe Luck, Ph.D. Student in BAE.  
 Santosh Pitla, Ph.D. Student in BAE

## Undergraduate Advising

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Served as mentor for the following senior capstone design course projects:

- Remote Sensing using UAVs (2002)
- Variable Depth Tillage Control (2003)
- Automatic Recording Penetrometer for use with an ATV (2004)
- Precision Sprayer Control (2005)
- Automated GPS Test Cart (2006)
- Sensing Shear Forces in Stream Flow (2006)
- Automated Equine Feeder (2007)
- Automated Fence Painter (2008)

## List of Courses Taught

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Course	Title	Semester	# Students	Teaching Evaluation <sup>1</sup>
BAE 400	Senior Seminar	F 10	17	
BAE 305	DC Circuits and Microelectronics	S 10	17	3.0
BAE 305	DC Circuits and Microelectronics	S 09	10	2.1
BAE 658	Instrumentation for Engineering Research	F 09		N/A
BAE 305	DC Circuits and Microelectronics	S 08	15	3.4
BAE 403 <sup>4</sup>	Capstone Design Course	S 08	4	
BAE 402 <sup>4</sup>	Capstone Design Course	F 07	4	
BAE 305	DC Circuits and Microelectronics	S 07	19	3.3
BAE 403 <sup>4</sup>	Capstone Design Course	S 07		
BAE 402 <sup>4</sup>	Capstone Design Course	F 06	4	
BAE 305	DC Circuits and Microelectronics	S 06	14	3.5
BAE 305	DC Circuits and Microelectronics	S 05	19	3.2

BAE 305	DC Circuits and Microelectronics	S 04	14	3.8
BAE 750	Microcontrollers in Agriculture	F 03	3	Not rated
BAE 305	DC Circuits and Microelectronics	S 03	11	2.8
BAE 658 <sup>2</sup>	Instrumentation for Engineering Research	S 02	6	4.0
BAE 658 <sup>3</sup>	Instrumentation for Engineering Research	S 01	6	3.7

<sup>1</sup>Out of maximum possible of 4.0

<sup>2</sup>Team taught with Dr. R.S. Gates – responsible for approximately 80% of lectures and labs

<sup>3</sup>Team taught with Dr. M.D. Montross – responsible for approximately 50% of lectures and labs

<sup>4</sup>Technical advisor for one design group

## Honors and Awards

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ASBAE Blue Ribbon Award for Educational Aids (2009)

College of Agriculture Outstanding Teacher Award (2008)

Nolan Mitchell Young Extension Worker Award (2006)

ASAE Blue Ribbon Award for Educational Aids (Extension Publication #5)

ASAE Honorable Mention Paper award for papers in the top 5% of manuscripts submitted to ASAE journals (Peer-Reviewed Publication #4)

## Scientific and Professional Affiliations

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American Society of Agricultural and Biological Engineers  
(formerly ASAE, American Society of Agricultural Engineers)

Gamma Sigma Delta, the Honor Society of Agriculture

Alpha Epsilon, the Honor Society of Agricultural Engineering

## Professional Service

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Convener of ISO TC23/SC19/WG7 committee to develop standards for GNSS-based equipment.

Associate editor, ASABE Power and Machinery Division, 2007-2009

Associate Editor, ASAE Information and Electrical Technology division, 1999-2002

USDA-SBIR Plant Production & Protection review panel, January, 2003

Ad-hoc reviewer for 15 journal articles and grant proposals

ASABE Committee Service

- PM-01 Power and Machinery Executive Committee
  - Secretary, 2009-2011
- PM-02 Power and Machinery Steering Committee
- ASAE PM-54 Precision Agriculture Committee
  - Past Chair, 2006-2008
  - Chair, 2004-2006
  - Program Chair, 2002-2004
  - Secretary, 2000-2002
- PM-23/19 Agricultural electronics and US TAG to ISO/TC23/SC19



- PM-23/19/7 Testing Procedures for Positioning & Guidance Systems in Agriculture
  - Chair
- ASAE IET 353 Instrumentation and Controls Committee (1997 – present)
  - Chair, 1999-2000
- Member, ASAE PM-58 Agricultural Equipment Automation, (2003 – present)
- M-117 Young Extension Worker Award Selection Committee (2010-2012)

NCERA-180 Regional committee on precision agriculture

- Hosted annual meeting in Lexington, Jan. 6-8, 2009
- Chair, 2009
- Secretary, 2008

## **University Committees**

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Faculty Senator, 2010 – present

- Academic Facilities Committee, 2010 – present

University IT Coordinating Committee

## **College Committees**

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COA Faculty Council, 2010 - present

COA Extension County Program Review Committee for Todd, Hopkins, and Christian counties

College of Ag. Precision Resource Committee (formerly Precision Agriculture Committee)

- Chair, 2004-2005

College of Engineering, E-Day Committee (2003)

College of Agriculture Web Advisory Committee (2005-2006)

## **Departmental Committees**

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Chair, Computer committee (2003 – present)

Ad hoc staff reorganization committee (2006)

Chair, Seminar committee (2001 – 2002)

Social committee (2001 – 2004)

Extension planning committee (2000 – present)

Student recruitment committee (2002 – 2006)

Courses and Curriculum committee (2006 – present)

## **Professional Meetings Attended**

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2010 FIPSE/CAPES Project Director's meeting, Florianopolis, Brazil

2010 Brazilian Society of Agricultural Engineering Annual Meeting, Vitoria, Brazil  
2010 International Conference on Precision Agriculture, Denver CO  
2010 International Meeting of the ASABE, Pittsburgh, PA  
2010 NCERA-180 Committee on Precision Agriculture, Lexington, KY  
2009 FIPSE/CAPES Project Director's meeting, Washington, DC  
2009 International Meeting of the ASABE, Reno, NV  
2009 Seventh European Conference on Precision Agriculture, Wageningen, Netherlands  
2009 Agricultural Equipment Technology Conference, Louisville, KY  
2009 NCERA-180 Committee on Precision Agriculture, Portsmouth, VA  
2008 CIGR International Agricultural Engineering Society, Iguassu Falls City, Brazil  
2008 International Meeting of the ASABE, Providence, RI  
2008 International Conference on Precision Agriculture, Denver CO  
2008 NCERA-180 Committee on Precision Agriculture, Minneapolis, MN  
2008 Agricultural Equipment Technology Conference, Louisville, KY  
2007 International Meeting of the ASABE, Minneapolis, MN  
2007 Sixth European Conference on Precision Agriculture, Skiathos, Greece  
2007 NCERA-180 committee on Precision Agriculture, Tampa, FL  
2006 International Meeting of the ASABE, Portland, OR  
2006 NCERA-180 Committee on Precision Agriculture, Cincinnati, OH  
2005 International Meeting of the ASAE, Tampa, FL  
2005 Fifth European Conference on Precision Agriculture, Uppsala, Sweden  
2005 Agricultural Equipment Technology Conference, Louisville, KY  
2005 NCR-180 Committee on Precision Agriculture, New Orleans, LA  
2004 International Meeting of the ASAE, Ottawa, Canada  
2004 International Conference on Precision Agriculture, Minneapolis, MN  
2004 Agricultural Equipment Technology Conference, Louisville, KY  
2004 NCR-180 Committee on Precision Agriculture, St. Louis, MO  
2003 International Meeting of the ASAE, Las Vegas, NV  
2003 Fourth European Conference on Precision Agriculture, Berlin, Germany  
2003 Agricultural Equipment Technology Conference, Louisville, KY  
2003 NCR-180 Committee on Precision Agriculture, Davis, CA  
2002 International Conference on Precision Agriculture, Minneapolis, MN  
2002 International Meeting of the ASAE, Chicago, IL

2002 Agricultural Equipment Technology Conference, Kansas City, KS  
2002 NCR-180 Committee on Precision Agriculture, State College, PA  
2001 Agricultural Equipment Technology Conference, Louisville, KY  
2001 Third European Conference on Precision Agriculture, Montpellier, France  
2001 Oak Ridge National Labs, Bio Feedstock Program, Contractors Workshop, Oak Ridge, TN  
2001 International Meeting of the ASAE, Sacramento, CA  
2000 International Meeting of the ASAE, Milwaukee, WI  
2000 International Conference on Precision Agriculture, Minneapolis, MN  
2000 Southern Region Extension Ag. Engineers and Housing Specialists Workshop, Athens, GA

## **Continuing Education**

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Electric Drives and Fuel Cell Technology. ASAE Continuing Professional Development Workshop, Feb 9, 2004. 3.5 contact hours

USDA Grant Writing Workshop, Minneapolis, MN, Sept. 18, 2002.

Traction and Tractor Performance Basics, ASAE Continuing Education Program, Thursday, Feb. 21, 2002.

Introduction to ArcGIS I, ESRI-Certified software training, May 29 and 30, 2002.

Fuzzy Logic and its Application. ASAE Continuing Professional Development Workshop, July 9, 2000. 4 contact hours.

Technical Writing and Presentations with Passion, Confidence, and Success. ASAE Continuing Professional Development Workshop, July 9, 2000. 3 contact hours.