

**VITA**

**Charles R. Hurburgh, Jr.**  
**Professor**  
**Agricultural and Biosystems Engineering Department**  
**Department of Food Science and Human Nutrition (Courtesy)**  
**Iowa State University**

**Education:**

B.S. Agricultural Engineering Iowa State University February 1973	M.S. Agricultural Engineering Iowa State University February 1980
Ph.D. Agricultural Engineering - Economics minor Iowa State University December 1981	

**Work history:**

May 1972 - March 1976	- Operated family cash grain farm 1000 acres corn, soybeans
April 1976 - September 1976	- Graduate research assistant Iowa State University
October 1976 - May 1978	- Instructor, full-time teaching Iowa State University
June 1978 - June 1982	- Instructor, 25% teaching, 75% research Iowa State University
July 1982 - June 1985 Awarded tenure July 1983	- Assistant Professor, 25% teaching, 75% research Iowa State University
July 1985 - June 1991	- Associate Professor, 30% teaching, 70% research Iowa State University
July 1991 - December 1994	- Professor, 30% teaching, 70% research Iowa State University
January 1995 - present	- Professor, 30% extension, 70% research Iowa State University Professor-in-Charge, Iowa Grain Quality Initiative (from 1998)

**Current research and extension interests:**

Grain quality, marketing and distribution, physical and chemical properties of biological materials, chemical and electronic instrumentation, near-infrared reflectance analysis, chemometrics, metrology.

Public and private standards development, international Standards, marketing incentives, and supply organizations. Country grain elevator management practices. Food safety/quality management systems. Food system traceability

Agricultural Engineering courses taught:

AE 437 Agricultural Hydraulics (3 cr., qrt.)  
AE 468 Crop Conditioning and Storage (3 cr., qrt.)  
AE 469 Crop Conditioning, Storage, and Processing (4 cr., sem.)  
AE 662 Graduate Seminar (1 cr., sem.)  
AE 569 Crop Conditioning and Processing (3 cr., sem.)  
AE 601 Graduate Seminar (1 cr. sem)  
AE 699 Graduate Research (various)

Agricultural Mechanization/Industrial Technology courses taught:

AM 134 Principles of Farm Machinery Management (2 cr., qrt.)  
AM 164 Agricultural Electrification (2 cr., qrt.)  
AM 364 Agricultural Electrification I (3 cr., qrt.)  
AM 366 Crop Conditioning and Storage Systems (3 cr., qrt.)  
AST 362 Crop Conditioning and Storage Systems (3 cr., sem.)  
AST 464 Grain Process Operations (2 cr., sem.)  
TSM 322 Preservation of Grain Quality

Professional societies (current):

American Society of Agricultural Engineers (ASAE)  
American Society of Cereal Chemists (AACC)  
Iowa Academy of Science (IAS)  
Grain Elevator and Processing Society (GEAPS)  
American Oil Chemists Society (AOCS)  
Society for Applied Spectroscopy (SAS)  
International Diffuse Reflectance Council (IRDC)  
Council on Near-Infrared Spectroscopy (CNIRS)

Honor societies and awards:

Alpha Epsilon (Agricultural Engineering Honorary)  
Gamma Sigma Delta (Agriculture Honorary)  
Mid-Central Region of ASAE Young Engineer of the Year Award (1989)  
Iowa Section ASAE Young Engineer of the Year Award (1989)  
American Oil Chemists Society Outstanding Paper Award (1989)  
American Oil Chemists Society - Best Article, Protein Division (1991)  
Pro Farmer Man of the Year – Iowa (1998)  
Andersen Research Award (2000)  
Best Paper Award, ASAE (2000)  
Grain Elevator and Processing Society Industry Leader Award (2002)  
Extension Service Award, College of Engineering (2010)

Theses:

Hurburgh, C.R., Jr. 1980. Sampling corn and soybeans for foreign material. M.S. Thesis, Iowa State University Library, Ames, Iowa.

Hurburgh, C.R., Jr. 1981. Improving moisture measurement in the corn market. Ph.D. dissertation. Iowa State University Library, Ames, Iowa.

Technical Committees:

- NC-213 USDA regional research committee, Marketing and Delivery of Quality Cereals and Oilseeds, Iowa State University representative (1978-present). Chair 1990-91. Iowa Contribution Station project 3261, Principal investigator
- ASAE FPE-701 Physical Properties of Biological Materials, American Society of Agricultural Engineers (1981-1992). Chair 1990-91
- Iowa and Illinois Departments of Agriculture Task Force on Grain Moisture Measurement (1980-1983)
- AACC Physical methods for grain testing (1982-1991). Chair, 1989-1991
- AACC NIR methods (1989-present). Chair 2000-present  
Calibration method developed, included in Methods of AACC and AOCS
- AACC Mycotoxins (1989-1992)
- AACC Biotechnology Methods (2000-present)
- State of Iowa task force on grain quality (1983-1984)
- GEAPS grades and weights committee (1986-present)
- GEAPS educational program committee (1986-1988; 1999-2002, 2005 - 2006)
- National Grain and Feed Association Grain Quality Workshops (1986-2005). Chair, 1991-1992
- Congressional Office of Technology Assessment grain quality study team (1986-1988)
- State of Iowa Grain Marketing Task Force (1987-1988)
- Iowa Corn Growers Association aflatoxin task force (1988-1989)
- Federal Grain Inspection Service Advisory Committee (1989-1992; 2000-2006)
- ASAE Transactions Food Engineering Division Editor (1988-1993)
- National Institute of Standards and Technology grain measurement type approval sectors (1992-present)
- Iowa Grain Quality Initiative (1995-present). Professor-in-Charge (1998-present)
- EPA Science Advisory Panel, food safety (2000-2002)
- Innovative Growers, LLC, Board of Directors (2000-2008)
- U.S. Technical Advisory Group, ISO Technical Committee TC34, working group 7 (biotechnology testing) and working group 12 (traceability) (2001-present)
- College of Agriculture/Extension Ag Quality Initiative (2001- present, co-chair)
- Council on Near Infrared Spectroscopy Associate Editor (2003 – present)
- Ag22006 ISO agricultural standards, ISO Technical Committee TC34, working group 12, (2004 – 2010)
- KEMA Registrars, Inc. Corporate Advisory Committee (2004 – 2009)
- European Union Study Committee Trace (traceability of foods) (2005-2009)
- European Union Study Committee CoExtra (GMO markets) (2005 – 2009)
- ISO22000, Food Safety and Quality Management Systems, TC34, WG17. US Expert Group (2009 – present)
- AACC Food Safety Audit Task Force. (2009-present)

### **Published Peer-Reviewed Journal Articles**

- Hurburgh, C.R., Jr., and C.J. Bern. 1983. Sampling corn and soybeans. I. Probing Methods. Trans. ASAE 26(3):930-934.
- Hurburgh, C.R., Jr., and T.E. Hazen. 1983. Performance of electronic moisture meters in corn. Drying Technology 2(1):149-156.
- Hurburgh, C.R., Jr., C.J. Bern, M.E. Anderson, and W.F. Wilcke. 1983. Shrinkage and corn quality changes in on-farm handling operations. Trans. ASAE 26(6):1954-1957.
- Grama, S.N., C.J. Bern, and C.R. Hurburgh, Jr. 1984. Airflow resistance of mixtures of corn and its fines. Trans. ASAE 27(1):268-272.
- Hurburgh, C.R., Jr., and B.W. Moechnig. 1984. Shrinkage and corn quality changes in commercial elevator operations. Trans. ASAE 27(4):1176-1180.
- Lee, T.P., C.R. Hurburgh, Jr. and C.P. Baumel. 1984. Fuel consumption in exporting grain to the Far East. Proc. Transportation Research Forum 25(1):303-314.
- Hurburgh, C.R., Jr., T.E. Hazen and C.J. Bern. 1985. Corn moisture measurement accuracy. Trans. ASAE 28(2):634-640.
- Gaul, A.D., M.K. Misra, C.J. Bern, and C.R. Hurburgh, Jr. 1986. Variation of physical properties in gravity separated soybeans. Trans. ASAE 29(4):1146-1149.
- Hurburgh, C.R., Jr., L.N. Paynter, S.G. Schmitt and C.J. Bern, 1986. Performance of farm-type moisture meters. Trans. ASAE 29(4):1118-1123.
- Hurburgh, C.R., Jr. 1987. A probe sampling method for country elevators. Applied Engineering in Agriculture 3(1):90-94.
- Hurburgh, C.R., Jr., L.N. Paynter and S.G. Schmitt. 1987. Moisture meter performance I. Corn over five crop seasons. Trans. ASAE 30(2):579-581.
- Hurburgh, C.R., Jr. 1987. Moisture meter performance II. Soybeans. Trans. ASAE 30(2):582-584.
- Hurburgh, C.R., Jr., L.N. Paynter and S.G. Schmitt. 1987. Quality characteristics of midwestern soybeans. Applied Engineering in Agriculture 3(2):159-165.
- Hurburgh, C.R., Jr. 1988. Moisture and compositional analysis in the corn and soybean market. Cereal Foods World 33(6):503-505.
- Lyon, H. J., S.G. Schmitt, C.J. Bern, and C.R. Hurburgh, Jr. 1988. Characteristics of a modified Wisconsin Breakage Tester. Trans. ASAE 31(6):1860-1862.

- Balascio, C.C., C.J. Bern, and C.R. Hurburgh, Jr. 1989. Effect of humidity ratio on corn moisture content as determined by the air-oven. *Trans. ASAE* 32(5):1715-1719.
- Hartwig, R.A. and C.R. Hurburgh, Jr. 1989. A justification for using a whole-grain oven method to determine soybean moisture content. *J. Am. Oil Chemists Soc.* 66(11):1635-1636.
- Hurburgh, C.R., Jr., C.J. Bern and T.J. Brumm. 1989. Efficiency of rotary grain cleaners in dry corn. *Trans. ASAE* 32(6):2073-2077.
- Kay, R.L., C.J. Bern and C.R. Hurburgh, Jr. 1989. Horizontal and vertical airflow resistance of shelled corn at various bulk densities. *Trans. ASAE* 32(2):733-736.
- Redding, C.D., C.R. Hurburgh, Jr., L.A. Johnson and S.F. Fox. 1989. Adjustment of maize quality data for moisture content. *Cereal Chemistry* 67(3):292-295.
- Schmitt, S.G. and C.R. Hurburgh, Jr. 1989. Distribution and measurement of aflatoxin in 1983 Iowa corn. *Cereal Chemistry* 66(3):165-168.
- Brumm, T.J. and C.R. Hurburgh, Jr. 1990. Estimating the processed value of soybeans. *J. Am. Oil Chemists Soc.* 67(5):302-307.
- Hartwig, R.A. and C.R. Hurburgh, Jr. 1990. Near infrared reflectance measurement of moisture, protein and oil content of ground crambe seed. *J. Am. Oil Chemists Soc.* 67(7):435-437.
- Hurburgh, C.R., Jr. and T.J. Brumm. 1990. Protein and oil content of soybeans received at country elevators. *Applied Engineering in Agriculture* 6(1):65-68.
- Brumm, T.J. and Charles R. Hurburgh, Jr. 1990. Size determination of shriveled and wrinkled soybeans. *J. Am. Oil Chemists Soc.* 67(11):747-749.
- Brumm, T.J., C.R. Hurburgh, Jr., and L.A. Johnson. 1990. Cracking and dehulling shriveled and wrinkled soybeans. *J. Am. Oil Chemists Soc.* 67(11):750-756.
- X. Yang, C.J. Bern, and C.R. Hurburgh, Jr. 1990. Airflow resistance of cleanings removed from corn. *Trans. ASAE* 33(4):1299-1302.
- Hurburgh, C.R., Jr., J.G. Guinn, T.J. Brumm and R.A. Hartwig. 1990. Protein and oil patterns in domestic and world soybean markets. *J. Am. Oil Chemists Soc.* 67(12):966-973.
- Redding, C.D., C.R. Hurburgh, Jr., L.A. Johnson, and S.F. Fox. 1991. Relationships among maize quality factors. *Cereal Chemistry* 68(12):602-605.
- Hartwig, R.A. and Charles R. Hurburgh, Jr. 1991. Interlaboratory comparison of soybean protein and oil determinations. *J. Am. Oil Chemists Soc.* 68(12):949-957.
- Al-Yahya, S.A., C.J. Bern and C.R. Hurburgh, Jr. 1991. Aspirator separation of corn-fines mixtures. *Trans. ASAE* 34(3):944-949.

- D.T. Lamb and C.R. Hurburgh, Jr. 1991. Moisture determination in single soybean seeds by near-infrared transmittance. *Trans. ASAE* 34(5):2123
- Fox, S.L., L.A. Johnson, C.R. Hurburgh, Jr. and C. Dorsey-Redding. 1992. Relations of grain proximate composition and physical properties to wet-milling characteristics of maize. *Cereal Chemistry* 69(2):191.
- Bern, C.J. and C.R. Hurburgh, Jr. 1992. Characteristics of fines in corn: A review. *Trans. ASAE* 35(6):2263
- Meinders, B.L. and C.R. Hurburgh, Jr. 1993. Properties of corn screenings. *Trans. ASAE* 36(3):811.
- Hurburgh, C.R., Jr. 1994. Corn quality patterns in U.S. markets. *Applied Engr. in Agric.* 10(4): 515.
- Hardy, C.L. and C.R. Hurburgh, Jr. 1994. Immunoassay detection of herbicide residues in corn. *Cereal Chemistry* 71(2):107.
- Hurburgh, C.R., Jr. 1994. Component pricing of soybeans at the country elevator. In Component pricing of soybeans. AE-4702. Dept. of Ag. Econ., University of Illinois, Urbana, IL.
- Hurburgh, C.R., Jr. 1994. Identification and segregation of high-value soybeans at a country elevator. *J. Am. Oil Chemists Soc.* 71(10):1073.
- Hurburgh, C.R., Jr. 1994. Long-term soybean composition patterns and their effect on processing. *J. Am. Oil Chemists Soc.* 71(12):1425.
- Siska, J. and C.R. Hurburgh, Jr. 1994. Prediction of Wisconsin Breakage Tester breakage susceptibility of corn from bulk density and NIRS. *Trans. ASAE* 37(5):1577.
- Hurburgh, C.R., Jr. 1995. An engineering economic model of corn cleaning. *Applied Engineering in Agriculture* 11(4):539-547.
- Siska, J. and C.R. Hurburgh, Jr. 1995. Corn density measurement by near-infrared transmittance. *Trans. ASAE* 38(6):1821-1824.
- Hurburgh, C.R., Y. Wu, and J. Siska. 1995. Effect of seed size and density on near-infrared transmittance analysis of corn and soybeans. *Applied Engr. in Agric.* 11(5):677-684.
- Hurburgh, C.R., Jr. 1996. U.S. soybean quality related to costs and benefits of soybean cleaning. *Applied Engr. in Agric.* 12(3):379-382.
- Hurburgh, C.R., Jr., J. Buresch, G. Rippke. 1996. Aspiration cleaning of soybeans. *Applied Engr. in Agric.* 12(5):585-586.
- Hurburgh, C.R., Jr. 1996. U.S. soybean quality related to costs and benefits of soybean cleaning. *Applied Engr. in Agric.* 12(3):379.

- Millmeir, A.C., J. Lorimor, C. Hurburgh, C. Fullhage, J. Hattery, H. Zhang. 2000. Near-infrared sensing of manure nutrients. *Trans. ASAE* 43(4): 903-908. **Superior Paper Award 2001.**
- Siska, J., C.R. Hurburgh, Jr. and P. Siska. 2001. The standardization of near-infrared instruments using master selection and Wiener filter methods. *J. Near Infrared Spectrosc.* **9**, 97-105.
- Siska, J., C.R. Hurburgh, Jr. and P. Siska. 2001. The impact of engineering parameters on the accuracy of calibration transfer. *JNIRS* **9**, 107-116.
- Chang, Ching-Wen, D. Laird, M.J. Mausbach, and C.R. Hurburgh, Jr. 2001. Near-Infrared reflectance spectroscopy – principal component regression analysis of soil properties. *Soil Sci. Soc. Am. J.* 65:480-490.
- Steenhoek, L.A., M.K. Misra, C.R. Hurburgh, Jr., and C.J. Bern. 2001. Implementing a computer vision system for corn kernel damage evaluation. *Trans. ASAE* 17(2):235-240.
- Roussel, S.A., C.L. Hardy, C.R. Hurburgh, Jr., G.R. Rippke. 2001. Detection of Roundup Ready™ soybeans by near-infrared spectroscopy. *Applied Spectroscopy* 55(10):1425-1430.
- Singh, S., L.A. Johnson, L.M. Pollak and C.R. Hurburgh, Jr. 2001. Compositional, physical and wet milling properties of accessions used in the germplasm of maize project. *Cereal Chemistry* 78(3): 330-335.
- Singh, S., L.A. Johnson, L.M. Pollak, and C.R. Hurburgh, Jr. 2001. Heterosis in compositional, physical and wet milling properties of adapted X exotic corn crosses. *Cereal Chemistry* 78(3): 336-341.
- Hurburgh, C. R., Jr. 2002. Quality of the US 2001 soybean crop. *American Oil Chemists Society, Inform* 13(5):394.
- Codgill, R.P., C.R. Hurburgh, Jr., G.R. Rippke, R.W. Jones, T.C. Jensen, and J.R. McClelland. 2004. Single kernel maize analysis by near-infrared hyperspectral imaging. *Trans. ASAE* 47(1): 150
- Chang, Cheng Wen, David A. Laird, and Charles R. Hurburgh, Jr. 2004. Influence of soil moisture on near-infrared reflectance spectroscopic measurement of soil properties. *Soil Science* 170(4):244-255
- Ye, W., J. C. Lorimor, C. Hurburgh, H. Zhang, and J. Hattery. 2005. Application of near-infrared reflectance spectroscopy for determination of nutrient contents in liquid and solid manures. *Trans ASAE* 48(5):1911
- Karlen, D., D.L. Dinnes, D.B. Jaynes, C. R. Hurburgh, Jr., C. A. Cambardella, T. S. Colvin, and G. R. Rippke. 2005. Corn response to late-spring nitrogen management in the Walnut Creek watershed. *Agron. J.* 97:1054-1061.

- Kovalenko, I. V., G. R. Rippke and C. R. Hurburgh, Jr. 2006. Determination of amino acid composition of soybeans (*Glycine max*) by near-infrared spectroscopy. *Journal of Agricultural and Food Chemistry*, 54 (10):3485-3491.
- Kovalenko, I. V., G. R. Rippke and C. R. Hurburgh, Jr. 2006. Measurement of soybean fatty acids by near-infrared spectroscopy: linear and nonlinear calibration methods. *JAOCS*, 83(5): 421-427.
- Brumm, T.J., and C.R. Hurburgh, Jr. 2006. Changes in long-term soybean compositional patterns. *JAOCS* 83(11):981-982
- Hurburgh, C. R., Jr. 2007. Measurement of fatty acids in whole soybeans with near infrared spectroscopy. *Lipid Technology* 19(4): 450.
- Igne, B., L. Gibson, G. Rippke and C. Hurburgh. 2007. Triticale moisture and protein measurement by near infrared spectroscopy. *Cereal Chemistry* 84:239-241
- Kovalenko, I, G. R. Rippke, and C. R. Hurburgh, Jr. 2007. Dimensionality reduction of near infrared spectral data using global and local implementations of principal component analysis for neural network calibrations. *JNIRS* 15:21-28.
- Gerde, J., Connie L. Hardy, Charles R., Hurburgh, Jr. and Pamela White. 2007. Rapid determination of degradation in frying oils by near-infrared spectroscopy. *JAOCS* 84:519-522
- Thakur, M. and C. R. Hurburgh, Jr. 2007. Quality of U.S. soybean meal compared to the quality of soybean meal from other origins. *JAOCS* 84:835-843.
- Esteve-Agelet, L., Charles R. Hurburgh, Feng Mao, James J. Gaunt, and Say Kee Ong. 2007. Permeation studies of PVC pipes with near infrared spectroscopy (NIRS). *JNIRS* 15:283-289
- Igne, B., L. Gibson, G. Rippke and C. Hurburgh. 2007. Influence of yearly variability of agricultural products on the NIRS calibration process: a triticale example. *Cereal Chemistry* 84(6):576-581
- Igne B., Rippke G.R., Hurburgh C.R., 2008. Measurement of whole soybean fatty acids by near infrared spectroscopy, *Journal of the American Oil Chemists' Society*, 85(12):1105-1113.
- Igne B., and C.R. Hurburgh, Jr. 2008. Standardization of near infrared spectrometers: Evaluation of common techniques for intra and inter brand calibration transfer. *JNIRS* 16:539-550.
- Maitri Thakur, Gretchen A. Mosher, Brittini Brown, Gregory S. Bennet, Howard E. Shepherd, Charles R. Hurburgh, 2009. Traceability in bulk grain supply chains. Resource: *Engineering and Technology for a Sustainable World*, American Society of Agricultural and Biological Engineers, April/May 2009:20-22.



- Maitri Thakur, Charles R. Hurburgh. 2009. Framework for implementing traceability system in the bulk grain supply chain. *Journal of Food Engineering* 95:617-626.
- Igné, B , Jean-Michel Roger, Sylvie Roussel, Véronique Bellon-Maurel, and Charles R. Hurburgh. 2009. Improving the transfer of near infrared prediction models by orthogonal methods, *Chemometrics and Intelligent Laboratory Systems* 99:57–65.
- Mosher, G.A., Freeman, S.A., Field, D.W. & Hurburgh, C.R. 2009. Development of a quality management course for adult learners using backward design. *Association of Technology, Management, and Applied Engineering (ATMAE) 2009 Conference Proceedings Refereed Paper. Proc ATMAE 2009:92-96.*
- Mosher, G.A., Laux, C.M. & Hurburgh, C.R. 2009. Using mock recall data to measure continuous quality improvement. *Association of Technology, Management, and Applied Engineering (ATMAE) 2009 Conference Proceedings Refereed Paper. Proc ATMAE 2009:97-103*
- Igné, B. and C.R. Hurburgh, Jr. 2010. Local chemometrics for samples and variables: Optimizing the calibration and standardization processes. *Journal of Chemometrics*. 24:75-86.
- Igné, B. and C.R. Hurburgh, Jr. 2010. Using the frequency components of near infrared spectra: Optimizing calibration and standardization processes. *Journal of Near Infrared Spectroscopy*, 18(1):39-47.
- Thakur, M. , Sigurdur Olafsson, Jong-Seok Lee, and Charles R. Hurburgh. 2010. Data mining for recognizing patterns in foodborne disease outbreaks. *Journal of Food Engineering* 97(2):213-227. 2010
- Laux, Chad and C.R. Hurburgh. 2010. Using Quality Management Systems in Food Traceability. *Journal of Industrial Technology*. 26(3):1-6 (web) July 2010.
- IGNE B., REEVES J.B., McCARTY G., HIVELY W.D., LUND E., HURBURGH C.R., 2010. Evaluation of PLS, LS-SVM, and LWR for quantitative spectroscopic analysis of soils, *Journal of Near Infrared Spectroscopy*, 18(3):167-176.
- Mosher, G and C.R. Hurburgh. 2010. Transgenic Plant Risk: Coexistence and Economy. *Encyclopedia of Biotechnology in Agriculture and Food*. 1: 1, 639 — 642 . Online publication date: 21 July 2010
- Esteve-Aglelet, L and C. R. Hurburgh. 2010. A Tutorial on Near Infrared Spectroscopy and Its Calibration. *Critical Reviews in Analytical Chemistry*, 40: 4, 246 — 260.
- Robertson, A.E., Munkvold, G.M., Hurburgh, C and Ensley, S. 2010. Effects of natural hail damage on maize grain quality. *Agronomy Journal* 103(1):193

- Robertson, A.E.,** Munkvold, G.P., Hurburgh, C.R. and Ensley, S. 2011. Impact of hail damage during early reproductive stages on ear rot and mycotoxin contamination of maize. *Phytopathology* 100: S109
- Thakur, M., Carl-Fredrik Sørensen; Finn Olav Bjørnson; EskilForås; Charles R Hurburgh.. 2011. Managing food traceability information using EPCIS framework. *Journal of Food Engineering*: 103 (4): 417-433
- Sylvie A. Roussel, Benoît Igne, David B. Funk, Charles R. Hurburgh . 2011. Noise Robustness Comparison for Near Infrared Prediction Models. *JNIRS* 19:23-26
- Mosher, G. A., S. A. Freeman, and C. R. Hurburgh. 2011. Design of an Online Course in Quality Management Systems for Adult Learners. *Journal of Industrial Technology* 27(4): online
- Esteve Agelet, Lidia, David D. Ellis, Susan Duvick, A. Susana Goggi, Charles R Hurburgh, and Candice A. Gardner. 2011. Feasibility of Near Infrared Spectroscopy for Analyzing Corn Kernel Damage and Viability of Soybean and Corn Kernels. *Journal of Cereal Science*: <http://dx.doi.org/10.1016/j.jcs.2011.11.002>

### **Other peer-reviewed publications**

- Baumel, C.P., C.R. Hurburgh, Jr. and Tenpao Lee. 1985. Estimates of total fuel consumption in transporting grain from Iowa to major grain-importing countries by alternative routes and modes. Special report 90, Agriculture and Home Economics Experiment Station, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1988. The interaction of corn and soybean quality with grain storage. Office of Technology Assessment, U.S. Congress, Washington, D.C.
- Hurburgh, C.R., Jr. 1988. Cleaning and blending of corn and soybeans. Office of Technology Assessment, U.S. Congress, Washington, D.C.
- Hurburgh, C.R., Jr. 1988. Technology for the inspection of corn, soybeans and wheat. Office of Technology Assessment, U.S. Congress, Washington, D.C.
- Hurburgh, C.R., Jr. 1990. Aflatoxins in midwestern corn. *In* A Perspective on Aflatoxin in Field Crops and Animal Food Products in the United States. pp. 25-34. J.F. Robens, ed. Publ. ARS-83. USDA-ARS, Beltsville, MD.
- Hurburgh, C.R., Jr. and T.J. Brumm. 1991. Estimated Processed Value - A new concept in soybean marketing. Proc. International Grain Grades Conference, University of Illinois, Urbana, IL.
- Hurburgh, C.R., Jr., Cristina Lang, Jeff Buresh and Glen Rippke. 1994. Measuring the costs and benefits of cleaning soybeans. Final report of Spec. Coop. Agreement 43-3AEK-80139. Economic Research Service, USDA, Washington, D. C.
- Hurburgh, C.R., Jr., G.R. Rippke, and C.L. Heithoff. 1999. Near-infrared spectroscopy system and method. U.S. Patent Application 09/317,363 and 09/317,278. (For detection of GMO grains by NIR)
- Westgate, M.E., E. Piper, W.D. Batchelor, and C. R. Hurburgh, Jr. 2000. Effect of cultural and environmental conditions during soybean growth on nutritive value of soy products. Proc. Soy Swine Symposium, Global Soybean Forum, United Soybean Board, St. Louis, MO.
- Hurburgh, C.R., Jr. 2002. Sampling and inspection systems: Validation and Evaluation. Proc. Facility Design Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Hurburgh, C. R. Jr. and John D. Lawrence. 2003. Quality management systems in agriculture: need and opportunity. Resource. April 2003. American Society of Agricultural Engineers, St. Joseph, MI.
- Hurburgh, C. R. Jr. 2003. Management of grain quality and security for world markets. Rewrite of USDA multistate project NC-213. Approved July 2003. [www.osu.edu/nc-213](http://www.osu.edu/nc-213)
- Laux, C. A, C.R. Hurburgh, Jr., G.A. Mosher. 2008. Food traceability using quality management systems to meet the Food and Drug Administration Bioterrorism Act of 2002. Published

Proceedings, National Association of Industrial Technologists Annual Conference, Nashville, TN (November 14, 2008).

**Outstanding Paper selection, First out of 273 contributions.**

Mosher, G.A., Freeman, S.A., Field, D.W. & Hurburgh, C.R. 2009. Development of a quality management course for adult learners using backward design. Association of Technology, Management, and Applied Engineering (ATMAE) 2009 Conference Proceedings Refereed Paper. Proc ATMAE 2009:92-96.

Mosher, G.A., Laux, C.M. & Hurburgh, C.R. 2009. Using mock recall data to measure continuous quality improvement. Association of Technology, Management, and Applied Engineering (ATMAE) 2009 Conference Proceedings Refereed Paper. Proc ATMAE 2009:97-103

Thakur, M. and K.M. Donnelly. 2009. Traceability of soya beans: Specifications for the information to be recorded in the soya bean farming, handling (elevator) and processing establishments and other links in the soya bean product distribution chain. Report 31/2009. Nofima Market, Tromsø, Norway.

Mosher, G. A., Charles Hurburgh and Howard Shepherd. 2009. Quality management systems in grain operations. 10-unit distance education course for the Grain Elevator and Processing Society distance education program, offered in January 2010.

Hurburgh, C. R., Jr., Daniel Loy, and J. D. Lawrence. 2010. Maintaining food safety through quality. PM-3005. Cooperative Extension Service, Iowa State University, Ames, Iowa, 50011.

**Published Proceedings, Invited Presentations**

- Hurburgh, C.R., Jr. 1983. Grain testing and shrinkage. Proc. 1983 Grain Quality Conference. Iowa Grain and Feed Assoc., Des Moines, IA.
- Hurburgh, C.R., Jr. 1984. Grain handling from planting to export. Proc. 55th International Technical Conference Grain Elevator and Processing Society, Minneapolis, MN.
- Hurburgh, C.R., Jr. 1986. Corn quality control-profit for tomorrow. Proc. 57th International Technical Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Hurburgh, C.R., Jr. 1987. Aeration-Cost control. Proc. 57th International Technical Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Hurburgh, C.R., Jr. 1987. U.S. grain quality update-Corn. Proc. 57th International Technical Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Hurburgh, C.R., Jr. 1988. Corn cleaning profit or loss? Proc. 58th International Technical Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Hurburgh, C.R., Jr. 1988. The value of quality to new and existing corn uses. Proc. Second Corn Utilization Conference, National Corn Growers Assoc., St. Louis, MO.
- Hurburgh, C.R., Jr. 1989. Know your customer's (end-user) values. Proc. 59th International Technical Conference, Grain Elevator and Processing Society, Box 15026, Minneapolis, MN.
- Hurburgh, C.R., Jr. and C.J. Bern. 1989. Fines in corn: A grower and country elevator perspective. Proc. NC-151 Symposium on Fines, Ohio Agric. and Res. Development Center, Wooster, OH.
- Hurburgh, C.R., Jr. 1989. Soybean marketing in the 1990's. Proc. NC-151 Symposium--Marketing soybeans by protein and oil Content, Ohio Agriculture and Research Development Center, Wooster, OH.
- Brumm, T.J. and C.R. Hurburgh, Jr. 1989. Estimating the Processed Value of Soybeans. Proc. NC-151 Symposium--Marketing soybeans by protein and oil content, Ohio Agriculture and Research Development Center, Wooster, OH.
- Guinn, J.G. and C.R. Hurburgh, Jr. 1989. Protein and oil patterns in domestic and world soybean markets. Proc. NC-151 Symposium--Marketing soybeans by protein and oil content, Ohio Agriculture and Research Development Center, Wooster, OH.
- Hurburgh, C.R., Jr. 1990. Your elevator as a grain quality laboratory. Testing equipment and strategies. Proc., 60th International Technical Conference, Grain Elevator and Processing Society, Minneapolis, MN.

- Hurburgh, C.R., Jr. 1990. End-user related corn quality factors. What does the USA have to offer? Proc. 3rd Corn Utilization Conference, National Corn Growers Association, St. Louis, MO.
- Hurburgh, C.R., Jr. 1990. New technologies and challenges in grain handling. Proc. Ia. Grain and Feed Association Grain Quality Conference. Iowa Grain and Feed Assoc., Des Moines, IA.
- Hurburgh, C.R., Jr. 1994. Mycotoxins in the grain market. Proc. 65th International Technical Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Hardy, C.L., C.R. Hurburgh, Jr., G.R. Rippke, and T.J. Brumm. 1995. Calibration and field standardization of Foss Grainspec analyzers for corn and soybeans. Proc. NIR-95. 7th International Conference on Near-Infrared Spectroscopy.
- Rippke, G.R., C.R. Hurburgh, Jr., C.L. Hardy, and T.J. Brumm. 1995. Calibration and field standardization of Perstorp Infratec analyzers for corn and soybeans. Proc. NIR-95. 7th International Conference on Near-Infrared Spectroscopy.
- Hurburgh, C.R., Jr. 1995. Foreign material in soybeans. Proc. 66th International Technical Conference, Grain Elevator and Processing Society. Minneapolis, MN.
- Hurburgh, C.R., Jr. 1997. Experiences with value-added grains: Testing and handling. Proc. 69<sup>th</sup> International Technical Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Winborn, B.R. and C.R. Hurburgh, Jr. 1997. Tools for value-added grain marketing. Proc. 1997 Integrated Crop Management Conference, Cooperative Extension Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. and D.H. Jarboe. 1998. Grain quality information to use in variety selection. Proc. 1998 Integrated Crop Management Conference, Cooperative Extension Service, Iowa State University, Ames, IA.
- Park, H., G.R. Rippke, C.R. Hurburgh, Jr., and R. Oberg. 1998. Calibration of Zeltex ZX800 for grain analysis. Proc. 9<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA.
- Hurburgh, C.R., Jr. 1999. Beyond feed ingredients – very high value grains. Integration strategies to capture output trait value. Global Research LTD, Stamford, CT. January 29, 1999.
- Hurburgh, C.R., Jr. 1999. Managing agricultural production. Agriculture in the 21<sup>st</sup> century – striving and thriving. Video broadcast, Cooperative Extension Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1999. Testing and handling procedures for segregation of non GMO grain. Proc. 1999 Integrated Crop Management Conference, Agribusiness Education, ISU, Ames, IA.
- Jarboe, D. and C.R. Hurburgh, Jr. 1999. The Iowa Grain Quality Initiative. Proc 1999 Integrated Crop Management Conference, Agribusiness Education, ISU, Ames, IA.

- Westgate, M.E., E. Piper, W. Batchelor and C.R. Hurburgh, Jr. 1999. Effects of cultural and environmental conditions during soybean growth on nutritive value of soy products. Proc. Soy-Swine Symposium. World Soybean Research Forum, United Soybean Board, St. Louis, MO, August 5-7, 1999.
- Hurburgh, C.R., Jr. 1999. Contracts and Contracting. Grain Export Handbook, U.S. Grains Council, Washington, D.C. Presented August 8-9, 1999.
- Hurburgh, C.R., Jr. 2000. Practical applications of biotechnology detection. Proc. Grain Biotechnology Methods Validation Workshop, USDA/GIPSA, Kansas City, MO. February 24, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Proc. 71<sup>st</sup> annual technical conference, Grain Elevator and Processing Society, Minneapolis, MN. March 1, 2000.
- Hurburgh, C.R., Jr., G.R. Rippke, C. Heithoff, S.A. Roussel, and C.L. Hardy. 2000. Detection of genetically modified grains by near-infrared spectroscopy. Proc. Pittcon 2000, New Orleans, LA. March 10, 2000.
- Hurburgh, C.R., Jr. 2000. GMO's in 2000. Proc. 12<sup>th</sup> Annual Food Focus, AACC, Minneapolis, MN. April 19, 2000.
- Roussel, S.A., G.R. Rippke and C.R. Hurburgh, Jr. 2000. Accuracy and robustness comparison of different processing algorithms for grain quality assessment. Proc. Pittcon 2000, New Orleans, LA. March 10, 2000, Proc. 10<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA. August 18, 2000.
- Hofstrand, D. and C.R. Hurburgh, Jr. 2000. Producer-owned supply networks for grain. Proc. 2000 Integrated Crop Management Conference, Agribusiness Education, ISU, Ames, IA. November 18, 2000.
- Ye, W., J. Lorimor, and C. Hurburgh. 2001. Application of Near-Infrared spectroscopic technique for determination of nutrient contents in poultry manures. *Proceedings of International Symposium on Animal Production/Environmental Issues*. Oct 3-5, 2001. ISBN 09669770-1-7. College of Ag and Life Sciences, NCSU, Raleigh, NC.
- Hurburgh, C. R. Jr. and T. J. Sullivan. 2002. A quality management system for grain facilities: an ongoing case study. Proc. 59<sup>th</sup> International Conference, Grain Elevator and Processing Society, Minneapolis, MN.
- Hurburgh, C. R., Jr. and Ray W. Hansen. 2002. Quality management systems for agriculture: Principles and case studies. Proc. 2002 Integrated Crop Management Conference, Agribusiness Education Program, Iowa State University, Ames, IA.
- Cogdill, R. P., and C. R. Hurburgh, Jr. 2002. Local chemometrics. Proc. International Diffuse Reflectance Conference, Chambersburg, PA.

- Cogdill, R.P., C.R. Hurburgh, T.C. Jensen, R.W. Jones. 2002. Single kernel maize analysis by near-infrared hyperspectral imaging. Corn Utilization and Technology Conference. Kansas City, Missouri. June 3-5.
- Dzupin, R., S.A. Roussel, C.R. Hurburgh. 2002. Client-server based internet communication and analyzing model for NIR instruments. Corn Utilization and Technology Conference. Kansas City, Missouri. June 3-5.
- Hurburgh, C. R., Jr. 2003. Certification and source verification in the the grain market. Proc. Economic Research Service Symposium on Differentiated Markets for Grain, ERA-USDA, Washington, DC. January 28, 2003.
- Hurburgh, C. R. Jr. 2003. Grain quality research yields big benefits. Grain Elevator and Processing Society International Technical Conference, Columbus, OH. March 3, 2003.
- Cogdill, R., P. Dardenne and C.R. Hurburgh, Jr. 2003. Support vector machines for NIRS calibration. Proc. NIR2003, International Conference on NIR Spectroscopy, Cordoba, Spain, April 8-12, 2003.
- Dzupin, R, C. R. Hurburgh, Jr. and S. A. Roussel. 2003. Improvement of prediction speed and accuracy with internet enabled networking software. Proc. NIR2003, 11<sup>th</sup> International Conference on Near Infrared Spectroscopy, Cordoba, Spain. April 6-11, 2003.
- Roussel, S. A., and C. R. Hurburgh, Jr. 2003. Noise robustness comparison for merging large datasets. . Proc. NIR2003, 11<sup>th</sup> International Conference on Near Infrared Spectroscopy, Cordoba, Spain. April 6-11, 2003.
- Ye, W., J. Lorimor, and C. Hurburgh. 2003. Transfer of beef cattle feedlot manure calibrations between near-infrared spectrophotometers using three standardization techniques. *Proceedings of 9th International Symposium on Animal Agriculture and Food Processing Wastes IX* Oct 12-15, 2003. ISBN 1-892769-32-8. ASAE, St. Joseph, MI.
- Hurburgh, C. R. Jr. 2004. Advances in spectroscopic methods for high throughput crop Analytics. Pittcon 2004, Chicago IL. (abstract 24700-100). Invited.
- Hurburgh, C. R., Jr. 2004. Certification and source verification in the bulk corn market. Proceedings of the Corn Utilization Conference, June 7, 2004. National Corn Growers Association, St. Louis, MO. Invited presentation.
- Hurburgh, C. R., Jr. 2004. Near infrared spectroscopy for crop analytics: Advances and challenges. Proc. International Grain Quality Conference, Indianapolis, IN. July 19-21, 2004. Invited presentation.
- Hurburgh, C.R., Jr. 2004. An ISO-based system for quality management and traceability in the US grain handling industry. Proc. International Grain Quality Conference, Indianapolis, IN. July 19-21, 2004. Invited presentation.



- Hurburgh, C. R., Jr. 2004. Real-time model selection and other technical challenges for the general use of NIR. IDRC-2004, International Diffuse Reflectance Conference, Chambersburg, PA. Aug 19-23, 2004. Invited presentation.
- Hurburgh, C.R., Jr. 2004. Impact and operational response to traceability in US commodity markets. Abstract 69. 2004 American Association of Cereal Chemists Annual Meeting, San Diego, CA. September 20, 2004. Invited presentation.
- Hurburgh, C.R., Jr. 2004. NIR from laboratory to the field. 2<sup>nd</sup> International Conference on Embedded NIR. Centre Wallon de Recherches Agronomiques, Gembloux, Belgium. November 19, 2004. Invited presentation.
- Hurburgh, C.R. Jr. 2005. The transition of NIR from lab-bench to online in agricultural applications. Proc. 19<sup>th</sup> International Forum for Process Analytical Technology, Arlington, VA. January 13, 2005. Invited presentation.
- Kovalenko, I and C.R. Hurburgh, Jr. 2005. Dimensionality reduction of NIR spectral data using global and local implementation of PCA for neural network calibrations. Abstract 2005-1372 Pittcon 2005, Orlando, Florida. Oral Presentation and Abstract
- Garraude-Verdier, Y., G. Rippke, C.R. Hurburgh, Jr., N. Cloud, D. Mattsson, O. Surel. 2005. NIR measurement of factors affecting oxidative potential of rosemary leaf. Poster and Paper 59. Proceedings of NIR 2005, Auckland, New Zealand. April 10-15, 2005.
- Roussel, S.A., I. Kovalenko, G. Rippke and C.R. Hurburgh, Jr. 2005. Comparison of chemometric models for proximate and fatty acid composition of soybeans. Oral presentation and paper 56. Proceedings of NIR 2005, Auckland, New Zealand. April 10-15, 2005.
- Hurburgh, C. R., Jr., G. Rippke, D. Honigs, and I Kovalenko. 2005. Calibration and standardization of Perten DA7200 diode array instrument. Poster and paper 221. Proceedings of NIR 2005, Auckland, New Zealand. April 10-15, 2005.
- Hurburgh, C. R., Jr., G. Rippke, and C. Hardy. 2005. Calibration and standardization of Bruins Omega transmittance instruments. Poster and paper 222. Proceedings of NIR 2005, Auckland, New Zealand. April 10-15, 2005.
- Wang, CiWen, E. Dierenfield and C. Hurburgh. 2005. Comparison of methods for development of a spectral database for wildlife nutrition. Poster and paper 184. Proceedings of NIR 2005, Auckland, New Zealand. April 10-15, 2005.
- Brumm, T.J., C.R. Hurburgh, and S. Naeve. 2005. Quality of the 2005 US Soybean Crop. United States Soybean Export Council quality seminars. Seoul, Dalian, Shanghai, Taipei, Tokyo. November 12-19, 2005. Invited paper and presentation.
- Hurburgh, C. R., Jr. 2006. Traceability in bulk agricultural products. International Conference on Food Traceability, IdTechEx, Norwich, UK. February 1-2, 2006, Dallas, Tx. Invited presentation.

- Hurburgh, C. R. Jr. 2006. The Impact of FDA Recordkeeping Rules on Grain Handling, Operations and Management Seminar, Grain Elevator and Processing Society, Minneapolis, MN. August 2, 2006. Invited Presentation.
- Hurburgh, C.R., Jr. 2007. Tracing GMOs in the US Bulk Agricultural Market. 3<sup>rd</sup> annual meeting of CoExtra 6<sup>th</sup> Framework EU Project, Bologna, Italy February 4, 2007. Invited presentation.
- Hurburgh, C.R. Jr. 2007. Developing traceability of bulk agricultural products. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Invited presentation.
- Hurburgh, C.R., Jr. 2007. Current Storage and Handling Issues for the 2007 Crop. Proc. 19<sup>th</sup> Annual Integrated Crop Management Conference, Agribusiness Education Program, Iowa State University, Ames, Iowa. November 28, 2007.
- Laux, C. and C.R. Hurburgh, Jr. 2007. Food Traceability Using Quality Management Systems to Meet the Food and Drug Administration Bioterrorism Act of 2002. Annual Conference 2007, National Association of Industrial Technologists, Nashville, TN. November 18-21, 2007. Invited presentation.
- Hurburgh, C.R. Jr. 2008. Use of standards for electronic data entry in the US grain and feed industry. 4th Trace Annual Meeting, Torremolinos, Spain. Invited presentation.
- IGNE B., RIPPKE G.R., HURBURGH C.R., 2008. Soybean Fatty Acid Prediction by Near Infrared Spectroscopy and Model Standardization, Proc 99th AOCS Meeting, Seattle, WA, May 2008. Invited Presentation and published abstract. Honored Student Award Presentation.
- Hurburgh, C. R., Jr., Elvira Fernandez d'Ahumada and G.R. Rippke. 2008. Chemometrics Issues in Calibrating an On-Harvester Embedded NIR Sensor. Chemometrics in Analytical Chemistry, Montpellier, France. June 30-July 4, 2008. Invited presentation, published abstract.
- Connie Hardy and C.R. Hurburgh, Jr. 2008 Progress in using near infrared grain analyzers (NIR) to measure amino acids in corn. Proc. Integrated Crop Management Conference, Iowa State University, Ames, Iowa, 50011. December 10-11, 2008.
- Allison Burgers and C. R. Hurburgh, Jr. 2008. Prediction of fermentable starch content by near-infrared spectroscopy. Proc. Integrated Crop Management Conference, Iowa State University, Ames, Iowa, 50011. December 10-11, 2008.
- Gregory Bennet and C. R. Hurburgh, Jr. 2008. Methodology to insure U.S. genetically modified (GM) grain sales into approved foreign markets—Integrating ISO traceability standards with agricultural quality management systems. Proc. Integrated Crop Management Conference, Iowa State University, Ames, Iowa, 50011. December 10-11, 2008.

- Howard Shepherd and C.R. Hurburgh, Jr. 2008. Grain storage, storage cost and training module. Proc. Integrated Crop Management Conference, Iowa State University, Ames, Iowa, 50011. December 10-11, 2008.
- Hurburgh, C.R. 2009. Quality and Quantity; It's the Business. Invited presentation. Operations Management and Technology Seminar, Grain Elevator and Processing Society. St. Louis, MO, July 28, 2009.
- Do Employee Trust Levels Affect Safety Decision-Making? G.A. Mosher, N. Keren, & S.A. Freeman. Oral presentation at the Association of Technology Management and Applied Engineering Annual Conference (ATMAE). November 2009. Louisville, Kentucky.
- Charles Hurburgh, Chad Hart, and Connie Hardy. 2009. Current technologies and status of grain-based biofuels. Growing the Bioeconomy. Multi-State Conference. Iowa State University, Ames, IA. December 1, 2009
- Charles R. Hurburgh, Jr. 2009. Feasibility of Bulk Material Traceability. Invited Presentation. FDA-FSIS Food Traceability Public Meeting. Washington, D.C. December 12, 2009
- HURBURGH, C. R., C. Hart, C. L. Hardy, B. Lamsal. 2010. Sustainability in the ethanol and feed processing industry. American Association of Cereal Chemists, Annual Meeting, Savannah, GA. October 24-28, 2010. Invited Symposium Presentation, Abstract
- Hurburgh, C. R. Jr., M. Thakur, C. Laux, G. Mosher, K. Donnelly. 2010. Theory and experience with traceability of bulk commodities in grain handling systems. American Association of Cereal Chemists, Annual Meeting, Savannah, GA. October 24-28, 2010. Invited Symposium Presentation, Abstract
- Mosher, G.A. and Hurburgh, C.R. 2010. Delivery of an online quality management course for adult learners. Presentation given at the Association of Technology Management and Applied Engineering (ATMAE) Annual Conference. Panama City, FL, October 2010.
- Mosher, G.A., Keren, N., and Hurburgh, C.R. 2010. The impact of employee trust on the perceptions of organizational safety and quality. Presentation given at the Association of Technology Management and Applied Engineering (ATMAE) Annual Conference. Panama City, FL, October 2010.
- Mosher, G.A. & Hurburgh, C.R. 2011. The role of trust and safety climate in agricultural safety decision-making. ISASH Proceedings Paper # 11-09. Boise, ID: ISASH (International Society of Agricultural Safety and Health
- Hurburgh, C. R. 2011. Food Safety and Quality Management in Bulk Grains. Proceedings of GEAPS Exchange 2011, March 2, 2011, Portland, OR. Grain Elevator and Processing Society, Minneapolis, MN.

## **Abstracts and Posters**

- Hurburgh, C.R., Jr. 1987. Moisture and compositional analysis in today's grain market. *Cereal Foods World* 32(9):649 (Abstr.)
- Hurburgh, C.R., Jr., T.J. Brumm and R.A. Hartwig. 1988. Annual surveys of soybean protein and oil content. *J.A.O.C.S.* 65(4):477 (Abstr.)
- Hurburgh, C.R., Jr. and R.A. Hartwig. 1989. Determination of moisture, protein and oil in whole soybean seed by near-infrared transmittance. *J.A.O.C.S.* 66(4):426 (Abstr.) Received outstanding paper award at AOCS Annual Meeting, May 1989.
- Redding, C.D., C.R. Hurburgh, Jr., L.A. Johnson, and S.F. Fox. 1989. Adjustment of maize quality data for moisture content. *Cereal Foods World* 34(9):788 (Abstr.)
- Redding, C.D., C.R. Hurburgh, Jr., L.A. Johnson, and S.F. Fox. 1989. Relationships among maize quality factors. *Cereal Foods World* 34(9):788 (Abstr.)
- Johnson, L.A., S.F. Fox, C.R. Hurburgh, Jr. and C.D. Redding. 1989. Relationships between physical and compositional properties to wet milling characteristics of maize. *Cereal Foods World* 34(9):796 (Abstr.)
- Hurburgh, C.R., Jr. 1990. Near-infrared transmittance measurement of soybean protein and oil content at country elevators. *Inform* 1(4):342 (Abstr.)
- Hartwig, R.A. and Charles R. Hurburgh, Jr. 1990. An interlaboratory comparison of soybean protein and oil determinations. *Inform* 1(4):342 (Abstr.)
- Hurburgh, C.R., Jr. 1991. A comparison of instruments for measuring protein and oil content of unground soybean seeds. *Inform* 4(2):353 (Abstr.)
- Brumm, T.J., L.A. Johnson and C.R. Hurburgh, Jr. 1991. The potential of near-infrared spectroscopy for determining corn wet milling characteristics. *Cereal Foods World* 36(8):706 (Abstr.)
- Hurburgh, C.R., Jr. 1992. Performance of near-infrared transmittance analyzers in corn. *Cereal Foods World* 37(7):552 (Abstr.)
- Hurburgh, C.R., Jr. 1993. Identification and segregation of high-value soybeans at a country elevator. *Inform* 4(4):502 (Abstr.)
- Hardy, C.L., G.R. Rippke, C.R. Hurburgh, Jr., and T.J. Brumm. 1995. Calibration of whole-grain near-infrared analyzers for grain market use. *Cereal Foods World* 40(9):685 (Abstr.)
- Hurburgh, C.R., Jr. 1996. NIRS: How agriculture has modernized the technology. *Cereal Foods World* 41(7):588 (Abstr.)

- Hurburgh, C.R., Jr. 1996. Quality control in a network of whole-grain near-infrared analyzers. *Cereal Foods World* 41(7):593 (Abstr.)
- Hurburgh, C.R., Jr. 1998. Performance of a network of near-infrared analyzers. *Food Focus 1998*, American Association of Cereal Chemists, St. Paul, MN (Abstr.)
- Hurburgh, C.R., Jr. 1999. Supply Management Networks. 11<sup>th</sup> Annual Food Focus, Association of Cereal Chemists. N.W. Section, St. Paul, MN. April 19, 1999.
- Hurburgh, C.R., Jr. and R.G. Ginder. 1999. Supply chain management of soybean composition. *Proc. World Soybean Research Forum*, United Soybean Board, St. Louis, MO. August 5-7, 1999.
- Hurburgh, C.R., Jr. 1999. Production management of soybean composition. *Proc. World Soybean Research Forum*, United Soybean Board, St. Louis, MO. August 5-7, 1999.
- Hurburgh, C.R., Jr., G.R. Rippke, S. Roussel, C.L. Hardy and T.J. Brumm. 1999. Impact of multiple calibrations on accuracy of near-infrared analyzers. *Cereal Foods World*. 44(10) (abstr). Presentation at 84<sup>th</sup> Annual Meeting, American Association of Cereal Chemists.
- Hurburgh, C.R., Jr. 2000. Rapid identification of biotechnology products. *Cereal Foods World*. 45(8):340, <http://www.scisoc.org/aacc> (abstr). Presentation at 85<sup>th</sup> Annual Meeting, American Association of Cereal Chemists.
- Dzupin, R., S. A Roussel, G. R. Rippke, C. L. Hardy, and C. R. Hurburgh, Jr. 2000. NIRGrainNet: Internet-enabled software for real time prediction using NIR whole grain analyzers. 10<sup>th</sup> Diffuse Reflectance Conference, Chambersburg, PA. August 15, 2000 (poster).
- Cogdill, R.P., C.R. Hurburgh, Jr., T.C. Jensen, and R.W. Jones. 2001. Single kernel maize analysis by near infrared hyperspectral imaging. *Proc NIR 2001*, International Diffuse Reflectance Council, Seoul, Korea (poster, abstr).
- Roussel, S.A., C.L. Hardy, C.R. Hurburgh, Jr., and G.R. Rippke. 2001. Detection of genetically modified soybeans by near infrared spectroscopy. *European Commission. Environment, Health and Safety: A challenge for measurements*. UNESCO, Paris. June 14-15, 2001 (poster).
- Roussel, S.A., C.R. Hurburgh, Jr., and G.R. Rippke. 2002. Detection of genetically modified soybeans by near-infrared spectroscopy. *Pittcon 2002*, New Orleans, LA. March 17-20, 2002. (abstr)
- Roussel, S.A., C.R. Hurburgh, Jr., T. Schroeder, G.R. Rippke, and B. Carr. 2002. On-the-go grain measurements for research harvesters. *Pittcon 2002*, New Orleans, LA. March 17-20, 2002. (abstr)
- Roussel, S.A., C.R. Hurburgh, Jr., and D.B Funk. 2002. Noise robustness comparison of multivariate calibration models based on near-infrared spectroscopy measurements. *Pittcon 2002*, New Orleans, LA. March 17-20, 2002. (abstr)

- Cogdill, R.P., C.R. Hurburgh, Jr., T.C. Jensen, and R.W. Jones. 2002. Single Kernel Maize Analysis by Near-Infrared Hyperspectral Imaging. Pittcon 2002, New Orleans, LA. March 17-20, 2002. (poster)
- Dzupin, R., S.A. Roussel, and C.R. Hurburgh, Jr. 2002. Client-server based internet communications and analyzing model for NIR instruments. Pittcon 2002, New Orleans, LA. March 17-20, 2002. (poster)
- Cogdill, R.P., and C.R. Hurburgh, Jr. 2002. Photometric standardization of a near-infrared hyperspectral imaging spectrometer. 3<sup>rd</sup> International Meeting of the Dutch Royal Chemometrics Society (ICRM 2002), Veldhoven, The Netherlands. May 26-30, 2002. (poster)
- Hurburgh, C.R., Jr. 2002. Amino acid content of soybeans: Rapid measurement and long-term trends. 2002 Annual Meeting, American Oil Chemists Society, Montreal, PQ, Canada. May 4-7, 2002. (abstr)
- Hurburgh, C. R., Jr. and T. J. Sullivan. 2002. A quality management system for grain facilities: An ongoing case study. 2002 Annual Meeting, American Association of Cereal Chemists, Minneapolis, MN. (abstr.)
- Cogdill, R.P., C.R. Hurburgh, T.C. Jensen, R.W. Jones. 2002. Single Kernel Maize Analysis by Near-Infrared Hyperspectral Imaging. Iowa State University-Pioneer Hi-Bred International, Inc., Scientific Exchange. Johnston, Iowa. April 19, 2002. (poster)
- Cogdill, R.P., C.R. Hurburgh, Jr., T.C. Jensen, and R.W. Jones. 2002. Single Kernel Maize Analysis by Near-Infrared Hyperspectral Imaging. Corn Utilization and Technology Conference. Kansas City, Missouri. June 3-5, 2002. (poster)
- Dzupin, R., S.A. Roussel, C.R. Hurburgh. 2002. Client-Server Based Internet Communications and Analyzing Model for NIR Instruments. Corn Utilization and Technology Conference. Kansas City, Missouri. June 3-5, 2002. (poster)
- Jarboe, D., C.R. Hurburgh, and R.G. Ginder. 2002. Development of Producer Education Programs for Biotechnology Grains. Corn Utilization and Technology Conference. Kansas City, Missouri. June 3-5, 2002. (poster)
- Jarboe, D., C.R. Hurburgh, and R.G. Ginder. 2002. Leveraging Outreach Program Resources Through Technology. Corn Utilization and Technology Conference. Kansas City, Missouri. June 3-5, 2002. (poster)
- Hurburgh, C. R., Jr. 2003. Measurement of soybean fatty acid content with near-infrared spectroscopy. 2003 Annual Meeting, American Oil Chemists Society, Kansas City, MO May 5-9, 2003. (abstr)
- Hurburgh, C. R., Jr. 2003. Certification and source verification in the grain handling industry. 2003 Annual Meeting, Institute of Food Technologists, Chicago, IL. July 15, 2003 (abstr)

- Hurburgh, C. R., Jr. 2003. Biotechnology, world trade, and the bioeconomy. 2003 Annual meeting, American Association of Cereal Chemists, Portland OR. September 1-4, 2003 (abstr.)
- Hurburgh, C. R. Jr. 2004. Advances in Spectroscopic Methods for High Throughput Crop Analytics. Pittcon 2004, Chicago IL. Invited presentation.
- Kovalenko, I., G. Rippke, and C. R. Hurburgh, Jr. 2004. Near infrared spectroscopy determination of amino acid composition of soybeans. Pittcon 2004. Chicago, IL. (poster abstract 4100-3000)
- Hansen, Audrey, C.R. Hurburgh, Jr., R. Dzupin, G. Rippke, and R. Stephenson. 2004. Establishing a quality management system in a university based analytical laboratory. Pittcon 2004. Chicago, IL. (abstract)
- Hansen, Audrey, C.R. Hurburgh, Jr., R. Dzupin, G. Rippke, and R. Stephenson. 2004. Launching an internet enabled quality manual for a university based analytical laboratory. Pittcon 2004. Chicago, IL. (poster)
- Jarboe, Darren, C. R. Hurburgh, and R. Ginder. 2004. Iowa Grain Quality Initiative. Proceedings of the Corn Utilization Conference, June 7, 2004. National Corn Growers Association, St. Louis, MO. Poster.
- Kovalenko, I. V., G. Rippke, and C. R. Hurburgh, Jr. 2004. Measurement of Soybean Fatty Acids, Comparison of Linear and Non Linear Calibration Methods. IDRC-2004, International Diffuse Reflectance Conference, Chambersburg, PA. Aug 19-23, 2004. Poster.
- Yang, CiWen, C. R. Hurburgh, Jr., and E. Dierenfeld. 2004. A Spectral Wildlife Nutrition Database Using Visible and Near Infrared Spectroscopy. IDRC-2004, International Diffuse Reflectance Conference, Chambersburg, PA. Aug 19-23, 2004. Poster.
- Roussel, S. A. and C. R. Hurburgh, Jr. 2004. Comparison of artificial neural network and partial least squares calibrations for Infratec analyzers. 2004 American Association of Cereal Chemists Annual Meeting, San Diego, CA. September 20, 2004. Abstract.
- Laux, Chad, H. Brumm and C. Hurburgh. 2005. Student attitudes toward genetically modified foods. American Association of Cereal Chemists, annual meeting, September 17, 2005. Poster.
- Suryatmaadja, M. and C.R. Hurburgh, Jr. 2006. Ongoing Quality Control Program for NIRS-based Service and Research Laboratory. World Grains Summits: Foods and Beverages. American Association of Cereal Chemistry. Annual meeting, San Francisco, CA. October 17-20, 2006.
- Benoit Igne, Lance R. Gibson, Glen R. Rippke, and Charles R. Hurburgh, Jr. 2006. Evaluation of preprocessing methods in the development of near-infrared models for triticale protein

- and moisture. World Grains Summits: Foods and Beverages. American Association of Cereal Chemistry. Annual meeting, San Francisco, CA. October 17-20, 2006. Poster.
- L. Esteve Agelet, C. R. Hurburgh Jr., F. Mao, and J. A. Gaunt. 2007. Measurement of Organic Solvent Permeation through PVC Pipes with Near Infrared Spectroscopy. Pittcon 2007, February 21, 2007 (Poster)
- Bennett, G., and C. R. Hurburgh, Jr. 2007. Cost-Benefit analysis flow chart for identity preservation systems: A case study of ultra-low linolenic soybeans grown on Iowa farms. Second Annual Symposium, Institute for Food Safety and Security, Ames Iowa. April 12, 2007. Poster.
- Shepherd, H. and C. R. Hurburgh, Jr. 2007. FDA Registration and Record Maintenance for Grain Handling Facilities and Feed Mill Facilities. Second Annual Symposium, Institute for Food Safety and Security, Ames Iowa. April 12, 2007. Poster
- Gemesi, H. G., and C. R. Hurburgh, Jr. 2007. Geographic Food Origin Traceability Model. Second Annual Symposium, Institute for Food Safety and Security, Ames Iowa. April 12, 2007. Poster
- Laux, C., and C. R. Hurburgh, Jr. 2007. Traceability of commodity grain using a quality management system. Second Annual Symposium, Institute for Food Safety and Security, Ames Iowa. April 12, 2007. Poster
- Bennett, G., and C. R. Hurburgh, Jr. 2007. Cost-Benefit analysis flow chart for identity preservation systems: A case study of ultra-low linolenic soybeans grown on Iowa farms. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.
- Shepherd, H. and C. R. Hurburgh, Jr. 2007. FDA Registration and Record Maintenance for Grain Handling Facilities and Feed Mill Facilities. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.
- Gemesi, H. G., and C. R. Hurburgh, Jr. 2007. Geographic Food Origin Traceability Model. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.
- Laux, C., and C. R. Hurburgh, Jr. 2007. Traceability of commodity grain using a quality management system. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.
- Hardy, C.L., J. Gerde, C.R. Hurburgh, Jr. , and P.J. White. 2007. Rapid Determination of Oxidation in Frying Oils by NIR Spectroscopy. Proc. 98<sup>th</sup> Annual Meeting, American Oil Chemists Society, Quebec City, QC. May 13, 2007. Oral presentation.
- Hurburgh, C.R., Jr. 2007 Harmonizing Near Infrared Spectroscopic Measurements and Terminology: NIRS Component of the AOCS Soybean Quality Traits (SQT) Program.



- Proc. 98<sup>th</sup> Annual Meeting, American Oil Chemists Society, Quebec City, QC. May 13, 2007. Oral presentation.
- Hardy, C.L., J. Gerde, C.R. Hurburgh, Jr., and P.J. White. 2007. Rapid Determination of Oxidation in Frying Oils by NIR Spectroscopy. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Oral presentation.
- Esteve-Agelet, L., C. R. Hurburgh Jr., F. Mao, S. K. Ong and J. A. Gaunt. 2007. Measurement of Organic Solvent Permeation through PVC Pipes with Near Infrared Spectroscopy. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 17, 2007. Oral presentation.
- Igné, B., G.R. Rippke, C.R. Hurburgh. 2007. Robust Regression for Inter-Brand Standardization. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster.
- Yang, CiWen, Suming Chen, Charles R. Hurburgh, Jr, I-Chang Yang, Chih-Hsiang Wu. 2007. Standardization of soybean spectra across NIRS instruments using support vector machines. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster.
- Yang, CiWen, Suming Chen, I-Chang Yang, Yin-Chih Chen, J-Wen Liang and Charles R. Hurburgh. 2007. The identification of raw materials for herbal medicine by NIRS and FT-NIRS. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster..
- Yang, CiWen, Suming Chen, Ellen Deierenfeld and Charles R. Hurburgh. 2007. A wildlife nutritional database based on near-infrared spectroscopy. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster.
- Thakur M. and Hurburgh C.R, 2008. Conceptual Design of Fully Traceable Supply Chain for Agricultural Industry, 4th Trace Annual Meeting, Torremolinos, Spain. Poster.
- Gemesi, Gunsu and C. R. Hurburgh, Jr. 2008. GIS-Based farm traceability model. 4th Trace Annual Meeting, Torremolinos, Spain. Poster.
- Bennett, Greg and C. R. Hurburgh, Jr. 2008. Scorecard matrix for grain traceability and identity preserved production. 4th Trace Annual Meeting, Torremolinos, Spain. Poster.
- Benoit Igné, Glen R. Rippke, and Charles R. Hurburgh Jr. 2008. Spectral Pretreatment for Among Brand Near Infrared Instrument Standardization. Pittsburgh Analytical Conference, March 2-6, 2008, New Orleans, LA. Poster and published abstract.
- Glen R. Rippke, Connie L. Hardy, Charles R. Hurburgh, Jr., and Walter A. Goldstein. 2008. Methods of Calibrating NIRS Sensors when Biological Parameters are Correlated: The Case of Maize Amino Acids. Chemometrics in Analytical Chemistry, Montpellier, France. June 30-July 4, 2008. Poster, published abstract

- Igné, B. and C. R. Hurburgh, Jr. 2008. Fourier and Wavelet Coefficients Filtering for Near Infrared Instrument Calibration and Standardization. Chemometrics in Analytical Chemistry, Montpellier, France. June 30-July 4, 2008. Poster, published abstract.
- Connie L. Hardy, Glen R. Rippke, Charles R. Hurburgh, Jr., Walter A. Goldstein. 2008. Methods of Calibrating NIRS Sensors when Biological Parameters are Correlated: The Case of Maize Amino Acids. 14<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA August 1-6, 2008. Poster.  
Second place, Poster competition, Scientist division.
- Benoit Igné and Dr. Charles R. Hurburgh, Jr. 2008. Particle Swarm Optimization for Variable Selection – A Strong Competitor to Genetic Algorithms. 14<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA August 1-6, 2008. Oral Presentation.  
Second place, Poster competition, Graduate Student Division.
- Benoit Igné, Charles R. Hurburgh Jr. 2008. Fourier and Wavelet Filtering: a New Type of Spectral Pretreatment for Near Infrared Instrument Calibration and Standardization. 14<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA August 1-6, 2008. Poster.
- Lidia Esteve Agelet and Charles R. Hurburgh, Jr. 2008. Measures of validation for Near Infrared calibrations: The RPD. 14<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA August 1-6, 2008. Poster.
- Ana Maria DiMartino, Glen R. Rippke, and Charles R. Hurburgh, Jr. 2008. Calibration of Diode Array Spectrometers to Analyze Soybean Meal From Multiple Extraction Methods. 14<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA August 1-6, 2008. Poster.
- Allison Burgers and Charles R. Hurburgh, Jr. 2008. Prediction of Fermentable Starch Content in Corn by Near-Infrared Spectroscopy. 14<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA August 1-6, 2008. Poster.
- Benoit Igné and Dr. Charles R. Hurburgh, Jr. 2008. Using the Frequency Components of Near Infrared Spectra: Optimizing calibration and standardization processes. 14<sup>th</sup> International Diffuse Reflectance Conference, Chambersburg, PA August 1-6, 2008. Oral Presentation.
- Mosher, G.A., N. Keren, and S.A. Freeman. 2008. Role of Trust in Safety-Related Workplace Decisions. Presentation at the National Association of Industrial Technologists Annual Conference, Nashville, TN (November 14, 2008).
- Burgers, A. and C. R. Hurburgh, Jr. 2009. Prediction of fermentable starch content of corn by near-infrared spectroscopy. AACC International Annual Meeting. Baltimore, Maryland. September 13-16, 2009. Oral presentation.

- Hardy, C.L., Glen R. Rippke, Charles R. Hurburgh, Walter A. Goldstein. 2009. Calibration of near-infrared whole grain analyzers for amino acid measurement in corn. AACC International Annual Meeting, Baltimore, Maryland. September 13-16, 2009. Poster.
- Esteve Agelet, L., Gowen, A., Cogdill, R. P., O'Donell, C., and Hurburgh, C. R. 2009. Near Infrared Chemical Imaging Applied to Discrimination of Conventional and Genetically Modified Soybeans. NIR2009, The 14th International Conference on Near Infrared Spectroscopy. Bangkok, Thailand, 16th - 19th November, 2009. Abstract 01051. Poster.
- Cao, N., Han, D., Hurburgh, C.R. 2009. Determination of fat, protein and lactose in raw milk using shortwave NIR transmission. NIR2009. The 14th International Conference on Near Infrared Spectroscopy. Bangkok, Thailand, 16th - 19th November, 2009. Abstract 02038. Poster.
- Maitri Thakur and Charles R. Hurburgh. 2009. Traceability activities in the United States and the TRACE project. Final TRACE conference "How to trace the origin of food?" 2-3 December 2009 - Autoworld - Brussels - Belgium
- Burgers, A. and C. R. Hurburgh, Jr. 2009. Prediction of fermentable starch content of corn by near-infrared spectroscopy. AACC International Annual Meeting. Baltimore, Maryland. September 13-16, 2009. Oral presentation abstract.
- Robertson, A.E.**, Munkvold, G.P., Hurburgh, C.R. and Ensley, S. 2010. Impact of hail damage during early reproductive stages on ear rot and mycotoxin contamination of maize. 2010 American Phytopathology Society Annual Meeting, August 7-11, Nashville, TN.
- Fleur, A-F, Charles R. Hurburgh, Lidia Esteve Agelet, Glen Rippke, and Phillip Clancy. 2010. Calibration of a Diode Array NIR Transmission Spectrometer. International Diffuse Reflectance Conference, Chambersburg, PA. August 1-5, 2010. Poster.
- Esteve Agelet, L., Hurburgh, C. R., Gowen, A., O'Donell, C., Duvick, S. and Gardner, C. 2010. Single Seed Discrimination by NIRS. Oral session presented at the biannual International Diffuse Reflectance Conference (IDRC), Chambersburg, PA.
- Esteve Agelet, L., Rippke, G. R., and Hurburgh, C. R. 2010. Effect of Fourier-Transform Instrument Resolution on Grain Calibration Performance. Poster session presented at the biannual International Diffuse Reflectance Conference (IDRC), Chambersburg, PA.
- Esteve Agelet, L., Rippke, G. R., and Hurburgh, C. R. 2010. Genetically-Modified and Conventional Single Seed Soybean Discrimination with Fourier-Transform Transmittance. Poster session presented at the biannual International Diffuse Reflectance Conference (IDRC), Chambersburg, PA.
- Cao, N., Rippke, G., Hurburgh, C.R. 2010. Sample selection for calibration models in near-infrared spectroscopy. Poster session presented at the 15th International Diffuse Reflectance Conference (IDRC), Chambersburg, PA.

Robertson. A., Charles Hurburgh, Lisa Shepherd, Charles Block, and Roger Elmore. 2011.  
Goss's wilt: Get the facts. Proceedings of the Integrated Crop Management Conference,  
ISU Agricultural Education Program, Iowa State University, Ames, Iowa. December 1,  
2011.

### Preprints

- Hurburgh, C.R., Jr. and Kajewski, A.H. 1976. Teaching farm machinery management to winter quarter farm operations students, ASAE paper MCR 77-221. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. and C.J. Bern. 1978. Stirring applied to low-temperature grain drying. ASAE paper MCR 78-110. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr., C.J. Bern, and D.F. Cox. 1979. Performance of in-load grain sampling devices. ASAE paper 79-121. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr., C.J. Bern and D.F. Cox. 1979. Evaluating grain probing devices and procedures. ASAE paper 79-3035. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr., C.J. Bern and C.D. Sitzmann. 1979. Grading variability at country elevators. ASAE paper 79-3526. Am. Soc. Agri. Engr., St. Joseph, MI.
- Bern, C.J., M.E. Anderson, W.F. Wilcke, and C.R. Hurburgh, Jr. 1979. Auger stirring of wet and dirty corn. ASAE paper 79-3523. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. and C.J. Bern. 1980. Accuracy of electronic moisture meters in corn. ASAE paper 80-3050. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. and C.J. Bern and S.N. Grama. 1981. Improvements in the accuracy of corn moisture measurement in Iowa. ASAE paper 81-3135. Am. Soc. Agr. Engr., St. Joseph, MI.
- Bern, C.J. and C.R. Hurburgh, Jr. 1981. Performance of some on-farm moisture meters in corn. ASAE paper 81-3025. Am. Soc. Agr. Engr., St. Joseph, MI.
- Grama, S.N., C.J. Bern and C.R. Hurburgh, Jr. 1981. Airflow resistance of mixtures of corn and fines. ASAE paper 81-3526. Am. Soc. Agr. Engr., St. Joseph, MI.
- Bern, C.J., M.E. Anderson, W.F. Wilcke, and C.R. Hurburgh, Jr. 1982. Auger-stirring wet and dry corn-airflow resistance and bulk density effects. Trans. ASAE 25(1):217-220.
- Resurrecion, A.N., K. Venkatachalapathy, C.R. Hurburgh, Jr. and C.J. Bern. 1982. Moisture content determination using ground corn in an electronic moisture meter. ASAE paper MCR 82-112. Am. Soc. Agr. Engr., St. Joseph, MI.
- Grama, S.N., C.R. Hurburgh, Jr., and C.J. Bern. 1982. Moisture determination of soybeans. ASAE paper MCR 82-114. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. 1982. National application of the Iowa-Illinois corn moisture calibrations. ASAE paper MCR 82-115. Am. Soc. Agr. Engr., St. Joseph, MI.

- Paynter, L.E. and C.R. Hurburgh, Jr. 1982. An evaluation of three reference methods for corn moisture determination. ASAE paper MCR 82-116. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr., C.J. Bern, M.E. Anderson and W.F. Wilcke. 1982. Shrinkage and corn quality changes in on-farm handling operation. ASAE paper 82-3550. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hemeda, M.A., C.R. Hurburgh, Jr. and C.J. Bern. 1982. Effects of corn variety, mechanical damage, and drying temperature on electronic moisture meters. ASAE paper 82-3545. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. and Bruce W. Moechnig. 1982. Corn quality changes in commercial elevator operations. ASAE paper 82-3547. AM. Soc. Agr. Engr., St. Joseph, MI.
- Paynter, L.E. and C.R. Hurburgh, Jr. 1983. Reference methods for corn moisture determination. ASAE paper 83-3088. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. 1984. Probe sampling of corn. ASAE paper 84-3019. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. 1984. On-site testing of a sampling strategy for country elevators. ASAE paper 84-3020. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R. Jr., C.P. Baumel and T.P. Lee. 1984. Fuel requirements for grain shipments. ASAE paper 84-6538. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr., L.N. Paynter, S.G. Schmitt. 1985. Quality characteristics of midwest soybeans. ASAE paper 85-3534. Am. Soc. Agr. Engr., St. Joseph, MI.
- Schmitt, S.G. and C.R. Hurburgh, Jr. 1985. flatoxin content of 1983 Iowa corn. ASAE paper 85-3536. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. and C.J. Bern. 1985. Performance of farm-type moisture meters. ASAE paper 85-3008. Am. Soc. Agr. Engr., St. Joseph, MI.
- Brumm, T.J., and C.R. Hurburgh, Jr. 1987. End-use value of soybeans. ASAE paper 87-6743. Am. Soc. Agri. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr., R.A. Hartwig and L.N. Paynter. 1988. Measurement of soybean protein and oil content with near-infrared reflectance. ASAE paper 88-6045. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. and T.J. Brumm. 1988. Geographic variation in soybean protein and oil content. ASAE paper 88-6046. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. and C.J. Bern, and T.J. Brumm. 1989. Efficiency of rotary grain cleaners in dry corn. ASAE paper 89-6027. Am. Soc. Agr. Engr., St. Joseph, MI.

- Hurburgh, C.R., Jr. 1989. Value of quality to new and existing corn uses. ASAE paper 89-6016. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. 1990. Calibration sample selection and on line error detection for NIR in corn and soybeans. ASAE Paper 90-3067. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. 1990. Methods of achieving long-term stability of NIR calibrations for corn and soybeans. ASAE Paper 90-3068. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr. 1992. An engineering-economic model of grain cleaning. ASAE paper 92-6533. Am. Soc. Agr. Engr., St. Joseph, MI.
- Meinders, B.L. and C.R. Hurburgh, Jr. 1992. Properties of corn screenings. ASAE paper 92-6551. Am. Soc. Agr. Engr., St. Joseph, MI.
- Siska, Juraj and C.R. Hurburgh, Jr. 1993. Measurement of corn breakage susceptibility and hardness with near-infrared spectroscopy. ASAE paper 93-6595. Am. Soc. Agr. Engr., St. Joseph, MI.
- Wu, Yan fang and C.R. Hurburgh, Jr. 1993. New technologies for grain moisture measurement. ASAE paper 93-6574. Am. Soc. Agr. Engr., St. Joseph, MI.
- Hurburgh, C.R., Jr., J.L. Neal, M.L. McVea, and C.P. Baumel. 1994. The capability of elevators to segregate grain by intrinsic quality. ASAE paper 94-6050. Am. Soc. Agr. Engr., St. Joseph, MI.
- Stevermer, S.W., B.L. Steward, R.P. Cogdill and C.R. Hurburgh, Jr. 2003. Automated Sorting and Single Kernel Analysis by Near-Infrared Hyperspectral Imaging. ASAE Paper 036159. Am. Soc. Agr. Engr., St. Joseph, MI.
- Ye, W., J. Lorimor, and C. Hurburgh. 2003. Application of near-Infrared spectroscopic technique for determination of nutrient and mineral contents in livestock manures. ASAE paper 033029. Am. Soc. Agr. Engr., St. Joseph, MI.
- Maitri Thakur, Lizhi Wang, Charles R. Hurburgh, 2009. "A lot aggregation optimization model for minimizing food traceability effort", ASABE Annual International Meeting, Reno, Nevada, June 21-24, 2009. Paper 095727.

### **Other publications and presentations**

- Hurburgh, C.R., Jr. 1978. Iowa probe test – Users manual. Grain probe test and computer analysis developed for Iowa Department of Agriculture, September 1978. Agricultural Engineering Department, Iowa State University, Ames, Iowa.
- Hurburgh, C.R., Jr. 1980. Moisture Meters – standardized now but problems remain. Iowa Grain and Feed Review, October 1980. Iowa Grain and Feed Association, Des Moines, IA.
- Hurburgh, C.R., Jr. and C.J. Bern. 1979 with revisions. A practical guide to grain storage and handling. Grain Conditioning course text. Agricultural Engineering Dept., Iowa State University, Ames, IA.
- Hill, L.D., C.R. Hurburgh, Jr. and M. Paulsen. 1981. Illinois-Iowa moisture meter recalibrations for corn. AE-4515. Department of Agricultural Economics, University of Illinois, Urbana, IL.
- Baumel, C.P., C.R. Hurburgh, Jr. and Tenpao Lee. 1983. Fuel consumption in grain shipments. Report to Iowa Department of Transportation, June 1983. IA Dept. of Trans., Ames, IA.
- Hurburgh, C.R., Jr. 1983. NIR: Its role and future in grain trading. AE-3013. Cooperative Extension Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1983. CIM: Breakage susceptibility, causes and cures. AE-3014. Cooperative Extension Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. and W.F. Wilcke. 1984. Using farm moisture testers. AE-3024. Cooperative Extension Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1985. A commitment to quality in U.S. grain. Presented at American Farm Bureau Grain Quality Conference. September 10-12, 1985, Chicago, IL.
- Hurburgh, C.R., Jr. 1986. A new emphasis on grain quality in the marketplace. Presented at the 84th Annual Convention of the Iowa Seed Association, October 27-29, 1986, Des Moines, IA.
- Hurburgh, C.R., Jr. 1986. Research-the groundwork for quality improvement. Presented at American Soybean Association Convention, July 29-31, 1986, Cincinnati, OH.
- Hurburgh, C.R., Jr. 1986. Protein and oil testing could be money in your pocket. Presented at American Soybean Association Convention, July 28-31, 1986, Cincinnati, OH.
- Hurburgh, C.R., Jr. 1987. Nutrient testing is coming to the soybean market. Presented at the National Soybean Breeders Workshop, Memphis, TN, February 24, 1987.
- Hurburgh, C.R., Jr. 1988. Commitment to quality--have we made it? 1988 Corn Classic, National Corn Growers Association, St. Louis, MO.



- Hurburgh, C.R., Jr. 1988. Continued progress toward marketing soybeans by protein and oil content. Presented at Soybean Expo '88, American Soybean Association, St. Louis, MO.
- Hurburgh, C.R., Jr. 1988. New quality concepts for corn and soybeans. Presented at the 84th Annual Convention of the Iowa Seed Association, Iowa Seed Association, Des Moines, IA.
- Hurburgh, C.R., Jr. 1989. Grain quality: Regaining competitiveness in world markets. Iowa Food and Energy Conference, Iowa Electrification Council, Des Moines, IA.
- Hurburgh, C.R., Jr., Dan Loy, Lee Kilmer, William Owings, and Rodney Williamson. 1989. Nutrient content and feeding value of Iowa corn. Publ. AS-598. Iowa Cooperative Extension Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1989. How can the State of Iowa improve grain quality? Testimony before the Iowa Legislature, February 1, 1989.
- Hurburgh, C.R., Jr. 1989. The challenge of marketing soybeans by protein and oil content. Presented at Soybean Expo '89, American Soybean Association, St. Louis, MO.
- Hurburgh, C.R., Jr. and T.J. Brumm. 1989. Estimated processed value: A new concept in soybean marketing. American Soybean Association 1989 Trade Mission to the Far East. American Soybean Association, St. Louis, MO.
- Hurburgh, C.R., and T.J. Brumm. 1989. Soybean Quality: A buyers perspective. American Soybean Association 1989 Trade Mission to the Far East American Soybean Association, St. Louis, MO.
- Hurburgh, C.R., Jr. ed. 1989. Grain quality: Competitiveness in world markets. A policy development conference. Conference proceedings. Nebraska Wheat Board, Lincoln, NE.
- Hurburgh, C.R., Jr. 1989. Grain quality and the 1990 Farm Bill. Presented at Iowa Section, Institute of Food Technologists, Cedar Rapids, IA.
- Brumm, T.J. and C.R. Hurburgh, Jr. 1990. Shriveled and wrinkled soybeans: Determination and effect on processing. Final report, Spec. Coop. Agreement 58-5114-9-1024. Ag. Res. Service, USDA, Washington, D.C.
- Hurburgh, C.R., Jr. 1991, 1993. Customer demands for quality grain: The market of the 1990s. Presented at: Grain Quality Conference, Midwest Grain Marketing Commission; Iowa-Mexico Specialty Grain Forum; Iowa Institute of Cooperation grain workshops, Iowa Seed Association Convention (1993).
- Hurburgh, C.R., Jr. 1991. Cleaner soybeans - the proposed change in Standards. Presented at Soybean Expo '91, American Soybean Association, St. Louis, MO.
- Hurburgh, C.R., Jr. 1991. Reducing foreign material limits in Official Soybean Standards: Economic and competitive impacts. Testimony presented to the U.S. Senate Committee on Agriculture, October 29, 1991.

- Hurburgh, C.R., Jr. 1992. Feasibility of whole-grain near-infrared analysis. Final report of Specific Cooperative Agreement 58-43 YK-9-0034. Ag. Res. Service, USDA, Washington, D.C.
- Hurburgh, C.R., Jr. 1992. Costs and benefits of redefining the grade factor broken corn - foreign material. Report of the Iowa component. Federal Grain Inspection Service, USDA, Washington, D.C.
- Hurburgh, C.R., Jr. 1994. Costs and benefits for cleaning soybeans. Final report of Specific Cooperative Agreement 58-43. Econ. Res. Service, USDA, Washington, D.C.
- Hurburgh, C.R., Jr. 1995. Value-added grains: The market of the 1990s. Bulletin PM-1634. Coop. Ext. Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr., and W.F. Wilcke. 1995. 1995 (Rev). Using farm moisture testers. Bulletin PM-1633. Coop. Ext. Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1995. Moisture basis conversions for grain composition data. Bulletin PM-1625. Coop. Ext. Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr., and M.K. Misra. 1995 (Rev). Soybean drying and storage. PM-1636. Coop. Ext. Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr., and G.O. Benson. 1995. Frost damage to corn and soybeans. Bulletin PM-1635. Coop. Ext. Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1996. Distribution of value-added grain quality data to extension clientele. Results of strip-plot sampling 1995. Coop. Ext. Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1996. Calibration and standardization of whole-grain near-infrared analyzers. Presented at 8<sup>th</sup> International Diffuse Reflectance Symposium, Chambersburg, PA.
- Hurburgh, C.R., Jr. 1997. Have you checked your grain bin? Bulletin SP-46. Coop. Ext. Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1997. Initiation of end-user specific grain marketing at Iowa Elevators. MATRIC Paper 97-MWP2. MATRIC, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1997. Quality of 1997 corn and soybeans produced in Iowa.
- Hurburgh, C.R., Jr. 1997. 1997 National Corn Quality Survey Report. Iowa Grain Quality Initiative, <http://www.exnet.iastate.edu/Pages/grain/homepage.html>.
- Hurburgh, C.R., Jr. 1997. 1997 National Soybean Quality Survey Report. Iowa Grain Quality Initiative, <http://www.exnet.iastate.edu/Pages/grain/homepage.html>.
- Hurburgh, C.R., Jr. 1998. Crop quality report. ICM Newsletter, Nov. 4, 1998, Cooperative Extension Services, Iowa State University, Ames, IA.

- Hurburgh, C.R., Jr. 1998. Quality of 1998 corn and soybeans produced in Iowa. Iowa Grain Quality Initiative, <http://www.exnet.iastate.edu/Pages/grain/homepage.html>.
- Park, H.S. and C.R. Hurburgh, Jr. 1998. Improving the U.S. position in world soybean meal trade. Final report to MATRIC, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 1998. 1998 National Soybean Quality Survey Report. Iowa Grain Quality Initiative, <http://www.exnet.iastate.edu/Pages/grain/homepage.html>.
- Hurburgh, C.R., Jr. 1998. Value-Added Grains – Market of the 1990s. Eastern Iowa Ag Technology Conference, Cedar Rapids, IA.
- Hurburgh, C.R., Jr. 1998. Critical elements of value-added grains. Presented at Cashing in on Value-Added, Storm Lake, IA.
- Hurburgh, C.R., Jr. 1998. High oil corn and swine feeding. Presented at Eastern Iowa Swine Conference, Cooperative Extension Service, Amana, IA.
- Hurburgh, C.R., Jr. 1998. Component pricing of commodity soybeans. Presented at Value-Added Grains Conference, Iowa Soybean Association, Des Moines, IA.
- Hurburgh, C.R., Jr. 1999. Marketing the 1998 corn crop. Satellite uplink presentation, Cooperative Extension Service, Iowa State University, Ames, IA. April 23, 1999.
- Hurburgh, C.R., Jr. 1999. Supply networks for grain. Presented at Food Focus 1999, American Association of Cereal Chemists, St. Paul, MN.
- Hurburgh, C.R., Jr. 1999. PHP-producers handlers and processors working together. Presented at 1999 annual meeting, Ag Processing, Inc., Omaha, NE.
- Hurburgh, C.R., Jr. 1999. Value-Added Grains. Presented at Farmland Industries crop specialist meeting, Ames, IA. February 12, 1999.
- Hurburgh, C.R., Jr. 1999. Biotechnology and the U.S. Grain Market. Presented at Golden K. Kiwanis, Ames, IA. June 24, 1999.
- Hurburgh, C.R., Jr. and M.E. Westgate. 1999. Adding value to commodity soybeans. Presented at Annual Information Seminar, Iowa Grain Quality Initiative, ISU, Ames, IA. June 19, 1999. [www.iowagrains.org](http://www.iowagrains.org).
- Hurburgh, C.R., Jr. 1999. The VIPS Database. Presented at Midwest Soybean Conference, Chicago, IL. August 7, 1999.
- Hurburgh, C.R., Jr. 1999. Supply networks for grain. Presented at Annual Information Seminar, Iowa Grain Quality Initiative, ISU, Ames, IA. June 19, 1999. [www.iowagrains.org](http://www.iowagrains.org).

- Hurburgh, C.R., Jr. 1999. Quality and handling properties of the 1999 crop. Presented at Greater Iowa GEAPS, Ft. Dodge, IA. September 14, 1999.
- Hurburgh, C.R., Jr. 1999. Handling the 1999 corn crop. ICN presentation, September 15, 1999. [www.iowagrains.org](http://www.iowagrains.org).
- Hurburgh, C.R., Jr. 1999. Update of GMO. Presented at Iowa Section, Institute of Food Technologists, Ames, IA. November 18, 1999.
- Hurburgh, C.R., Jr. 1999. GMO decisions. Eastern Iowa Integrated Crop Management Conference. Cedar Rapids, IA. December 20, 1999.
- Hurburgh, C.R., Jr. 2000. Marketing the 1999 Crop and Planning for 2000. Hardin County Integrated Crop Management Clinic. January 14, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Annual meeting Practical Farmers of Iowa. January 15, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Boone County Wednesday Ag Series. January 19, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Worth County Annual Crop Clinic. January 27, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Cerro Gordo County Annual Crop Clinic. January 27, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Novartis Crop Production Conferences. January 31, February 1-3, 2000.
- Hurburgh, C.R., Jr. 2000. Grain quality and production contracts. Iowa Chapter, Independent Crop Consultants. February 4, 2000.
- Hurburgh, C.R., Jr. 2000. Testing and handling GMO and non-GMO grains. Northeast Iowa Extension Crop Conference. February 8, 2000.
- Hurburgh, C.R., Jr. 2000. GMO analysis. Central Illinois Crop Conference. February 21, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. North Iowa Farm Expo. March 2, 2000.
- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Johnson County Extension Clinic. March 30, 2000.
- Hurburgh, C.R., Jr. 2000. GMO's and corn handling. Presented at 41<sup>st</sup> Annual Meeting, North American Millers Association, Peoria, IL. June 1, 2000.

- Hurburgh, C.R., Jr. 2000. The GMO controversy and grain handling for 2000. Extension Crop Specialist In-Service. September 21, 2000.
- Hurburgh, C.R., Jr. 2000. GMO Grains – Lessons Learned. Biotechnology Education Conference, Office of Biotechnology, Iowa State University, Ames, IA. October 9, 2000.
- Harl, N.E., R. Wisner, R. Ginder, C. Hurburgh, and S. Moline. 2000 with updates. The StarLink Situation. <http://www.iowagrains.org>.
- Hurburgh, C.R., Jr. 2000. Soybean Quality: 2000 Crop and Historical Trends. American Soybean Association Asia Quality Seminar, Tokyo and Seoul. December 3-9, 2000.
- Hurburgh, C.R., Jr. 2001. Meter to meter inspection programs. Presented at Central Weights and Measures Association, Bettendorf, IA. September 12, 2000.
- Hurburgh, C.R., Jr. 2001. The GMO issue: Planting 2001. Presented at Hardin County ICM Conference, Iowa Falls, IA. January 12, 2001.
- Hurburgh, C.R., Jr. 2001. The GMO issue: Planting 2001. Presented at Boone Co. Extension Conference, Boone, IA. January 17, 2001.
- Hurburgh, C.R., Jr. 2001. Supply networks. Presented at Innovative Growers membership meeting. Pickens, IA. February 8, 2001.
- Hurburgh, C.R., Jr. 2001. Supply networks. Presented at Innovative Growers membership meeting. Algoona, IA. February 8, 2001.
- Hurburgh, C.R., Jr. 2001. Supply networks. Presented at Innovative Growers membership meeting. Fort Dodge, IA. January 9, 2001.
- Hurburgh, C.R., Jr. 2001. Supply networks. Presented at Innovative Growers membership meeting. Clear Lake, IA. January 9, 2001.
- Hurburgh, C.R., Jr. 2001. The GMO issue: Planting 2001. Presented at Webster County Master Growers, February 13, 2001.
- Hurburgh, C.R., Jr. 2001. Supply networks. Presented at Innovative Growers membership meeting. Eldridge, IA. February 20, 2001.
- Hurburgh, C.R., Jr. 2001. Supply networks. Presented at Innovative Growers membership meeting. Cedar Rapids, IA. February 20, 2001.
- Hurburgh, C.R., Jr. 2001. The GMO issue: Planting 2001. Presented at Crop Specialists In-Service. March 21, 2001. Ames, IA.
- Hurburgh, C.R., Jr. 2001. Biotechnology issues. Presented at FAS Agricultural Attaché tour. June 8, 2001.

- Hurburgh, C.R., Jr. 2001. StarLink: Creating a National Biotechnology Policy. Presented at GMO Workshop, Seed Science Center July 31, 2001.
- Hurburgh, C.R., Jr. 2001. Biotechnology policy for the future. Presented at Sustainable Agriculture Colloquium, September 17, 2001.
- Hurburgh, C.R., Jr., and T.L. Sullivan. 2001. The role of USDA in certification systems for agriculture. Presented at USDA, July 16, 2001.
- Hurburgh, C.R. 2001. Quality of the 2001 Soybean Crop from the United States. American Soybean Association Asia Quality Seminar. November 26 – December 6. Tokyo, Seoul, Taipei.
- Jarboe, D., C.R. Hurburgh, R.G. Ginder, and L.A. Johnson. 2001. Leveraging Outreach Resources Through Technology. 2001 Outreach Scholarship Conference. State College, PA. October 15, 2001.
- Hurburgh, C.R., Jr. 2002. Quality control process for grain analyses at elevators. GEAPS North Central Regional Conference, June 12, 2002.
- Hurburgh, C. R., Jr. 2002. Source verification for Iowa specialty soybean markets. Iowa-Japan Trade Mission, Tokyo Japan. November 19, 2002.
- Cogdill, R. P. and C. R. Hurburgh, Jr. 2002. Local chemometrics. 7<sup>th</sup> Chemometrics Symposium, Belgian Chemometrics Society, Machelen, Belgium. December 4, 2002.
- Brumm, T.J. and C. R. Hurburgh, Jr. 2002. Quality of the 2002 US Soybean Crop. American Soybean Association Asia Quality Seminar Tour. November 15-24, 2002. Tokyo, Seoul, Taipei, Shanghai.
- Hurburgh, C. R., Jr. 2002. Quality of the 2002 Corn and Soybean Crop from North Central Iowa. Presented at GEAPS Greater Iowa Chapter, September 12, 2002.
- Brumm, T.J. and C. R. Hurburgh, Jr. 2003. Quality of the 2003 US Soybean Crop. American Soybean Association Asia Quality Seminar Tour. November 15-22, 2003. Tokyo, Seoul, Taipei, Beijing, Shanghai, Dalian.
- Hurburgh, C. R., Jr. 2003. Quality of the 2003 Corn and Soybean Crop from North Central Iowa. Presented at GEAPS Greater Iowa Chapter, September 5, 2003.
- Hurburgh, C. R., Jr. 2003. Improvement of Soybean Quality. Iowa Soybean Association. March 31, 2003.
- Hurburgh, C. R. Jr. 2003. Improvement of Corn Quality. Iowa Corn Promotion Board. June 25, 2003.
- Hurburgh, C.R., Jr. 2003. Biotechnology and the Iowa Bioeconomy. Agribusiness Association of Iowa Marketing Seminar. March 18, 2003.

- Hurburgh, C. R. , Jr. 2003. Biotechnology, World Grain Trade and Grain Handling. US Grains Council International Biotechnology Tour. October 3, 2003.
- Cogdill, R. P. and C. R. Hurburgh, Jr. 2003. Imaging spectroscopy for seed analysis. Fulbright Fellowship presentation. NIR NORD, Copenhagen, DK. February 18, 2003.
- Hurburgh, C. R., Jr. 2004. Certification and source verification in the bulk corn market. Proceedings of the Corn Utilization Conference, June 7, 2004. National Corn Growers Association, St. Louis, MO. Invited presentation.
- Hurburgh, C. R., Jr. 2004. Near infrared spectroscopy for crop analytics: Advances and challenges. Proc. International Grain Quality Conference, Indianapolis, IN. July 19-21, 2004. Invited presentation.
- Hurburgh, C. R., Jr. 2004. Quality of US Soybeans. F.I.R.S.T. Annual Meeting, Morton, MN. January 30, 2004
- Hurburgh, C. R., Jr. 2004. Certification, Traceability and Security in the Grain Handling Industry. Educational Seminar, Grain Elevator and Processing Society, Ames, IA. January 21, 2004.
- Hurburgh, C. R., Jr. 2004. Certification and Traceability in US Grain Markets. Sustainable Agriculture Colloquium, Ames, IA. February 4, 2004.
- Hurburgh, C. R., Jr. 2004. Quality Management Systems for Elevators. NC 213 Multistate Annual Technical Meeting, Minneapolis, MN. February 25, 2004.
- Hurburgh, C.R., Jr. 2004. An ISO-based system for quality management and traceability in the US grain handling industry. Proc. International Grain Quality Conference, Indianapolis, IN. July 19-21, 2004. Invited presentation.
- Jarboe, D., R. Ginder, and C.R. Hurburgh, Jr. 2004. Corn stewardship for biotechnology corn. Proc. International Grain Quality Conference, Indianapolis, IN. July 19-21, 2004.
- Brumm, T.J., and C. R. Hurburgh, Jr. 2004. Long-term study of US Soybean Quality: Protein, oil and amino acids. Proc. International Grain Quality Conference, Indianapolis, IN. July 19-21, 2004.
- Hurburgh, C. R., Jr. 2004. Quality of the 2004 Corn and Soybean Crop in NC Iowa. GEAPS Greater Iowa Chapter, September 14, 2004. Invited presentation.
- Hurburgh, C. R., Jr. 2004. Security, Certification, and Product Traceability in the Grain Handling Industry. Plant Sciences Seminar Series. Department of Plant Pathology. October 5, 2004.
- Hurburgh, C. R., Jr. 2004. Certification and traceability in US grain markets. AEGO Seminar Series. Department of Agricultural and Biosystems Engineering. November 11, 2004.

- Hurburgh, C. R. Jr. 2004. Quality management systems, traceability and food safety in US Grain Markets. Food Science Seminar Series. Department of Food Science and Human Nutrition, Iowa State University. December 4, 2004.
- Brumm, T. J. , C. R. Hurburgh, Jr. and G.R. Rippke. 2004. Quality of the 2004 US Soybean Crop. American Soybean Association, St. Louis , MO. Invited presentations Seoul, Shanghai, Beijing, Tokyo, Taipei. November 2004.
- Garraude, Y.G., C. R. Hurburgh, Jr., G.R. Rippke, and C. Yang. 2004. Measurement of antioxidant factors in rosemary with NIR. Kemin seminar series, Kemin Americas Co., Des Moines, IA. October 19, 2004.
- Hurburgh, C.R., Jr. 2004. Certification, and Product Traceability in the Grain Handling Industry. Purdue University International Training Seminar, Purdue University, W. Lafayette, IN. December 15, 2004. Invited Presentation.
- Hurburgh, C.R., Jr. 2005. Grain Quality Analysis for Soybean Train Development. Soybean Breeders Workshop, St. Louis, MO. February 22, 2005. Invited Presentation.
- Hurburgh, C. R. Jr. 2005. Traceability for US grain markets. North Central Regional GEAPS Conference, Ames, Iowa. June 14, 2005. Invited presentation.
- Hurburgh, C. R., Jr. Dan Loy, and Alison Robertson. 2005. Aflatoxins in Corn. PM1800, Cooperative Extension Service, Iowa State University, Ames, IA.
- Hurburgh, C.R., Jr. 2005. Quality Issues in 2005 Corn. Eastern Iowa Aflatoxin Workshop, Cooperative Extension Service, Iowa State University, Ames, IA. October 3, 2005.
- Hurburgh, C. R. ,Jr. 2005. Sampling and Testing For Aflatoxin in Corn. [www.iowagrains.org](http://www.iowagrains.org) (10/26/2005), Cooperative Extension Service, Iowa State University, Ames, IA
- Hurburgh, C.R., Jr. 2005. Grain quality and grain handling issues in drought-stressed areas. Integrated Crop Management, 9/12/2005. Cooperative Extension Service, Iowa State University, Ames, IA
- Hurburgh, C. R., Jr. 2005. Grain Storage Challenges in Iowa for the 2005 Crop. <http://www.extension.iastate.edu/agenergy/info/update1.html> October 26, 2005. Cooperative Extension Service, Iowa State University, Ames, IA
- Hurburgh, C.R., Jr. 2005. Quality of the 2005 Corn and Soybean Crop from North Central Iowa. Greater Iowa Chapter, Grain Elevator and Processing Society, Boone IA. September 19, 2005.
- Hurburgh, C. R., Jr. 2005. The impact of the new FDA bioterror regulations on Iowa agriculture. Proc. 2005 Integrated Crop Management Conference, Agribusiness Education Program, Iowa State University, Ames, Iowa November 30 – December 5, 2005.



- Hurburgh, C.R., Jr. 2005. Quality and storage challenges for the 2005 crop. Proc. 2005 Integrated Crop Management Conference, Agribusiness Education Program, Iowa State University, Ames, Iowa November 30 – December 5, 2005.
- Hurburgh, C. R., Jr. 2005. Traceability in the Grain Handling System. Omaha GEAPS Chapter Meeting, Gretna, NE. December 5, 2005.
- Hurburgh, C. R., Jr. 2006. Quality and storage challenges for the 2005 crop. Agribusiness Education Crop Adviser Series, Agribusiness Education Program, Iowa State University. Burlington and Cedar rapids, IA. January 4 and 5, 2006.
- Hurburgh, C.R., Jr. 2006. Traceability and grain handling: A wider view. Agribusiness Association of Iowa annual meeting, Des Moines, IA. January 11, 2006.
- Connie L. Hardy, Mary S. Holz-Clause, Howard E. Shepherd and Charles R. Hurburgh, Jr. 2006. Sourcing Corn for Ethanol: Impacts of Local Processing. Report of Iowa Grain Quality Initiative. November 2006. [www.iowagrains.org](http://www.iowagrains.org)
- Hurburgh, C. R., Jr. 2007. Traceability and biosecurity issues for grain. Operations Management Training, Grain Elevator and Processing Society, Minneapolis, MN. August 2, 2007.
- Hurburgh, C. R., Jr. 2007. Current issues in grain storage and handling. Extension regional workshops on grain storage. Cooperative Extension Service. Ames IA. Sheldon, IA August 8, 2007; Dows, IA August 9, 2007, Indianola, IA. November 12, 2007, Sully, IA November 13, 2007; Newton, IA November 14, 2007.
- Laux, Chad and C. R. Hurburgh, Jr. 2008. Traceability of bulk grains. GEAPS / IAOM – Great Lakes Regional Conference, Angola, IN. April 12, 2008. Invited Presentation (CY08, FFY08)
- Thakur M. and Hurburgh C.R, 2008. Conceptual Design of Fully Traceable Supply Chain for Bulk Agricultural Commodities, NC-213: 2008 Annual Meeting, Omaha, Nebraska February 27, 2008.
- Charles Hurburgh and Roger Elmore. 2008. Corn Quality Issues in 2008 – Storage Management. Integrated Crop Management Newsletter, Iowa State University Extension. October 24, 2008.  
<http://www.extension.iastate.edu/CropNews/2008/1023hurburghrobertson.htm>
- Charles Hurburgh, Alison Robertson, Roger Elmore. 2008. Corn Quality Issues in 2008 – Field Molds. Integrated Crop Management Newsletter, Iowa State University Extension. October 24, 2008.  
<http://www.extension.iastate.edu/CropNews/2008/1023hurburghrobertsonelmore2.htm>
- Charles Hurburgh, Roger Elmore. 2008. Corn Quality Issues in 2008 - Moisture and Test Weight. Integrated Crop Management Newsletter, Iowa State University Extension, October 24, 2008.

<http://www.extension.iastate.edu/CropNews/2008/1023hurburghrobertsonelmore1.htm>

Charles Hurburgh. 2008. Corn Breakage Increases with More Drying. Integrated Crop Management Newsletter, Iowa State University Extension. November 6, 2008. <http://www.extension.iastate.edu/CropNews/2008/1105hurburg.htm>

Charles Hurburgh. 2008. Aerate Grain NOW. Integrated Crop Management Newsletter, Iowa State University Extension. November 21, 2008. <http://www.extension.iastate.edu/CropNews/2008/112108hurburgh.htm>

Hurburgh, C. R., Jr. 2008. Instrumentation, Calibration and Sample Handling for On Farm Research. On Farm Research Conference, Agribusiness Education Program, Iowa State University, Ames, IA. December 18-19, 2008.

Hurburgh, C.R., Alison Robertson and Gary Munkvold. 2009. Quality Issues Related to Hail Damaged Crops. Integrated Crop Management News, September 9, 2009 and presentations September 17 (Callender, IA and Wall Lake, IA) and September 24 (Hubbard, IA).

Hurburgh, C. R. 2009. Corn quality issues continue. Integrated Crop Management News, July 15, 2009.

A six-part series was done for the Integrated Crop Management Newsletter, October, November and December 2009..

2009 Corn Quality Issues. Charles Hurburgh, Department of Agricultural and Biosystems Engineering; Roger Elmore, Department of Agronomy

2009 Corn Quality Issues – Field Molds. Alison Robertson, Department of Plant Pathology; Roger Elmore, Department of Agronomy; Charles Hurburgh, Department of Agricultural and Biosystems Engineering

2009 Corn Quality Issues – Storage Management. Charles Hurburgh, Department of Agricultural and Biosystems Engineering; Roger Elmore, Department of Agronomy

Soybean Quality Issues in 2009. Charles Hurburgh, Department of Agricultural and Biosystems Engineering; Palle Pedersen, Department of Agronomy

A Tough Harvest - Frequently Asked Questions. Charles R. Hurburgh, Department of Agricultural and Biosystems Engineering

A Tough Harvest - Frequently Asked Questions, Update. Charles Hurburgh, Department of Agricultural and Biosystems Engineering.

Hurburgh, C. R. 2009. The 2009 Corn & Soybean Crop: Harvest Planning. West Central – Iowa State Preharvest Grain Seminar. September 2, 2009. Jefferson, Iowa.

- Chad Hart, Connie Hardy, and Charles Hurburgh. 2009. Current technologies and status of grain-based biofuels in Iowa. Proc Integrated Crop Management Conference, Iowa State University Extension, December 2, 2009.
- Charles Hurburgh and Connie Hardy. 2009. Corn quality and agronomic issues relating to ethanol production. Proc Integrated Crop Management Conference, Iowa State University Extension, December 3, 2009.
- Alison Robertson, Charles Hurburgh, Gary Munkvold and Steve Ensley. 2009. Impact of hail damage on corn quality. Proc Integrated Crop Management Conference, Iowa State University Extension, December 3, 2009.
- Hurburgh, C.R. 2010. Handling the 2009 Corn Crop. Agribusiness Showcase. Agribusiness Association of Iowa, Des Moines, Iowa. February 9, 2010.
- Hurburgh, C.R. 2010. Inventory Management and the 2009 Crop. In service training, AgPartners, LLC, Calumet, IA. February 16, 2010.
- Hurburgh, C. R. 2010. Current research in grain handling operations. Proc. Exchange 2010, Grain Elevator and Processing Society, Wichita, KS. February 20-23, 2010.  
Organizer of research session, GEAPS Exchange 2010.
- Hurburgh, C. R., Jr. 2010. Grain storage and management- what now. Webinar, ISU Extension, March 4, 2010.  
<http://connect.extension.iastate.edu/p72291359/?launcher=false&fcsContent=true&pbMode=normal>
- Hurburgh, C. R. Jr. 2010. The impact of the 2009 corn crop quality on ethanol production. Novozymes, Inc., Ames., Iowa. March 5, 2010.
- Hurburgh, C. R., Jr. 2010. Grain storage and management now and in the future. AAI Feed Committee. Agribusiness Association of Iowa, Des Moines, Iowa. March 10, 2010.
- Hurburgh, C.R., Jr. 2010. Increased Corn Yields: Warehouse Challenges. USDA-FSA Warehouse Inspectors Conference. July 20, 2010. Omaha, NE
- Hurburgh, C.R., Jr. 2010. Quantity and Quality: Warehouse Issues for 2010. Association of Grain Regulatory Officials Annual Conference, July 27, 2010. Des Moines,
- Robertson, A., Munkvold, G. and Hurburgh, C. 2010. Characteristics of corn left standing through winter 2009-2010 in Iowa. ICMNews.  
[www.extension.iastate.edu/CropNews/2010/0603robertsonhurburgh.htm](http://www.extension.iastate.edu/CropNews/2010/0603robertsonhurburgh.htm)
- Hurburgh, C.R., Jr. 2010. Lessons for the 2009 Crop and Forecast for 2010. Siouland Chapter, Grain Elevator and Processing Society. Sioux City, IA. September 7, 2010.
- Hurburgh, C.R., Jr. 2010. Lessons for the 2009 Crop and Forecast for 2010. Four Corners Ag Supply. September 10, 2010.

- Hurburgh, C.R., Jr. 2010. Lessons for the 2009 Crop and Forecast for 2010. Greater Iowa Chapter, Grain Elevator and Processing Society. Nevada, IA. September 14, 2010.
- Hurburgh, C. R., Jr. 2010. Harvest training 2010. West Central Coop Company. Carroll IA. September 2, 2010.
- Hurburgh, C. R., Jr. 2010. Harvest training 2010. Farmers Coop Company. Ames IA. September 8, 2010.
- Hurburgh, C.R., Jr. 2010. US Soybean and Soybean Meal Quality. Iowa Soybean Association Philippine Trade Team. October 12, 2010.
- Hurburgh, C.R., Jr. 2010. US Soybean and Soybean Meal Quality. Iowa Soybean Association China Trade Team. October 20, 2010.
- Hurburgh, C.R., Jr. 2010. Food Safety Management Systems and Bulk Material Traceability. Iowa Food Industry Networking Day. Food Science and Human Nutrition Department, Iowa State University, Ames, IA. October 21, 2010.
- Hurburgh, C.R. 2011. International Center for Grain Operations and Processing. North Central Regional Conference, Grain Elevator and Processing Society. June 28, 2011. Ames, IA.
- Hurburgh, C.R. 2011. Grain quality recap. ISU Extension Crop Advantage Series, January 13, 2011, Spirit Lake, Iowa.
- Hurburgh, C.R. 2011. Food Safety Management in Bulk Grains; The impact of the Food Safety Modernization Act. Agribusiness Association of Iowa Showcase. February 8, 2011, Des Moines, Iowa.
- Greco, A., C.R. Hurburgh, G.P.Munkvold, C.K. Jones, C.M. Pilcher, and J.F. Patience. 2011. Defining the swine feeding value of moldy corn selected for low mycotoxin content. Iowa State University, Ames. Presented at NC-213, Kansas City, MO – February 2011
- Hurburgh, C. R. 2011. Food Safety and Quality Management in Bulk Grains. Hansen Mueller, Inc., Omaha, NE. March 28, 2011
- Hurburgh, C. R. 2011. Food Safety and Quality Management in Bulk Grains. Bunge North America, Inc., St. Louis, MO. April 27, 2011.
- Greco, A., C.R. Hurburgh, G.P.Munkvold, C.K. Jones, C.M. Pilcher, and J.F. Patience. Defining the swine feeding value of moldy corn selected for low mycotoxin content. 2010 Annual Industry Report, Department of Animal Science, Iowa State University, Ames. March 2011.
- Hurburgh, C. R. 2011. Crop Quality Forecast 2011. Greater Iowa Chapter, Grain Elevator and Processing Society, Nevada, IA. August 27, 2011.

- Hurburgh, C. R. 2011. Crop Quality Forecast 2011. AgVantage, Inc., Waverly, IA. August 30, 2011
- Pilcher, C. M., A. Greco, C. R. Hurburgh, J. F. Patience. 2011. Amino acid composition and digestibility of mold damaged corn selected for low mycotoxin content fed to finishing pigs. Iowa State University, Ames. Submitted to 2011 ASAS Midwest Meeting
- Pilcher, C. M., A. Greco, C. R. Hurburgh, G. P. Munkvold, C. K. Jones, J. F. Patience. 2011. Determining the energy digestibility of mold damaged corn selected for low mycotoxin content in finishing pigs. Iowa State University, Ames. Submitted to 2011 ASAS National Meeting
- Hurburgh, C.R. 2011. ISU Extension Field Day, Northeast Iowa Research Farm, Nashua IA. August 31, 2011
- Hurburgh, C.R. 2011. 2011 Corn and soybean crops and a new support program. TEGMA Summer meeting, Kansas City, MO. September 14, 2011
- Hurburgh, C.R. 2011. Harvest update and grain quality. US-Mexico Trade team visit, Iowa Soybean Association., Ames, Iowa. October 5, 2011
- Hurburgh, C.R. 2011. Crop Quality and Grain Storage Management. US-Ukraine Trade visit. West Central Coop Elevator, Jordan, IA. October 18, 2011.
- Hurburgh, C.R. and Jelena Medic. 2011. Redefining soybean value by augmenting protein and oil value with amino acid data. Soy Summit 2011, United Soybean Board, St. Louis, MO. November 2, 2011
- Hurburgh, C.R. and Jelena Medic. 2011. A new formula for calculating Estimated Process Value of soybeans. Illinois Soybean Board, November 14, 2011
- Greco, A.; C.R. Hurburgh. 2011. Estimation of the impact of total damage on corn ethanol plant yield. Grain Quality Laboratory, Iowa State University, Ames; Novozymes North America, Inc.

## Graduate Committees

### Completed:

Major Professor: 23 MS, 11 doctoral, 7 post doctoral  
Committee: 16 MS, 15 doctoral

### Active as of update date:

Major Professor:  
Ms. Cao Nanning, pHd, AE  
Aldane Greco, MS, IAT

## Project proposals funded:

### Completed

1. Hurburgh, C.R., Jr. 1978. Grain quality grading at the producer and country elevator level. State of Iowa General Assembly, House file 2098. \$75,000. Agricultural Engineering, Economics.
2. Hurburgh, C.R., Jr. 1980. Evaluation of reference methods for corn moisture determination. Iowa Corn Promotion Board. \$11,200. Agricultural Engineering, Agronomy.
3. Hurburgh, C.R., Jr., C.J. Bern, and C.M. Sizer. 1980. Factors affecting the accuracy of corn moisture determination. Anderson Research Fund, Ohio Research and Development Center. \$11,500. Agricultural Engineering.
4. Baumel, C.P. and C.R. Hurburgh, Jr. 1981. Measuring and minimizing corn quality losses in grain transportation. Iowa Corn Promotion Board. \$14,200. Agricultural Engineering, Economics.
5. Hurburgh, C.R., Jr., and C.P. Baumel. 1981. Measuring and minimizing energy use in transportation. Iowa Corn Promotion Board, \$10,000. Iowa Department of Transportation, \$78,000. Economics, Agricultural Engineering.
6. Hurburgh, C.R., Jr. 1981. Calibration of moisture meters in corn. Iowa Department of Agriculture, \$1,000. West Central Coop Elevator, \$2,000. Agricultural Engineering.
7. Hurburgh, C.R., Jr. and G.L. Kline. 1981. Measurement of grain quality at country elevators. United States Department of Agriculture. \$80,000. Agricultural Engineering.
8. Hurburgh, C.R., Jr. 1983, 1984. Soybean quality in Iowa. Iowa Soybean Association. \$20,100. Agricultural Engineering.
9. Hurburgh, C.R., Jr. and Gary W. Williams. 1984. Soybean quality standardization through nutrient measurement. American Soybean Association. \$61,670. Agricultural Engineering, Economics.
10. Hurburgh, C.R., Jr. 1984. Corn quality in the drought of 1983. Iowa Corn Promotion Board. \$5,200. Agricultural Engineering.

11. Hurburgh, C.R., Jr., R.E. Mullen, K.E. Ziegler and W.A. Russell. 1984, 1985. Measuring quality characteristics of corn varieties grown in Iowa. Iowa Corn Promotion Board. \$68,161. Agricultural Engineering, Agronomy.
12. Hurburgh, C.R., Jr. 1984. Corn starch calibrations for near-infrared reflectance instruments. Corn Refiners Association. \$3,000. Agricultural Engineering.
13. Hurburgh, C.R., Jr. 1984. Performance of on-farm moisture testers. Farm Journal, Inc. \$4,500. Agricultural Engineering.
14. Hurburgh, C.R., Jr. 1984. Measurement of breakage susceptibility with near-infrared reflectance. Anderson Research Fund, Ohio Research and Development Center. \$9,050. Agricultural Engineering.
15. Hurburgh, C.R., Jr., L.A. Johnson and C.P. Baumel. 1986. Profit for Iowa soybean growers from protein and oil measurements. Iowa Soybean Promotion Board. \$64,000. Agricultural Engineering, Food Technology, Economics.
16. Bern, C.J. and C.R. Hurburgh, Jr. 1986. Removal and characterization of fines and foreign material from corn. Anderson Research Fund. \$2,400. Agricultural Engineering.
17. Hurburgh, C.R., Jr. and L.A. Johnson. 1987, 1988. Determination of corn value for major end uses. Iowa Corn Promotion Board. \$33,600. Agricultural Engineering, Food Technology.
18. Hurburgh, C.R., Jr. 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001. An annual survey of soybean quality. American Soybean Association, United Soybean Board. \$304,000. Agricultural Engineering.
19. Hurburgh, C.R., Jr. 1987, 1988, 1989. A survey of corn nutrient content and breakage susceptibility. National Corn Growers Association. \$18,800. Agricultural Engineering.
20. Hurburgh, C.R., Jr. and W.R. Fehr. 1988, 1989. Interpretation of varietal data on soybean protein and oil content. Iowa Soybean Association. \$22,128. Agricultural Engineering, Agronomy.
21. Hurburgh, C.R., Jr. and C.J. Bern. 1988. Performance of on-farm grain cleaners. Farm Journal, Inc. \$2,128. Agricultural Engineering.
22. Hurburgh, C.R., Jr. and L.D. Hill (Illinois). 1989. Costs and benefits of redefining the grade factor broken corn and foreign material in corn. Federal Grain Inspection Service, National Grain and Feed Association, National Corn Growers Association. \$69,000. Agricultural Engineering.
23. Hurburgh, C.R., Jr. and C.P. Baumel. 1989, 1990. Efficient distribution of grain to meet the quality needs of end-users. Midwest Transportation Center, Iowa Dept. of Transportation. \$360,000. Agricultural Engineering, Economics.

24. Hurburgh, C.R., Jr. and L.A. Johnson. 1989. Shrivelled and wrinkled soybeans: determination and effect on processing. Federal Grain Inspection Service. \$27,805. Agricultural Engineering, Food Technology.
25. Hurburgh, C.R., Jr. 1989. Feasibility of whole-grain near-infrared analysis of coarse grains: Effects of seed physical properties. Federal Grain Inspection Service. \$10,000. Agricultural Engineering.
26. Wilson, L.A., P.A. Murphy, J.A. Love, and C.R. Hurburgh, Jr. 1989. Determination and validation of rapid methods that will predict the quality of soyfoods from raw soybeans. Iowa Soybean Promotion Board, Center for Crops Utilization Research. \$35,000. Food Technology, Agricultural Engineering.
27. Hurburgh, C.R., Jr. and L.A. Johnson. 1989, 1990. Mass balance simulation of corn wet milling. Center for Crops Utilization Research. \$34,000. Agricultural Engineering, Food Technology.
28. Hurburgh, C.R., Jr. and C.P. Baumel. 1990, 1991. Efficient distribution of grain to meet the quality needs of end-users. A soybean grower perspective. Iowa Soybean Promotion Board. \$32,300. Agricultural Engineering, Economics.
29. Hurburgh, C.R., Jr. and C.P. Baumel. 1990, 1991. Efficient distribution of grain to meet the quality needs of end-users. A corn grower perspective. Iowa Corn Promotion Board. \$32,300. Agricultural Engineering, Economics.
30. Hurburgh, C.R., Jr., C.P. Baumel, L.A. Johnson, and J.L. Sell. 1991. Education of foreign and domestic buyers and Iowa producers on the value of intrinsic soybean and corn qualities. Iowa Corn and Soybean Promotion Boards. \$33,000. Agricultural Engineering, Economics, Food Technology, Animal Science.
31. Hurburgh, C.R., Jr. 1991-1993. Costs and benefits of cleaning soybeans. Economic Research Service. \$66,000. Agricultural Engineering.
32. Hurburgh, C.R., Jr. 1992, 1993. Survey of Iowa corn and soybean quality. Cooperative Production Network. \$20,000. Agricultural Engineering.
33. Hurburgh, C.R., Jr. 1993. Equipment for soybean quality analysis. Iowa Soybean Promotion Board. \$38,000. Agricultural Engineering.
34. Hurburgh, C.R., Jr. 1993. Initiation of end-user specific grain marketing at Iowa country elevators. MATRIC. \$11,650. Agricultural Engineering.
35. Hurburgh, C.R., Jr. 1993. Survey of Iowa corn quality. Federal Disaster Admin. \$4,000. Agricultural Engineering.
36. Hurburgh, C.R., Jr. 1994-1996. Initiation of end-user specific grain marketing at country elevators. Anderson Res. Fund. \$26,000. Agricultural Engineering.



37. Hurburgh, C.R., Jr. 1995. Measurement of composition on a plot harvester. CATD-U.S. Dept. of Commerce. \$150,000. Agricultural Engineering.
38. Hurburgh, C.R., Jr., and R. Ginder. 1995. Distribution of value-added grain quality data to extension clientele. Agricultural Engineering and Economics. \$34,000.
39. Hurburgh, C.R., Jr., and T.J. Brumm. 1995, 1996. Assistance for Iowa elevators in marketing value-added grains. Iowa Dept. of Economic Development, Agricultural Engineering, and MBS, Inc. \$350,000.
40. Hurburgh, C.R., Jr. 1995-1997. Developing the infrastructure to market value-added grains. Anderson Research Fund. \$34,000. Agricultural Engineering.
41. Hurburgh, C.R., Jr. 1997. Analysis of the national soybean quality survey data. United Soybean Board. \$15,300. Agricultural Engineering.
42. Hurburgh, C.R., Jr. and R. Ginder. 1997, 1998, 1999, 2000. Component pricing and identity preserved marketing of soybeans. Soybean Research and Development Council. \$192,000. Agricultural Engineering, Economics.
43. Hurburgh, C.R., Jr. 1996-1997. Grain quality data from grower-sponsored strip plots. Iowa Soybean Association. \$4,000. Agricultural Engineering.
44. Hurburgh, C.R., Jr. and H.S. Park. 1997. Quality of soybean meal in world markets. United Soybean Board. \$15,000. Agricultural Engineering.
45. Hurburgh, C.R., Jr. and T.J. Brumm. 1995, 1996, 1997. Support for Iowa Elevators to purchase near-infrared analyzers. Iowa Dept. of Economic Development. \$480,000. Agricultural Engineering and MBS, Inc.
46. Lorimor, J.C. and C.R. Hurburgh, Jr. 1997, 1998, 1999, 2000. Near-infrared technology to determine manure nutrients. \$227,600. Multi-state Swine Waste Consortium, Iowa Pork Producers Council.
47. McClelland, J.F., C.R. Hurburgh, Jr., and P.L. Keeling. 1999, 2000. Rapid whole kernel single seed analyzer. \$183,000. IPRT/CATD/ExSeed.
48. Hurburgh, C.R., Jr. 2000, 2001, 2002. Calibration of Case/Textron grain monitoring system. \$131,580. Case/Textron.
49. Hurburgh, C.R., Jr. 1999, 2000. NIR calibration development. \$25,000. ISURF.
50. Hurburgh, C.R., Jr., and G.R. Rippke. 1999, 2000. Calibration of NIR for GMO identification. \$25,000. Iowa Department of Economic Development.
51. Hurburgh, C.R., Jr. 1999, 2000. Relationship of soybean meal quality and soybean quality. \$18,400. Frazier, Barnes and Associates.

52. Hurburgh, C.R., Jr., R. Ginder and M. Westgate. 2001-2004. Data Uniformity and interpretation for soybean quality. \$132,000. Iowa Soybean Promotion Board. Agricultural Engineering, Economics, Agronomy.
53. Hurburgh, C.R., Jr. 1998, 1999, 2000, 2001, 2002, 2003, 2004 Iowa Grain Quality Initiative. \$155,000. Iowa Corn Promotion Board.
54. Hurburgh, C.R., Jr. 1998, 1999, 2001, 2002, 2003, 2004. Iowa Grain Quality Initiative. \$135,000. Iowa Soybean Promotion Board.
55. Hurburgh, C.R., Jr. 2001-2003. Emergency assistance for Iowa grain delivery system programs. \$20,188. CSREES-USDA.
56. Hurburgh, C. R. Jr. 2001, 2002, 2003. Expanding the Instrumentation Capacity of the Official Inspection System. \$75,000. USDA – GIPSA.
57. Hurburgh, C. R., Jr. 2003 Equipment match. \$25,000. Plant Sciences Institute.
58. Brumm, T. J. and C. R. Hurburgh, Jr. 2002, 2003, 2004. 2002, 2003, 2004 US Soybean Quality Surveys. \$100,000. United Soybean Board.
59. Hurburgh, C. R. Jr. and T. J. Brumm. 2002-2004. Improving the marketability of distillers grains. \$75,000. Illinois-Missouri Biotechnology Alliance.
60. Hurburgh, C. R. Jr., 2003, 2004. Identification of grain varieties and transgenic events with near infrared spectroscopy. \$10,000. Plant Sciences Institute, Iowa State University.
61. Hurburgh, C. R. Jr. 2003, 2004. Select yield and quality project. \$30,000. United Soybean Board, Iowa Soybean Promotion Board. Agricultural Engineering.
62. Hurburgh, C.R. Jr. 2004. Foreign material in soybean market channels. \$33,070. American Soybean Association. Agricultural Engineering.
63. Hurburgh, C.R., Jr. 2000 – 2005. A grain market infrastructure for large-scale identity presentation. \$130,360. Iowa Soybean Promotion Board, Iowa Department of Economic Development (Five subcontractors)
64. Hurburgh, C. R., Jr. 2003, 2004, 2005. Uniformity in Near Infrared Measurements of Soybean Quality Traits. \$51,300, \$53,200. United Soybean Board, American Oil Chemists Society.
65. Hurburgh, C.R. Jr. 2004. Global soybean meal quality update. \$86,337. American Soybean Association. Agricultural Engineering.
66. Hurburgh, C. R.. 2005. Iowa Grain Quality Initiative FY06. \$161,320. Extension 21 Grants. July 1, 2005 – June 30, 2006. Center for Crops Utilization Research.
67. Hurburgh, C. R. Jr. 2005. Iowa Grain Quality Initiative Support. \$25,000. Iowa Soybean Promotion Board. October 1, 2005 – September 30, 2006. Center for Crops Utilization Research.

68. Hurburgh, C. R. Jr. 2005. Select Yield and Quality. \$46,350. United Soybean Board. October 1, 2005 – September 30, 2006. Agricultural Engineering.
69. Charles R. Hurburgh, Jr. 2005. Uniformity in Near Infrared Measurements of Soybean Quality Traits. (Continuation). \$54,500. United Soybean Board. October 1, 2005 – September 30, 2006. Agricultural Engineering.
70. Thomas J. Brumm, Charles R. Hurburgh, Jr. 2005. Annual soybean quality survey (Continuation). \$30,000. American Soybean Association. March 1, 2005 – February 28, 2006. Agricultural Engineering
71. Hurburgh, C. R.. 2006. Iowa Grain Quality Initiative FY07. \$163,460. Extension 21 Grants. July 1, 2006 – June 30, 2007. Center for Crops Utilization Research.
72. Hurburgh, C. R. Jr. 2006. Iowa Grain Quality Initiative Support. \$25,000. Iowa Soybean Promotion Board. October 1, 2006 – September 30, 2007. Center for Crops Utilization Research.
73. Hurburgh, C. R. Jr. 2006. Select Yield and Quality. \$35,700. United Soybean Board. December 1, 2006 – September 30, 2007. Agricultural Engineering
74. Charles R. Hurburgh, Jr. 2006. Uniformity in Near Infrared Measurements of Soybean Quality Traits. (Continuation IV. \$58,500. United Soybean Board. October 1, 2006 – September 30, 2007. Agricultural Engineering.
75. Hurburgh, C.R. Jr. 2006. Regional variation in soybean traits. \$10,000. United Soybean Board. October 1, 2006 – September 30, 2007. Agricultural Engineering.
76. Hurburgh, C.R. Jr. 2006. Harmonization of United Soybean Board NIRS efforts. \$25,000. United Soybean Board. October 1, 2006 – September 30, 2007. Agricultural Engineering.
77. Hurburgh, C. R. , Jr. and J.D. Lawrence. 2005. Food Chain Economic Analysis –III. \$369,442. 9/01/2005 – 8/14/2008. USDA Special Grant. Agricultural Engineering and Economics.
78. Hurburgh, C. R. , Jr. and J.D. Lawrence. 2006. Food Chain Economic Analysis –IV. \$375,475. 9/15/2006 – 9/14/2009. USDA Special Grant. Agricultural Engineering and Economics.
79. Hurburgh, C. R.. 2007. Iowa Grain Quality Initiative FY08. \$166,230. Extension 21 Grants. July 1, 2007 – June 30, 2008. Center for Crops Utilization Research.
80. Hurburgh, C. R. Jr. 2007. Select Yield and Quality. \$36,250. United Soybean Board. October 1, 2007 – September 30, 2008. Agricultural Engineering
81. Charles R. Hurburgh, Jr. 2007. Uniformity in Near Infrared Measurements of Soybean Quality Traits. (V). \$62,500. United Soybean Board. October 1, 2007 – September 30, 2008. Agricultural Engineering.

82. Hurburgh, C.R. Jr. 2007. Regional variation in soybean traits (II). \$10,000. United Soybean Board. October 1, 2007 – September 30, 2008. Agricultural Engineering.
83. Hurburgh, C.R. Jr. 2007. Harmonization of United Soybean Board NIRS efforts (II). \$25,000. United Soybean Board. October 1, 2007 – September 30, 2008. Agricultural Engineering.
84. Jane, Jay Lin, Sathaporn Srichuwong, Charles Hurburgh, Antony L. Pometto, Lawrence A. Johnson, Jacek Koziel. 2007. Enzyme Hydrolysis of Uncooked Dry-grind Corn for Ethanol Production. Grow Iowa Values Fund. July 1, 2007 – June 30, 2009. \$561,857. Partner: Poet Ethanol.
85. Hurburgh, C. R. ,Jr. and Lie Tang. 2008. Automated phenotyping of biomass crops. Grow Iowa Values Fund. April 1, 2008 – May 30, 2010. \$102,240. Partner: Enagen, LLC.
86. Hurburgh, C. R., Jr. 2008. Expanding the Near-Infrared Spectroscopic Capacity of the Official Inspection System. USDA-Grain Inspection-Packers and Stockyards Administration. September 1, 2008 – August 29, 2009. \$32,588. Agricultural Engineering
87. Hurburgh, C. R. Jr. 2008. Select Yield and Quality. \$36,000. United Soybean Board. October 1, 2008 – September 30, 2009. Agricultural Engineering
88. Charles R. Hurburgh, Jr. 2008. Uniformity in Near Infrared Measurements of Soybean Quality Traits. (VI). \$62,358. United Soybean Board. October 1, 2008 – September 30, 2009. Agricultural Engineering
89. Hurburgh, C.R. Jr. 2008. Harmonization of United Soybean Board NIRS efforts (III). \$29,500. United Soybean Board. October 1, 2008 – September 30, 2009. Agricultural Engineering.
90. Hurburgh, C. R. 2009. NIR Variety Data. United Soybean Board. October 1, 2009 – September 30, 2010. \$36,000. Agricultural Engineering.
91. Hurburgh, C. R.. 2009. Iowa Grain Quality Initiative FY10. \$153,430. Extension 21 Grants. July 1, 2009 – June 30, 2010 Center for Crops Utilization Research.
92. Charles R. Hurburgh, Jr. 2009. Uniformity in Near Infrared Measurements of Soybean Quality Traits. (VII). \$64,555. United Soybean Board. October 1, 2009 – September 30, 2010. Agricultural Engineering.
93. Hurburgh, C. R. , Jr. 2010-2014. Strengthening public corn breeding to ensure that organic farmers have access to elite cultivars; ISU Subaward. \$89,295. Organic Agriculture Research and Extension Initiative, National Institute for Food and Agriculture. July 1, 2010 – June 30, 2014. Total project : 2,864,478

94. Hurburgh, C. R.. 2010. Iowa Grain Quality Initiative FY11. \$153,430. Extension 21 Grants. July 1, 2010 – June 30, 2011 Center for Crops Utilization Research.
95. Hurburgh, C. R. 2010. Uniformity in Near Infrared Measurements of Soybean Quality Traits, FY2011. \$61,889. United Soybean Board. October 1, 2010– September 30, 2011. Agricultural Engineering.
96. Hurburgh, C. R. 2010. Integration of Soybean Analytics with Modern Animal Nutrition. \$59,671. United Soybean Board. October 1, 2010– September 30, 2011. Agricultural Engineering.
97. Hurburgh, C. R. 2010. Improved Sensing Systems for Grain Quality Measurement and Storage. \$11,294. Agreement No. 58-5430-0-326. USDA. Agricultural Engineering.
98. Hurburgh, C. R. 2011. Uniformity in Near Infrared Measurements of Soybean Quality Traits, FY2012. \$65,576. United Soybean Board. October 1, 2011– September 30, 2012. Agricultural Engineering.
99. Hurburgh, C.R., J.A. Roth, Dirk Maier, and Leland McKinney. 2011. Food Safety Inspection Training for Bulk Agricultural Products. October 1, 2011 – September 30, 2014. \$1,483,522. Agricultural Engineering and Kansas State University Grain Science and Industry.
100. Hurburgh, C. R.. 2011. Iowa Grain Quality Initiative FY11. \$156,430. Extension 21 Grants. July 1, 2011– June 30, 2012 Center for Crops Utilization Research.

### **Ongoing projects, services and licensed products:**

1. Hurburgh, C.R., Jr. Principal investigator. 1980-present. NC-151, NC-213 Multi-State Research, Marketing and Delivery of Quality Cereals and Oilseeds; Marketing and Delivery of Quality Grains and BioProcess Coproducts (after 1998). Multistate station representative
2. Iowa State University Grain Quality Laboratory analysis and calibration services. 1986-present. \$100,000 annually. Agricultural Engineering.

### **Economic Development Activities/Service Agreements**

John Deere, Inc. 2006, 2007, 2008. Evaluation of Zeiss Corona NIR.  
 Dickey-john, Inc. 2006, 2007, 2008 Calibration support for prototype NIRS unit.  
 BASF. 2006, 2007, 2008 Ongoing NIRS calibration support.  
 Iowa Renewable Fuels Association. 2008. NIRS calibrations for Distillers Grains  
 SafeSoy, LLC. 2007, 2008, 2009. Measurements of CO<sub>2</sub>-Expeller Process Soybean Meal with NIRS.  
 Michael Fields Agricultural Institute. 2007,2008, 2009, 2010. Calibration for corn amino acids  
 Farmers Cooperative Co. 2008, 2009, 2010. NIRS Laboratory for FC.  
 NIR Australia. 2009, 2010 Calibration of Crop Scan 1000B.  
 Dickey-john, Inc. 2009, 2010. Calibration of Instalab 800.

Bruins Instruments, North America. 2009, 2010. Calibration of Omega Analyzers.  
NEW Cooperative Co. 2010. Calibration of Foss InfraExact for feed ingredients  
Case New Holland. 2010. Evaluation of harvest sensors  
Schillinger Seed Co. 2010. Calibrations for specialty soybeans  
Asoya, LLC. 2009, 2010. Harvest program for low linolenic soybeans  
Zeeland Farm Service, LLC. 2010. Calibrations for modified fatty acid soybeans.  
Ocean Optics, Inc. 2010. Calibration of InfraWG.  
Perten Instruments, NA. 2010, 2011, 2012. Calibration of Inframatic 9300.

## **Appendix A. International Activities**

Participant - Design team for Foss-Multispec XSPEC NIR analyzer. Foss Electric, York, UK. 1996-1998.

Hurburgh, C.R. 2001. Quality of the 2001 Soybean Crop from the United States. American Soybean Association Asia Quality Seminar. November 26 – December 6. Tokyo, Seoul, Taipei.

Brumm, T.J. and C. R. Hurburgh, Jr. 2002. Quality of the 2002 US Soybean Crop. American Soybean Association Asia Quality Seminar Tour. November 15-24, 2002. Tokyo, Seoul, Taipei, Shanghai.

Cogdill, R., P. Dardenne and C.R. Hurburgh, Jr. 2003. Support vector machines for NIRS calibration. Proc. NIR2003, 11<sup>th</sup> International Conference on NIR Spectroscopy, Cordoba, Spain, April 8-12, 2003.

Dzupin, R, C. R. Hurburgh, Jr. and S. A. Roussel. 2003. Improvement of prediction speed and accuracy with internet enabled networking software. Proc. NIR2003, 11<sup>th</sup> International Conference on Near Infrared Spectroscopy, Cordoba, Spain. April 6-11, 2003.

Roussel, S. A., and C. R. Hurburgh, Jr. 2003. Noise robustness comparison for merging large datasets. . Proc. NIR2003, 11<sup>th</sup> International Conference on Near Infrared Spectroscopy, Cordoba, Spain. April 6-11, 2003.

Brumm, T.J. and C. R. Hurburgh, Jr. 2003. Quality of the 2003 US Soybean Crop. American Soybean Association Asia Quality Seminar Tour. November 15-22, 2003. Tokyo, Seoul, Taipei, Beijing, Shanghai, Dalien.

USA Principal Investigator – Spectranet Marie Curie Research Training Network Proposal, European Union. 2003 – 2006.

Hurburgh, C.R., Jr. 2004. NIR from laboratory to the field. 2<sup>nd</sup> International Conference on Embedded NIR. Centre Wallon de Recherches Agronomiques, Gembloux, Belgium. November 19, 2004. Invited presentation.

Brumm, T. J. , C. R. Hurburgh, Jr. and G.R. Rippke. 2004. Quality of the 2004 US Soybean Crop. American Soybean Association, St. Louis , MO. Invited presentations Seoul, Shanghai, Beijing, Tokyo, Taipei. November 2004.

Hurburgh, C.R., Jr. 2004. NIR from laboratory to the field. 2<sup>nd</sup> International Conference on Embedded NIR. Centre Wallon de Recherches Agronomiques, Gembloux, Belgium. November 19, 2004. Invited presentation.

Brumm, T. J. , C. R. Hurburgh, Jr. and G.R. Rippke. 2004. Quality of the 2004 US Soybean Crop. American Soybean Association, St. Louis , MO. Invited presentations Seoul, Shanghai, Beijing, Tokyo, Taipei. November 2004.

Project participant – CoExtra and TRACE European Union food traceability and certification projects.

Brumm, T.J., C.R. Hurburgh, and S. Naeve. 2005. Quality of the 2005 US Soybean Crop. United States Soybean Export Council quality seminars. Seoul, Dalian, Shanghai, Taipei, Tokyo. November 12-19, 2005. Invited paper and presentation.

Dr. Hurburgh attended the second meeting of TRACE, EU 6<sup>th</sup> Framework project for food traceability systems, in Prague, CK April 24-26, 2006

Hurburgh, C.R., Jr. 2007. Tracing GMOs in the US Bulk Agricultural Market. 3<sup>rd</sup> annual meeting of CoExtra 6<sup>th</sup> Framework EU Project, Bologna, Italy February 4, 2007.

Hurburgh, C.R. Jr. 2007. Developing traceability of bulk agricultural products. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Invited presentation.

Bennett, G., and C. R. Hurburgh, Jr. 2007. Cost-Benefit analysis flow chart for identity preservation systems: A case study of ultra-low linolenic soybeans grown on Iowa farms. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.

Shepherd, H. and C. R. Hurburgh, Jr. 2007. FDA Registration and Record Maintenance for Grain Handling Facilities and Feed Mill Facilities. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.

Gemesi, H. G., and C. R. Hurburgh, Jr. 2007. Geographic Food Origin Traceability Model. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.

Laux, C., and C. R. Hurburgh, Jr. 2007. Traceability of commodity grain using a quality management system. 3<sup>rd</sup> Annual Meeting, TRACE 6<sup>th</sup> EU Framework project, Iraklion, Crete April 27, 2007. Poster.

Hardy, C.L., J. Gerde, C.R. Hurburgh, Jr., and P.J. White. 2007. Rapid Determination of Oxidation in Frying Oils by NIR Spectroscopy. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Oral presentation.

Esteve-Agelet, L., C. R. Hurburgh Jr., F. Mao, S. K. Ong and J. A. Gaunt. 2007. Measurement of Organic Solvent Permeation through PVC Pipes with Near Infrared Spectroscopy. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 17, 2007. Oral presentation.

Igné, B., G.R. Rippke, C.R. Hurburgh. 2007. Robust Regression for Inter-Brand Standardization. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster.



Yang, CiWen, Suming Chen, Charles R. Hurburgh, Jr, I-Chang Yang, Chih-Hsiang Wu. 2007. Standardization of soybean spectra across NIRS instruments using support vector machines. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster.

Yang, CiWen, Suming Chen, I-Chang Yang, Yin-Chih Chen, J-Wen Liang and Charles R. Hurburgh. 2007. The identification of raw materials for herbal medicine by NIRS and FT-NIRS. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster.

Yang, CiWen, Suming Chen, Ellen Deierenfeld and Charles R. Hurburgh. 2007. A wildlife nutritional database based on near-infrared spectroscopy. Proc. 13th International Conference on Near Infrared Spectroscopy, Umeå, Sweden, June 13-17, 2007. Poster

Dr, Hurburgh attended the fourth meeting of the TRACE European union project, in Torremolinos Spain, April 23-26, 2008. One presentation and three student posters.

Thakur M. and Hurburgh C.R, 2008. Conceptual Design of Fully Traceable Supply Chain for Agricultural Industry, 4th Trace Annual Meeting, Torremolinos, Spain. Poster.

Gemesi, Gunsu and C. R. Hurburgh, Jr. 2008. GIS-Based farm traceability model. 4th Trace Annual Meeting, Torremolinos, Spain. Poster.

Bennett, Greg and C. R. Hurburgh, Jr. 2008. Scorecard matrix for grain traceability and identity preserved production. 4th Trace Annual Meeting, Torremolinos, Spain. Poster.

Hurburgh, C.R. Jr. 2008. Use of standards for electronic data entry in the US grain and feed industry. 4th Trace Annual Meeting, Torremolinos, Spain. Invited presentation.

Dr. Ana Di Martino, laboratory leader, INTA, Argentina did a six week training period on NIR technology in the Grain Lab, May 19- June 22, 2008.

Dr. Hurburgh and Benoit Igne attended the 11<sup>th</sup> meeting of Chemometrics in Analytical Chemistry, Montpellier, France. June 30-July 4, 2008.

Glen R. Rippke, Connie L. Hardy , Charles R. Hurburgh, Jr., and Walter A. Goldstein. 2008. Methods of Calibrating NIRS Sensors when Biological Parameters are Correlated: The Case of Maize Amino Acids. Chemometrics in Analytical Chemistry, Montpellier, France. June 30-July 4, 2008. Poster, published abstract

Hurburgh, C. R., Jr., Elvira Fernandez d'Ahumada and G.R. Rippke. 2008. Chemometrics Issues in Calibrating an On-Harvester Embedded NIR Sensor. Chemometrics in Analytical Chemistry, Montpellier, France. June 30-July 4, 2008. Invited presentation, published abstract.

Igne, B. and C. R. Hurburgh, Jr. 2008. Fourier and Wavelet Coefficients Filtering for Near Infrared Instrument Calibration and Standardization. Chemometrics in Analytical Chemistry, Montpellier, France. June 30-July 4, 2008. Poster, published abstract.

Benoit Igne won the chemometrics shootout competition, to correctly classify a dataset of unknown samples. There were 25 university researchers, professional consultants, and other students in the competition.

Aurelie De Rus, Purpan, Toulouse, France did an internship in NIR calibration and applications in the Grain Lab, August 15, 2008 – September 29, 2008.

Dr. Hurburgh attended the 5<sup>th</sup> annual meeting of TRACE, EU project, March 30-April 3, 2009, Freising Germany, and presented one oral presentation, and 4 student posters.

Maitri Thakur and Charles R. Hurburgh. 2009. Internal Traceability Database Modeling for a Grain Elevator, Poster presented at TRACE 5<sup>th</sup> Annual meeting and conference, Freising, Germany, April 1-3, 2009.

Thakur, M., G.A. Mosher, B. Brown, G.S. Bennet, H.E. Shepherd, and C.R. Hurburgh, 1-3 April 2009, Traceability in the bulk grain supply chain. Poster presented at the TRACE 5<sup>th</sup> Annual Meeting and Conference, Freising, Germany. April 1-3, 2009.

Bennet, G.S., and C.R. Hurburgh. 2009 Methodology to Insure U.S. Genetically Modified (GM) Grain Sales into Approved Foreign Markets—Integrating ISO Traceability Standards with Agricultural Quality Management Systems. Poster presented at the TRACE - 5<sup>th</sup> Annual Meeting and Conference, Freising, Germany. April 1-3, 2009.

Brown, B. & Hurburgh, C.R. (2009). Maize to Milk: An analysis of the traceability systems of bulk commodities. Poster presented at TRACE 5<sup>th</sup> Annual Meeting, Munich, Germany, April 1-3, 2009.

Hurburgh, C. R. 2009. Tracing bulk grains. TRACE 5<sup>th</sup> Annual Meeting, Munich, Germany, April 1-3, 2009. Invited oral presentation.

Kathryn AM Donnelly from NOFIMA, Tromso, Norway spent two weeks in May 2009 in the Grain Lab collaborating on the development of grains-based terminology for the international traceability methodology being created by TRACE.

Maitri Thakur went to Norway (Trondheim, Sintef) in August 2009 for four months to develop the international traceability methodology.

Lidia Esteve spent six weeks researching NIR imaging applications at the University College of Dublin, Dublin, Ireland, June 16-August 1, 2009.

Anne Fleur, a student at Purpan, Toulouse France, did a four month internship in the Grain Lab, calibrating a new NIRS instrument for corn and soybean analysis. This will lead to a meeting paper and journal article in 2010.

Presentation was made at the closing meeting of TRACE, Brussels Belgium in December 2009. Dr. Hurburgh was on the advisory committee also.

Phillippine deClerville, a student at Purpan, Toulouse France, did a four month internship in the Grain Lab. Summer 2010, calibrating two NIRS instrument for temperature stability in grain analysis. This will lead to a meeting paper and journal article in 2011.

Julie Thomas, a student at Purpan, Toulouse France, did a four month summer internship in the Grain Lab in summer 2011, developing a procedure for particle size analysis of ground oily materials.

Thakur, M. et al (15 EU participants plus Iowa State). 2011-2013. Global versus local food supply chains. Submitted to the 7<sup>th</sup> Framework, European Union Commission. Submitted September 2011. €2,999,000; ISU €152,000.