

Curriculum Vitae
Robert Thomas Burns, Ph.D., P.E.

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Education:

Ph.D. in Civil Engineering. Environmental Engineering specialization. University of Tennessee, Knoxville. May 1995. GPA: 3.91/4.00. Dissertation title - Impact of Electric Vehicles on Ozone Formation in the Middle Tennessee Area.

M.S. in Environmental Engineering. Air Quality Management/Pollution Control concentration with a minor in mixed waste management. University of Tennessee, Knoxville. May 1992. GPA: 4.00/4.00 Thesis title - Preparation of Air Pollution Emission Inventories for Stationary Sources.

B.S. in Agricultural Engineering. Soil and Water Conservation concentration. University of Tennessee, Knoxville. May 1990.

Professional Experience:

Associate Professor, Iowa State University. Joint appointment between extension (55% appointment) and research (45% appointment). Environmental engineering specialization, including the design of animal waste management systems and nutrient management planning for livestock and poultry operations. August, 2004 - Present.

Associate Professor, University of Tennessee, Knoxville. Joint appointment between The Tennessee Agricultural Extension Service (70% appointment) and The Tennessee Agricultural Experiment Station (30% appointment). Environmental engineering specialization, including the design of animal waste management systems and nutrient management planning for livestock and poultry operations. July, 2000 – July, 2004.

Assistant Professor, University of Tennessee, Knoxville. Tennessee Agricultural Extension Service Water Quality Specialist, 100% Extension service appointment. June 1995 - 1998. Joint appointment (70% extension and 30% research). 1998 - July, 2000.

Research Associate, University of Tennessee, Knoxville. Civil & Environmental Engineering Air Pollution Control Laboratory. Full-time staff position. Worked directly with EPA and State agencies in the preparation of air pollutant emission inventories and computer modeling of ozone formation (EKMA and UAM modeling). 1992 - 1995.

Environmental Engineer, Sverdrup Technology Inc., Tullahoma, Tennessee. Responsible for identifying and classifying waste streams, and monitoring RCRA 90 day hazardous waste storage facility. Maintained Sverdrup air permits at Arnold Engineering Development Center facility. 1992.

Professional Registration:

Registered Professional Engineer in Tennessee (P.E. # 102322)

Certified Crop Advisor (CCA) in Tennessee (CCA # 34046)

USDA - NRCS Certified Technical Service Provider for CNMP Plan Development

Publications: Refereed Journal Articles & Technical Publications

- Burns, R.T., L. B. Moody, G. Considine, B. Gramig, T. Hebert, J.K. Meeker and A. Stokes. 2005. Developing the Model of Animal Waste System Risk (MAWSR) for Livestock Waste Storage Facilities. *Proceedings of the 98th Annual Air & Waste Management Association Conference*. Paper # 1305.
- Oh, I.H., R. T. Burns and J. Lee. 2005. Optimization Of Phosphorus Partitioning In Dairy Manure Using Chemical Additives With A Mechanical Solids Separator. *Transactions of the ASAE*. v48(8) pages 1235-1240.
- Burns, R.T. Poultry Broiler Ammonia Emission Factor Comparisons. 2004. Published in the Proceedings of the *2004 National Poultry Waste Management Symposium*, Memphis Tennessee. Pages 141 - 144.
- Celen, I., R.T. Burns, R.B. Robinson, D.R. Raman, L.B. Moody, and J.R. Buchanan. 2004. Reduction of Dissolved Reactive Phosphorus from Swine Wastewater via Struvite Precipitation: Influence of pH Changes and Mg Addition. *Published in the proceedings of the International Conference on Struvite: Its Role in Phosphorous Recovery and Reuse*, Cranfield University, England.
- Mayhew, C. R., D. R. Raman, R. R. Gerhardt, R. T. Burns, and M. S. Younger. 2004. Periodic Draining Reduces Mosquito Emergence from Free-water Surface Constructed Wetlands. *Transactions of the ASAE*. v47(2) pages 567-573.
- Raman, D. R., E. L. Williams, A. C. Layton, R. T. Burns, J. P. Easter, A. S. Daugherty, G. S. Saylor, and M. D. Mullen. 2003. Estrogen content of dairy and swine wastes. *Environmental Science & Technology*. v47(2) pages 567-573.
- Oh, I.H., J. Lee and R. T. Burns. 2003. Development and Evaluation of a Multi-Hose Slurry Applicator for Rice Paddy Fields. *Applied Engineering in Agriculture*. 20(1): 101-106.
- Edens, W. C., L. O. Pordesimo, L. R. Wilhelm, and R. T. Burns. 2003. Energy use analysis of the major milking center components at a dairy experiment station. *Applied Engineering in Agriculture*. 19(6): 711-716.
- Burns, R.T., L.B. Moody, I. Celen and J. Buchanan. 2003. Optimization of Phosphorus Precipitation from Swine Manure Slurries to Enhance Recovery. *Water Science & Technology*. 48(1): 138 -146.
- Burns, R.T and L.B. Moody. 2003. CNMP Element Writer Certification: Short Course and Certification Process. Published in *Proceedings of the 9th ISAAFPW*. RTP, NC. pp 427-431.
- Grandle, G.F., L.B. Moody, R.T. Burns and R.W. Anderson. 2003. Experiences in Preparing a CNMP Emergency Response Plan for a Tennessee Dairy Farm. Published in the *Proceedings of the 9th Proceedings of the 9th ISAAFPW*. RTP, NC. pp 448 - 455.
- Armstrong, K.A., R.T. Burns, F.R. Walker, L.R. Wilhelm and D.R. Raman. 2003. Ammonia Concentrations in Poultry Broiler Production Units Treated with Liquid Alum. Published in the *Proceedings of the 3rd International Conference on Air Pollution from Agricultural Operations*. Research Triangle Park, NC. pp 116 - 122.
- Burns, R.T and L.B. Moody. 2003. CNMP certification for third party technical service providers. *ASAE Paper # 038027*. ASAE St. Joseph, MI.
- Burns, R.T. and L.B. Moody. 2003. Development of a standard method for testing mechanical manure solids separators. *ASAE Paper # 034131*. ASAE St. Joseph, MI.

Publications: Refereed Journal Articles & Technical Publications (continued):

- Oh, I.; L.B. Moody, I. Celen, J. Lee; R.T. Burns. 2003. Optimization of phosphorus partitioning in dairy manure using aluminum sulfate with a mechanical solids separator. *ASAE Paper # 032266*. ASAE St. Joseph, MI.
- Burns, R.T., K.A. Armstrong, F.R. Walker, C.J. Richards and D.R. Raman. 2003 Ammonia Emissions from a Broiler Production Facility in the United States. Published in the *Proceedings of the Gaseous and Odour Emissions from Animal Production Facilities Conference*. 2003. Horsens, Denmark. pp 88 - 95.
- Burns, Forbes R. Walker, and F. Ann Draughon. 2003. Effect of Liquid Alum on Naturally Occurring Salmonella and Campylobacter in Poultry Broiler Production Facilities. Published in the *Proceedings of the International Association for Food Protection Annual Meeting*. New Orleans, Louisiana.
- Burns, R.T., L.B. Moody, I. Celen and J. Buchanan. 2002. Optimization of Phosphorus Precipitation from Swine Manure Slurries to Enhance Recovery. *Proceedings of the International Conference 'From Nutrient Removal to Recovery'*. Amsterdam, The Netherlands, pp. 121-128.
- Williams, E.L., D. R. Raman, R. T. Burns, A. C. Layton, A.S. Daugherty and M. D. Mullen. 2002. Estrogen Concentrations in Dairy and Swine Waste Storage and Treatment Structures in and around Tennessee. *ASAE Paper No. 024150*. ASAE, St. Joseph, MI.
- Burns, R.T. and L.B. Moody. 2002. Phosphorus Recovery from Animal Manures using Optimized Struvite Precipitation. Published in the *Proceedings of the Global Market and Technical Opportunities for Water Treatment Chemicals, INTERTECH Coagulants and Flocculants Meeting*.
- Burns, R.T., L.B. Moody, F.R. Walker and D.R. Raman. 2001 Laboratory and In-Situ Reductions of Soluble Phosphorus in Liquid Swine Waste Slurries. *Environmental Technology*. 22(11):1273 -1278.
- Raman, D. R., A. C. Layton, L. B. Moody, J. P. Easter, G. S. Saylor, R. T. Burns, and M. D. Mullen. 2001. Degradation of estrogens in dairy waste solids: storage methods and temperature effects. *Transactions of the ASAE*. 44(6):1881-1888.
- Daugherty, A. S., R. T. Burns, T. L. Cross, D. R. Raman, and G. F. Grandle. 2001. Liquid Dairy Waste Transport and Land Application Cost Comparisons Considering Herd Size, Transport Distance, and Nitrogen versus Phosphorus Application Rates. *ASAE Paper No. 012263*. ASAE, St. Joseph, MI.
- Hawkins, G. L., D. R. Raman, R. T. Burns, R. E. Yoder, and T. L. Cross. 2001. Enhancing Dairy Lagoon Performance with High-Rate Anaerobic Digesters. *Transactions of the ASAE* . 44(6):1825-1831.
- Burns, R.T. and L.B. Moody. 2001. Performance testing of screw-press solid separators: comprehensive solids analysis and nutrient partitioning. Published in the *Proceedings of the International Symposium Addressing Animal Production and Environmental Issues*. Raleigh, North Carolina.
- Dyer, A. R., D. R. Raman, M. D. Mullen, R. T. Burns, L. B. Moody, A. C. Layton, and G. S. Saylor. 2001. Determination of 17 β -estradiol Concentrations in Runoff from Plots Receiving Dairy Manure. *ASAE Paper No. 012107*. ASAE, St. Joseph, MI.
- Ervin, T. L., R. E. Yoder, F. A. Draughon, R. T. Burns, and D. R. Raman. 2001. Incidence of *Escherichia coli* O157:H7, *Listeria monocytogenes*, and *Salmonella* Species on a Tennessee Dairy Farm. *ASAE Paper No. 012272*. ASAE, St. Joseph, MI.
- Hawkins, G.L., D.R. Raman, R.T. Burns, R.E. Yoder, and T.L. Cross. 2000. Reducing Dairy Lagoon Organic Loading Rates with High-Rate Anaerobic Digesters. *Proceedings of the 8th International Symposium on Animal Agriculture and Food Processing Wastes*. Ed. James A. Moore. pp. 362 - 371. Des Moines, Iowa. ASAE, St. Joseph, MI.
- Burns, R.T. and F.R. Walker. 2000. Livestock Production and Water Quality in Tennessee. *Proceedings of the Tenth Annual Tennessee Water Resources Symposium*, Montgomery Bell State Park (Dickson, TN). pp. 2B.15 - 2B.19.

Publications: Refereed Journal Articles & Technical Publications (continued):

- Beal, L.J., R.T. Burns, K.J. Stalder. 1999. Effect of Anaerobic Digestion on Struvite Production for Nutrient Removal from Swine Waste Prior to Land Application. 1999. *ASAE Paper No. 994042*. ASAE, St. Joseph, MI.
- Burns, R.T. 1999. Overview of Dairy, Swine, Poultry, and Beef Waste Management Options in the United States. International Association of Milk Food and Environmental Sanitarians Meeting, Dearborn, MI. Symposium on Animal Waste Management and Its Relationship to Food Safety. Published on the International Life Sciences Institute (ILSI) North America *Proceedings of the Symposium Series on Food Microbiology*. pp. 36 - 38.
- Coffey, D.L., M.J. Buschermohle, J.B. Wills, R.T. Burns, R.E. Yoder, G.S. Honea and J.R. Summerlin. 1999. Performance and Soil Temperature and Moisture Conditions of Tomatoes Grown on Colored Plastic Mulches. *Proceedings of the 28th National Agricultural Plastic Conference*.
- Freeland, R.S., J.C. Regan, R.T. Burns, and J.T. Ammons. 1998. Sensing Perched Water using Ground-penetrating Radar - A Critical Methodology Examination. *Applied Engineering in Agriculture*. Vol. 14(6): pp. 675-681.
- Buschermohle, M.J. and R.T. Burns. 1998. Solar Watering Pumping Systems for Livestock. *ASAE Paper No. 984088*. ASAE, St. Joseph, MI.
- Burns, R.T., T.L. Cross, K.J. Stalder and R.F. Theurer. 1998. Cooperative Approach to Land Application of Animal Waste in Tennessee. *Proceedings of the Animal Production Systems and the Environment: International Conference on Odor, Water Quality, Nutrient Management and Socioeconomic Issues Meeting: Vol.1:pp.151-156* Des Moines, Iowa.
- Freeland, R.S., J.C. Regan, R.T. Burns, and J.T. Ammons. 1997. Noninvasive Sensing of Near-Surface Perched Water using Ground Penetrating Radar. *ASAE Paper No. 973073*. ASAE, St. Joseph, MI.
- Buschermohle, M.J., R.T. Burns, J.B. Wills, D.L. Coffey, and G.S. Honea. 1997. Mulch Color Effects on Soil Temperature, Soil Moisture and Vegetable Yields. *Proceedings of the 1997 SERA-IEG 4 Meeting*. Tifton, Georgia.
- Davis, W.T., A. Early and R.T. Burns. 1995. The Significance of NO_x emissions from Coal-fired Power Plants in the Middle Tennessee Area on Tropospheric Ozone. *Proceedings of the 88th annual Air and Waste Management Association Conference*. San Antonio, Texas.
- Burns, R.T., 1995. Impact of Electric Vehicles on Ozone Formation in the Middle Tennessee Area, Dissertation, University of Tennessee, Knoxville.
- Burns, R.T., M.A. Kaminski, W.T. Davis, and T.L. Miller. 1994. Interactive Visualization of Urban Airshed Modeling Simulations. *Proceedings of the Air and Waste Management Association Conference, Computing in Environmental Management*. RTP, N.C.
- Burns, R.T., W.T. Davis and T.L. Miller. 1995. Potential Air Quality Impact of Electric Vehicles in Southeastern U.S. Urban Area. *Proceedings of the 88th annual Air and Waste Management Association Conference*. San Antonio, Texas.
- Davis, W.T., R.T. Burns, M.A. Kaminski, T.L. Miller. 1994. Middle Tennessee Modeling Domain 1996 Urban Airshed Modeling Attainment Demonstration. *U.S. EPA Office of Air Quality Planning and Standards*.
- Burns, R.T., A. Early, W.T. Davis, and T.L. Miller. 1994. *Significance of NO_x Emissions for Power Plants on Ozone Formation in an Urban Area*. Presented at the 1994 WATTec Meeting.
- Burns, R.T., T.L. Miller, and W.T. Davis. 1993. *Emission Inventory Preparation*, APTI Course 519 Training Manual. U.S. EPA Air Pollution Training Institute. Course manual, 411 pp.
- Burns, R.T., T.L. Miller, and W.T. Davis, 1992. *Preparation of Emission Inventories*, APTI Course 419 Training Manual. U.S. EPA Air Pollution Training Institute. Course manual, 314 pp.
- Burns, R.T., 1992. Preparation of Air Pollutant Emission Inventories for Stationary Sources. Thesis: University of Tennessee.

Publications: Extension Service Publications

- Anderson, R, R.T. Burns, L.B. Moody, G. Brann, G. Grandle, F.R. Walker, G. Moore, and D. Tapp. 2002. Comprehensive Nutrient Management Plan for The Barr Dairy Farm; Example CNMP for the UT CNMP Certification Program. UT Agricultural Extension Service.
- Burns, R.T. 2001. Alternative Livestock Watering Systems. Conservation Practices for the Farms and Forests of Tennessee. (pp. 45 - 46). The UT Agricultural Extension Service.
- Burns, R.T. 2001. Liquid Manure Storage Structures. Conservation Practices for the Farms and Forests of Tennessee. (pp. 49 - 50). The UT Agricultural Extension Service.
- Burns, R.T. and C. Goan. 2001. Manure and Litter Land Application. Conservation Practices for the Farms and Forests of Tennessee. (pp. 45 - 46) Knoxville, Tennessee. UT Agricultural Extension Service.
- Burns, R.T. 2001. Protected Heavy-Use Areas. Conservation Practices for the Farms and Forests of Tennessee. (pp. 63 - 64) Knoxville, Tennessee. The UT Agricultural Extension Service.
- Burns, R.T. 2001. Runoff Management. Conservation Practices for the Farms and Forests of Tennessee. (pp. 65 - 66) Knoxville, Tennessee. The UT Agricultural Extension Service.
- Burns, R.T. 2001. Stream Crossings. Conservation Practices for the Farms and Forests of Tennessee. (pp. 67 - 68) Knoxville, Tennessee. The UT Agricultural Extension Service.
- Burns, R.T. 2001. Selection of Beef Watering Systems. University of Tennessee Agricultural and Biosystems Engineering Extension Publication. WQS-01-01.
- Burns, R.T. and L.B. Moody. 2001. *Press Tech* Agri-Press 600 solids separator performance test results using The University of Tennessee testing protocol. University of Tennessee Agricultural and Biosystems Engineering Extension Publication. AWM-01-01.
- Burns, R.T. and L.B. Moody. 2001. *Vincent* KP-6L solids separator performance test results using The University of Tennessee testing protocol. University of Tennessee Agricultural and Biosystems Engineering Extension Publication. AWM-01-02.
- Burns, R.T. 2000. Using Incinerators for Poultry Mortality Management. University of Tennessee Agricultural and Biosystems Engineering Extension Publication AWM -01-00.
- Walker, F.R. and R.T. Burns. 2000. Treating Broiler Litter with Alum. P&SS IS # 318.
- Burns, R.T. and M.J. Buschermohle. 1999. Selection of Alternative Livestock Watering Systems. University of Tennessee Extension Publication PB1641.
- Buschermohle, M.J. and R.T. Burns. 1999. Solar Livestock Watering Systems. University of Tennessee Extension Publication PB1640.
- Burns, R.T., F.R. Walker and H.J. Savoy. 1999. Nutrient Management Plan Assistance Guide for Tennessee Class II Concentrated Animal Feeding Operation Permit. University of Tennessee Agricultural Extension Service Publication PB 1635.
- Eash, N.S., J. McClurken and R.T. Burns. 1998. Best Management Practices for Land Application of Biosolids. University of Tennessee Agricultural Extension Publication SP500.
- Burns, R.T. 1998. Basic Filtration for Micro-Irrigation Systems. University of Tennessee Agricultural and Biosystems Engineering Extension Publication IR-01-98.
- Burns, R.T. 1998. Basic Fertigation for Micro-Irrigation Systems. University of Tennessee Agricultural and Biosystems Engineering Extension Publication IR-02-98.
- Eash, N.S. and R.T. Burns. Cryptosporidium Contamination of Water. 1996. University of Tennessee Agricultural Extension Publication SP465-A.
- Turner, L., R. Bowling, R.T. Burns, M. Buschermohle, W. Crist, G. Grandle, S. Isaacs, P. Scharko, and J. Taraba. 1996. *Farmstead Planning. Chapter 3 - Sustainable Dairy Systems Manual*. SARA / ACE Project. The University of Tennessee AES.
- Taraba, J., R. Bowling, R.T. Burns, T. Cross, S. Isaacs and M. Williams. 1996. Manure Management. Chapter 10 - Sustainable Dairy Systems Manual. Southern Region SARA / ACE Project. The University of Tennessee Agricultural Extension Service.
- Burns, R.T. and J.B. Wills. 1996. Assessing your Petroleum Product Storage. Tennessee Farm-A-Syst Factsheet. University of Tennessee Agricultural Extension Publication SP484G.
- Burns, R.T. and J.B. Wills. 1996. Assessing your Hazardous Waste Management. Tennessee Farm-A-Syst Factsheet. University of Tennessee Agricultural Extension Publication SP484H.

Grantsmanship:

Grants Funded

10/05 – 10/07 *Total Suspended Particulate, PM10, PM2.5, Hydrogen Sulfide and Hydrocarbon National Consent Agreement Emissions Determination from Broiler Production Systems*. R.T. Burns, H. Xin, R. Gates and S. Hoff. \$648,231 awarded by Tyson Foods.

10/05 – 9/07 *Development and Integration of A National Feed Management Education Program and Assessment Tools into a Comprehensive Nutrient Management Plan (CNMP)*. Joe Harrison, Alan Sutton, Galen Erickson, Robert Burns. \$228,586 awarded by the USDA-NRCS Conservation Initiative Grant program.

9/05 - 9/09 *A National Learning Center for Animal Agricultural Water Quality Issues*. R. K. Koelsch, Frank Humenik, Mark Risse, Joe Harrison (R.T. Burns is project contributor). \$300,000 awarded by the USDA 406 Water Quality Program.

9/05 – 9/06 *Bio-fuel Production from Bio-Dried Animal Manure to Improve Iowa Livestock Production Economy*. S. Sadaka, R.T.Burns & M. Hanna. \$80,000 awarded by the Iowa State University Biotechnology Bioproducts Consortium.

7/05 – 6/06 *Monitoring of Alternative Technology Systems Using Settling Benches For Beef Feedlot Run-off Control*. R.T.Burns, J.D. Lawrence, L.B. Moody. \$100,000 awarded by the Iowa Department of Agriculture and Land Stewardship.

6/05 – 6/06 *Pathogen Monitoring from Alternative Beef Feedlot Run-Off Control Systems*. R.T. Burns, L.B. Moody and J.D. Lawrence. \$30,000 awarded by the U.S. EPA.

5/05 – 11/08 *Non-basin Technologies For Open Feedlot Runoff: Demonstration, Implementation, And Modeling*. R.T. Burns, J.D. Lawrence, L.B. Moody and M.J. Helmers. \$632,367 awarded by the Iowa Cattlemen's Association.

3/05 – 9/06 *Ammonia Emissions Determination from Broiler Production Systems*. R.T. Burns, H. Xin and R. Gates. \$399,525 awarded by Tyson Foods.

9/03 - 9/06. *Development of A CNMP Core Training Curriculum*. R.T. Burns, L. B. Moody, N. Rector, A. Sutton and R. Sheffield. \$290,000 awarded by the USDA 406 Extension Education Program.

12/03 – 12/06. *Concentration and Extraction of Phosphorus from Swine Manure Slurries*. R.T. Burns, L. B. Moody, F. R. Walker, W. M. Park, and J. R. Buchanan. \$168,000. Awarded by USDA/NRI.

05/02 – 12/03. *Control of Ammonia and Litter Pathogen Levels in Broiler Production Facilities Treated with Alum as a Litter Amendment*. R.T. Burns, F.A. Draughon, L.R. Wilhelm and F.R. Walker. \$27,914 awarded by the General Chemical Corporation.

07/01 – 06/02. *Animal Waste System Design Workshop*. R.T. Burns. \$26,850 awarded by the Tennessee Department of Agriculture.

07/01 – 06/02. *Dairy Waste Management Field Day*. R.T. Burns., F.R. Walker, T. Woods, and J. Goddard. \$12,540 awarded by the Tennessee Department of Agriculture.

Grants Funded (continued):

7/01 – 7/03. *On-farm Demonstration of the Use of Aluminum Sulfate as an in-house amendment for Poultry Litter.* Walker, F.R., and R.T. Burns. \$45,030 awarded by the TN 319 Pollution Control Program.

7/01 – 7/03. *Control of Ammonia and Litter Pathogen Levels in Broiler Production Facilities Treated with Alum as a Litter Amendment.* R.T. Burns., A. Draughon, F.R. Walker, L. Wilhelm. \$25,625 awarded by the Food Safety Center of Excellence.

11/00 – 01/04. *Agricultural Engineering Water Quality Technical Support.* R.T. Burns. \$225,000 awarded by the Tennessee Department of Agriculture.

07/00 – 06/01. *Animal Waste System Design Workshop.* R..T. Burns. \$50,608 awarded by the Tennessee Department of Agriculture.

01/00 - 12/00. Walker, F.R., and R.T. Burns. *Demonstration of Phosphorus Binding in Swine Waste using Alum.* \$10,000 awarded by the Tennessee Department of Agriculture.

11/99-11/01. Raman, D. R., A.C. Layton, M.D. Mullen, R.T. Burns and G. S. Saylor. *Quantifying and minimizing 17 Beta-estradiol emissions from dairy and swine.* \$215,500 awarded by the USDA / NRI.

3/99 B 8/00. Raman, D. R., and R. T. Burns. *High-Rate Anaerobic Pretreatment of Animal Wastewater : Impact on Traditional Anaerobic Animal Waste Treatment System Performance and Economics.* \$38,680 awarded by The United States Geological Service Water Resources Research Program.

07/99 - 06/00. R.T Burns and H.H. Dowlen. Dairy Manure Solids Separation project: Animal Waste Management Information & Education Project. \$7,000 awarded by The Tennessee Department of Agriculture.

07/98 - 06/99. R.T. Burns, R.E. Yoder, M.J. Buschermohle, and G.S. Honea. *Soil Moisture Measurement of Plasticulture on Tomatoes and Cantaloupes.* UT Vegetable Initiative grant request. \$1,800 awarded by the Knox Experiment Station. Work Plan Number TN-050-KES-02.

07/97 - 06/98. R.T. Burns and M.J. Buschermohle. *Alternative Livestock Watering Systems for Limited Access Situations.* \$5,000 awarded by The Tennessee Department of Agriculture.

07/97 - 06/98. R.T. Burns and R.E. Yoder. *Soil Moisture Measurement Equipment for Irrigation Scheduling at Knoxville, Crossville, Greenville.* UT Vegetable Initiative grant request. \$2,500 awarded by the Knox Experiment Station. Work Plan Number TN-050-KES-01.

07/97 - 06/98. R.T. Burns, R.E. Yoder, and M.J. Buschermohle. *Soil Moisture Data Monitoring in Support of TN-058-KES-01-1 and TN-058-KES-24-1.* UT Vegetable Initiative grant request. \$5,400 awarded by the Knox Experiment Station. Work Plan Number TN-050-KES-02.

07/97 - 06/98. R.T. Burns and R.E. Yoder. *Drip Irrigation Filter Demonstration System Plant Sciences Unit - Knoxville.* UT Vegetable Initiative grant request. \$5,500 awarded by the Knox Experiment Station. Work Plan Number TN-050-KES-03.

07/97 - 06/98.. R.T. Burns and R.E. Yoder. *Drip Irrigation Fertigation Demonstration System Plant Sciences Unit - Knoxville.* UT Vegetable Initiative grant request. \$2,400 awarded by the Knox Experiment Station. Work Plan Number TN-050-KES-04.

Grants Funded (continued):

10/96 - 09/97. R.T. Burns. Funding to support the Level II Agent In-Service *Animal Waste Management Training. Environmental Education Project*. Course taught in Spring 1997. \$5,000 awarded by the U.S. Environmental Protection Agency.

07/96 - 06/97. R.T. Burns. Applied research work in swine waste manure application: *Application of Swine Waste*. \$4,000 awarded by the Tennessee Department of Agriculture.

07/95 - 06/97. Yoder, R.E., D.C. Yoder, C.R. Mote, M.J. Buschermohle, R.T. Burns and N.S. Eash. *Cattle Access to Streams: Research and Demonstration*. \$22,400 awarded by The Tennessee Department of Agriculture.

Web Site Development:

Iowa State University Animal Waste Management Website co-developed by Lara B. Moody and R.T. Burns. 2004 - Present. Web address: <http://www.iastate.edu/>

University of Tennessee Animal Waste Management Website co-developed by Lara B. Moody and R.T. Burns. 2001 - 2004. Web address: <http://wastemgmt.ag.utk.edu/>

Short-Courses Developed:

Comprehensive Nutrient Management Plan Development Course. Nov. 15-17, 2005. Portland, OR. R.T. Burns Course Coordinator.

Anaerobic Treatment of High-Strength Industrial and Agricultural Wastes. September 22-23, 2005 Milwaukee, WI. R.T. Burns course Co-Coordinator with D. Zitomer (Marquette University).

Comprehensive Nutrient Management Plan Development Course. Nov. 16-18, 2004. Indianapolis, IN.. R.T. Burns Course Coordinator.

Comprehensive Nutrient Management Plan Development Course. Feb. 12-14, 2003. Nashville, TN. R.T. Burns Course Coordinator.

Anaerobic Treatment of High-Strength Industrial and Agricultural Wastes. Feb. 19-20, 2004 Nashville, TN. R.T. Burns course Co-Coordinator with D. Zitomer (Marquette University).

Comprehensive Nutrient Management Plan Development Course. Nov. 17-19, 2003. Knoxville, TN. R.T. Burns Course Coordinator.

NRCS Anaerobic Treatment of Agricultural Wastes. Nov. 3-5, 2003 Nashville, TN. R.T. Burns Course Coordinator.

Anaerobic Treatment of High-Strength Industrial and Agricultural Wastes. Sept. 22-23, 2003. Milwaukee, WI. D. Zitomer (Marquette University) course Co-Coordinator with R. T. Burns.

Anaerobic Treatment of High-Strength Industrial and Agricultural Wastes. April 7-8, 2003. Knoxville, TN. R.T. Burns course Co-Coordinator with D. Zitomer (Marquette University).

Comprehensive Nutrient Management Plan Development Course. Feb. 12-14, 2003. Nashville, TN.. R.T. Burns Course Coordinator.

Animal Waste Management Systems: Comprehensive Nutrient Management Plan Development Course. Feb. 20-22, 2002. Nashville, TN. R.T. Burns Course Coordinator.

Short-Courses Developed:

Manure Utilization Planning for CAFOs. July 28, 2001 Sacramento, CA. Continuing Professional Development Course (CPD) taught at 2001 ASAE meeting. R.T. Burns Course Coordinator.

Animal Waste Management Systems: Comprehensive Nutrient Management Plan Development Course. Feb. 19-21, 2001 Nashville, TN Feb. R.T. Burns Course Coordinator.

Animal Waste Management Training: Level II Agent In-Service . March (Taught over a five week period), 1997 Nashville. R.T. Burns Course Coordinator.

Emission Inventory Preparation: APTI Course 519, U.S. EPA Air Pollution Training Institute. 1993. RTP, North Carolina. Course co-developed by W.T. Davis, T.L. Miller and R.T. Burns.

Professional Service:

Iowa State University CNMP TSP Certification Program:

Serve as the Designated Technical Leader for the ISU Comprehensive Nutrient Management Plan Technical Service Provider certification program. Iowa State University serves as a national certification program from the United States Department of Agriculture. (2004 - Present).

Tennessee CNMP Third Party Certification Program:

Serve as the Designated Technical Leader for the Tennessee Comprehensive Nutrient Management Plan Technical Service Provider certification program. The University of Tennessee Agricultural Extension Service serves as a national certification program from the United States Department of Agriculture. (2000 - 2004).

Proceedings Chair - ISAAFPW 2003

Served as proceedings chair for The Ninth International Symposium on Animal, Agricultural and Food Processing Wastes held in Raleigh, NC on October 11-14, 2003.

Professional Service (continued):

ASAE Committee Service:

T-09 *Environmental Quality Group* member.

SE - 412 *Structures & Environment* committee member, Chair 2004 / 05 Vice Chair 2003 / 04, Secretary 2003 / 04, Session Chair - 2001 ASAE International Meeting

P - 414 *Professional Engineering Licensure* member, Chair for 2003 / 2005 (two -year term) 414 Vice-Chair 2001 - 2003

ASAE Manure Utilization Planning for CAFOs Short-Course:

Coordinated an ASAE national short-course titled "Manure Utilization Planning for CAFOs " held in conjunction with the 94th International ASAE meeting in Sacramento, CA in July, 2001.

2005 Vice Chair for Programs - Iowa Section of the ASAE

Served as 2005 Chair of the Iowa Section of ASAE.

2002 Chair - Tennessee Section of the ASAE

Served as 2002 Chair of the Tennessee Section of ASAE.

Southern Region Chair - National Animal Waste Initiative

Served as the 2001-2002 Southern Region Chair of the National Animal Waste Initiative.

USDA Grant Reviews:

Served as a member of the 2004 USDA Conservation Effects Assessment Program CSREES competitive grant review panels held in Washington, DC.

Panel Manager for the 2002 USDA 406 Water Quality CSREES competitive grant review panel. Served as a member of the 2000 and 2001 USDA 406 Water Quality CSREES competitive grant review panels held in Washington, DC.

Provide reviews of NRI and SBIR grants within the water quality area on request. 1999 – present.

Preparation of the PE Exam:

Assist with preparation of the national professional engineers exam (Agricultural Engineering exam). 1998 – Present.

Membership on Graduate Degree Candidate Committees: As Major Professor:

Dennis Kuan Ph.D., Industrial Technology In-Progress
Dissertation Title: Development of a Predictive Risk Management Model for Animal Waste Storage Systems

Timothy Shepard M.S., Agricultural Engineering In-Progress
Thesis Title: Development of a Pilot-Scale Struvite Recovery System for Phosphorus Recovery from Swine Manure Slurries.

Ishadeep Khanijo M.S., Agricultural Engineering In-Progress
Thesis Title: Modeling and Monitoring of Alternative Technology Beef Feedlot Run-Off Control Systems.

Ipek Celen Ph.D., Biosystems Engineering In-Progress
Dissertation Title: Optimization of Phosphorus Precipitation from Swine Manure Slurries to Enhance Recovery.

Ken Armstrong M.S., Biosystems Engineering Technology Completed 2003.
Thesis Title: Effect of Alum addition to Broiler Litter on Pathogen levels, Soluble Phosphorus and In-house Ammonia Levels on Broiler Production Systems.

Adam Daughtery M.S., Biosystems Engineering Technology Completed 2001
Thesis Title: Economic Comparison of Animal Waste Transport and Application Methods.

Membership on Graduate Degree Candidate Committees: As Committee Member:

Hong Li Ph.D. Agricultural Engineering In-Progress
Dissertation Title: Gaseous Emissions from Stored Poultry Manure

Wei Wu M.S., Animal Science In-Progress
Thesis Title: Influence of Diet on Ammonia and Hydrogen Sulfide Emissions from Laying Hens

Elizabeth Williams M.S., Biosystems Engineering Technology Completed 2003.
Thesis Title: Presence of 17-Beta Estradiol and Estrone in Dairy and Swine Manures.

Alexandra Maria Pinto Ph.D. Biosystems Engineering Completed 2001
Dissertation Title: Fuzzy-Logic Based Toxicity Detector for Upflow Anaerobic Sludge Bed Reactors.

Membership on Graduate Degree Candidate Committees: As Committee Member (Cont.)

A. Renea Peters M.S., Biosystems Engineering Technology Completed 2001
Thesis Title: Runoff Masses of 17-Beta Estradiol from Plots Amended with Dairy Manure.

Theresa Louise Ervin M.S., Biosystems Engineering Completed 2001
Thesis Title: Reservoirs of *Escherichia coli* O157:H7, *Listeria monocytogenes*, and *Salmonella* species on a Tennessee dairy farm.

Gary Hawkins Ph.D. Biosystems Engineering Completed 2000.
Dissertation Title: Kinetics of High-Rate Anaerobic Digestion of Dairy Waste.

Catherine R. Mayhew M.S., Biosystems Engineering Technology Completed 1999.
Thesis Title: *Mosquito Control and Pollutant removal in Constructed Wetlands: A Mesocosm Study Using Dairy-Wastewater.*

Jeffery Russell Powell M.S., Biosystems Engineering Technology Completed 1998.
Thesis Title: *Water Quality and Ecological Impacts of Watering Cattle Adjacent to a Small Middle Tennessee Stream.*

Joseph Cole Reagan M.S. Biosystems Engineering Technology Completed 1997.
Thesis Title: *An Examination of Methodologies to Assess High-Resolution Noninvasive Sensing of Near-Surface Perched Water.*

International Experience:

Republic of Korea.

Provide consultation to the Animal Science Research Institute in the Republic of Korea on the development of a 100,000 head swine finish facility. 2004.

Seoul National University - Invited Speaker. Presented a lecture on Developing Sustainable Animal Production Systems. 2004.

Zambia. Mpongwe Development Company - Agricultural engineering support in the areas of post-harvest grain drying / storage and irrigation expansion planning for Mpongwe Development Company (MDC). The MDC operates the largest arable farm (60,000 ha) in Africa. The farm is operated in north central Zambia under a partnership between the Commonwealth Development Corporation and the Government of Zambia. 2003.

International Visits - Presented at scientific meetings in Great Britain, The Netherlands and Denmark. Invited visitor to Cranfield University to discuss struvite formation research.

Consulting: Have provided agricultural and environmental engineering consulting services to various groups including the U.S. EPA, Mpongwe Development Corporation, America's Clean Water Foundation, The Tennessee Department of Environment and Conservation as well as numerous individuals and farming operations.

Membership in Professional and Honorary Societies

Air and Waste Management Association

American Society of Agricultural Engineers

Tennessee Association of Agricultural Agents and Extension Specialists

National Association of County Agricultural Agents

Chi Epsilon (National Civil Engineering Honor Society)

Tau Beta Pi Engineering Honor Society (National member and Alpha Chapter member)

Phi Kappa Phi Honor Society (National Member and UTK Chapter member)

Gamma Sigma Delta (Honor Society of Agriculture)

Honors & Awards:

- **2005 Honorary Senior Scientist.** Named a Senior Scientist in the Livestock Waste area for a three year term by The National Livestock Research Institute, RDA, South Korea.
- **2003 Nolan Mitchell Young Extension Worker Award.** Awarded by the American Society of Agricultural Engineers for distinguished educational programming in the areas of water quality and animal waste management.
- **2003 NACAA “Learning Module” National Winner Award.** Presented by the National Association of County Agricultural Agents, R. T. Burns, L. Moody and G. Grandle for the Comprehensive Nutrient Management Plan (CNMP) Certification Program Notebook.
- **2002 ASAE Blue Ribbon Award.** Awarded by the American Society of Agricultural Engineers in the Extension Methods Category in recognition of the TN CNMP Certification Program for Third Party Technical Providers. 2002.
- **2001 Outstanding Young Agent.** Awarded by the Tennessee Association of Agricultural Agents and Specialists. 2001.
- **Best Publication.** 1st Place statewide winner for best extension publication recognized by the Tennessee Association of Agricultural Agents and Specialist for *Solar Livestock Watering Systems*. (PB 1640 Co-authored with M.J. Buschermohle). April, 2000.
- **Outstanding Speaker** by USDA-NRCS for paper *Mass Balance Approach to Long Term Nutrient Management Planning* at the Southeast Animal By-Product Utilization Workshop. September 3, 1999.
- **Epsilon Sigma Phi State Team Award** - Member of the Sustainable Dairy Systems Team that received the 1998 Epsilon Sigma Phi State Team Award. 1998.
- **Tennessee Higher Education Environmental Stewardship Award.** Member of the Extension Environmental Stewardship Priority Team that received the 1998 award.
- **Friend To CFW** - Award given by the Coffee-Franklin-Warren Animal Waste Utilization Association for Continued Support and Interest to the Association’s Dairy and Swine Producers. 1998.
- **Exceptional Service Award.** Presented by The University of Tennessee Department of Civil and Environmental Engineering. 1995.
- **Undergraduate Student with Professional Promise** - Recognition awarded by the faculty of the University of Tennessee Agricultural Engineering Department. 1990
- **ASAE Student Honor Award** - Tennessee Student Engineering Branch. Given in Recognition of Conspicuous Student Activity. 1990.
- **Farm Shop Workhorse Award.** Given for Outstanding Achievement in Agricultural Mechanics by the Future Farmers of America (Owasso, Oklahoma Chapter). 1985.