

CURRICULUM VITAE

John J. Classen

CURRENT POSITION

Associate Professor
Biological and Agricultural Engineering Department
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EDUCATION

Ph.D. Agricultural Engineering, Texas A&M University, May, 1995
M.S. Agricultural Engineering, University of Arkansas, May, 1990
B.S. Agricultural Engineering, University of Arkansas, May, 1987

EXPERIENCE

January 1995 - present: Associate professor (Assistant professor from January 1, 1995 to June 30, 2000), agricultural waste management and bioresource recovery, North Carolina State University.

May 1993 - December 1994: Graduate assistant, Agricultural Engineering Department, Texas A&M University, College Station, Texas.

May 1990 - May 1993: U.S.D.A National Needs Fellow; Agricultural Engineering Department, Texas A&M University, College Station, Texas.

May 1987 - May 1990: Research Assistant, Biological and Agricultural Engineering Department, University of Arkansas, Fayetteville.

PROFESSIONAL ACTIVITIES / AWARDS

Arkansas Academy of Biological and Agricultural Engineers, 2007
Registered Engineer Intern, State of Arkansas
Member of ASABE, The society for engineering in agricultural, food, and biological systems
Graduate of Class 12, ESCOP/ACOP Leadership Development Program, 2003.

REFEREED JOURNAL ARTICLES

Classen, J.J., J.M. Rice, and R. Sherman, 2007. The Effects of Vermicompost on Field Turnips and Rainfall Runoff. *Compost Science and Utilization* 15(1): 34-39.

Chaiprapat, S., J. Cheng, J.J. Classen, and S.K. Liehr. 2005. Role of internal nutrient storage in duckweed growth for swine wastewater treatment. *Transactions of the ASAE* 48(6): 2247-2258.

Chaiprapat, S., J. Cheng, J.J. Classen, J.J. Ducoste, and S.K. Liehr. 2003. Modeling nitrogen transport in duckweed pond for secondary treatment of swine wastewater. *Journal of Environmental Engineering* 129(8):731-739.

Cheng, J., B.A. Bergmann, J.J. Classen, A.M. Stomp, and J.W. Howard. 2002. Nutrient recovery from swine lagoon water by *Spirodela punctata*. *Bioresource Technology* 81(1): 81-85.

Price, Michael S., John J. Classen, and Gary Payne, 2001. *Aspergillus niger* absorbs copper and zinc from swine wastewater. *Bioresource Technology* 77(1):41-49.

Jones, M. Lloyd, Sarah K. Liehr, John J. Classen, and Wayne Robarge, 2000. Mechanisms of dinitrogen gas formation in anaerobic lagoons. *Advances in Environmental Research* 4:133-139.

Classen, John J., Cady R. Engler, Charles M. Kenerley, and A. Dale Whittaker, 2000. A logistic model of subsurface fungal growth with application to bioremediation. *Journal of Environmental Science and Health - Part A Toxic / Hazardous Substances & Environmental Engineering* A35(4): 465-488.

Classen, J.J., J.S. Young, R.W. Bottcher, P.W. Westerman, 2000. Design and analysis of a pilot-scale biofiltration system for odorous air. *Transactions of the ASAE* 43(1): 111-118.

Bergmann, B.A., J. Cheng, J. Classen, A.-M. Stomp, 2000. *In vitro* selection of duckweed geographical isolates for potential use in swine lagoon effluent renovation. *Bioresource Technology* 73(1):13-20.

Bergmann, B.A., J. Cheng, J. Classen, A.-M. Stomp, 2000. Nutrient removal from swine lagoon effluent by duckweed. *Transactions of the ASAE* in 43(2):263-269.

Bicudo, Jose R., John J. Classen, C. Douglas Goldsmith, Jr., and Thomas Smith, 1999. Effects of aeration and hydraulic retention time on the sequencing batch treatment of flushed swine manure. *Advances in Environmental Research* 3(1):58-73.

Classen, John J., Wensheng Liu, Charles M. Kenerley, and A. Dale Whittaker. 1996. Fractal analysis of subsurface growth of a genetically modified strain of *Gliocladium virens* and its parental strain. *Transactions of the ASAE* 39(6):2271-2276.

Classen, John J., Terry J. Siebenmorgen, and Carl L. Griffis. 1993. Vegetable processing energy requirements. *Arkansas Farm Research* 42(2):8-9.

Classen, J.J., T.J. Siebenmorgen, C.L. Griffis, and J.C. Young. 1992. Processing energy requirements of several vegetables. *Transactions of the ASAE* 35(3):973-974.

Classen, J.J., T.J. Siebenmorgen, C.L. Griffis and J.C. Young. 1991. Anaerobic digestion of hominy waste. *Transactions of the ASAE* 34(3):937-943.

OTHER PUBLICATIONS & PRESENTATIONS

Classen, J.J., J.M. Rice, S.K. Liehr, K.D. Zering. 2007. Engineering and Economic Approaches to Technology Evaluations: A Call for a New Approach. International Symposium on Air Quality and Waste Management for Agriculture, 16-19 September 2007, Broomfield, CO.

Arogo, J., P.W. Westerman, A.J. Heber, W.P. Robarge, and J.J. Classen. 2006. Ammonia Emissions from Animal Feeding Operations. In Rice, J.M., D.F. Caldwell, and F.J. Humenik (eds) *Animal Agriculture and the Environment: National Center for Manure and Animal Waste Management*

White Papers, pp 41-88. St. Joseph, Michigan: ASABE.

Bahe, A.R., J.J. Classen, and W. Williams, 2006. Antibiotic Resistance and the Environment: Current Science and Policy Concerns. In Rice, J.M, D.F. Caldwell, and F.J. Humenik (eds) *Animal Agriculture and the Environment: National Center for Manure and Animal Waste Management White Papers*, pp 89-108. St. Joseph, Michigan: ASABE.

Bahe, A.R., J. Staveley, J.J. Classen, W. Williams, 2006. Emerging Environmental Contaminants: Current Science and Policy Concerns. In Rice, J.M, D.F. Caldwell, and F.J. Humenik (eds) *Animal Agriculture and the Environment: National Center for Manure and Animal Waste Management White Papers*, pp 181-200. St. Joseph, Michigan: ASABE.

Liehr, S.K., J.J. Classen, F.J. Humenik, C. Baird, J.M. Rice. 2006. Ammonia Recovery from Swine Belt Separated Liquid. ASABE Paper No. 064110. St. Joseph, Mich.: ASABE.

Bahe, A., J.J. Classen, W. Williams, and J. Stavley. 2005. National Center for Manure and Animal Waste Management White Paper, Antibiotic Resistance and the Environment: Science and Policy Concerns. In Havenstein, G.B. (ed) *Proceedings of the Animal Waste Management Symposium: The Development of Alternative Technologies for the Processing and Use of Animal Waste*, Research Triangle Park, NC, October 5-7, 2005.

Bahe, A., J.J. Classen, W. Williams, and J. Stavley. 2005. National Center for Manure and Animal Waste Management White Paper, Emerging Environmental Contaminants: Science and Policy Concerns. In Havenstein, G.B. (ed) *Proceedings of the Animal Waste Management Symposium: The Development of Alternative Technologies for the Processing and Use of Animal Waste*, Research Triangle Park, NC, October 5-7, 2005.

Classen, J.J., S.K. Liehr, and C.D. Goldsmith, Jr. 2005. Performance Evaluation of Alternative Natural Technology's Sequenceing Batch Reactor Treatment of Flushed Swine Waste. In Havenstein, G.B. (ed) *Proceedings of the Animal Waste Management Symposium: The Development of Alternative Technologies for the Processing and Use of Animal Waste*, Research Triangle Park, NC, October 5-7, 2005.

Humenik, F.J., K.D. Zering, A. Atkinson, J.M. Rice, S.K. Liehr, R. Sherman, J.J. Classen, Y. Chen, J. Anderson, G. Palin. 2005. Development of Marketable Products from Alternative Swine Manure Treatment Technologies. Final Report to the Golden Leaf Foundation.

Classen, J.J. and S.S. Schiffman. 2004. Evaluation of the Carbofil International Downflow Tube Reactor for Treatment of Swine Waste. ASAE Paper No. 044031. St. Joseph, Mich.: ASAE.

Humenik, F.J., J.J. Classen, J.M. Rice, C.L. Baird, S.K. Liehr, and K.D. Zering. 2004. Belt System for Swine Waste Management. *Proceedings of Integrated Solutions to Manure Management II*, March 8-9, London, Ontario, Canada.

Classen, J.J., F.J. Humenik, J.M. Rice, and C.L. Baird. 2004. Belt System for Swine Waste Management. *Proceedings of Engineering the Future*, the 2004 European Agricultural Engineering conference, September 12-16, Leuven, Belgium.

Classen, J.J., F.J. Humenik, and J.M. Rice. 2003. Solid Separation Equipment Verification Testing Protocol. Proceedings of the Ninth International Symposium on Animal, Agricultural, and Food Processing Waste, Oct. 13-15, Raleigh, North Carolina; p.472-479. ASAE, St. Joseph, MI.

Gandy, S.R., J.J. Classen, and S.K. Liehr. 2003. Quicklime Stabilization of Belt-Separated Swine Manure Solids. ASAE Paper No. 032265. St. Joseph, Mich.: ASAE

Larsen, J.M., J.J. Classen, and S.K. Liehr. 2003. Dinitrogen Gas Collection Method for Lagoon Waste Treatment Systems. ASAE Paper No. 032248. St. Joseph, Mich.: ASAE

Rice, J.M., C.L. Baird, F.J. Humenik, J.J. Classen, S.K. Liehr, K.D. Zering, and E. van Heugten. 2003. Belt system for manure removal. In Havenstein, G.B. (ed) Proceedings of the North Carolina Animal Waste Management Workshop, Research Triangle Park, NC, October 16-17, 2003.

Classen, J.J. and S.K. Liehr. 2003. Evaluation of the Hoffland Environmental Inc. waste management system. In Havenstein, G.B. (ed) Proceedings of the North Carolina Animal Waste Management Workshop, Research Triangle Park, NC, October 16-17, 2003.

Classen, J.J. and S.K. Liehr. 2003. Evaluation of the Battelle InStream lagoon modification system. In Havenstein, G.B. (ed) Proceedings of the North Carolina Animal Waste Management Workshop, Research Triangle Park, NC, October 16-17, 2003.

Classen, J.J., F.J. Humenik, and J.M. Rice. 2002. Test Plan for the Verification of Technologies for Separation of Manure Solids from Flushed Swine Waste. Prepared for NSF International and the U.S. Environmental Protection Agency under the Environmental Technology Verification Program, Water Quality Protection Center. Ann Arbor: NSF International.

Chaiprapat, S., J. Cheng, J.J. Classen, and S.K. Liehr. 2002. Role of Internal Nutrient Storage in Duckweed for Secondary Swine Wastewater Treatment. ASAE Paper No. 024130. St. Joseph, Mich.: ASAE.

Elmer, K.A., C.A. Rimbach, R.W. Bottcher, F.J. Humenik, J.J. Classen, J.M. Rice, T.A. van Kempen, E. van Heugten, K.D. Zering, J. Gregory, J. Hardesty, 2001. Development of an Energy Efficient Swine Building using Conveyor Belts for Manure Handling. In Stowell, R.R., R. Bucklin, and R.W. Bottcher (eds) Livestock Environment VI: Proceedings of the 6th International Symposium, pp 749-757, May 21-23, 2001, Louisville, Kentucky.

Smith, R.A., J. Cheng, J.J. Classen. 2001. Duckweed Harvesting and Mat Control. ASAE Paper No. 012277. St. Joseph, MI: ASAE.

Arogo, J. P.W. Westerman, A.J. Heber, W.P. Robarge, and J.J. Classen. 2001. Ammonia in Animal Production – A Review. ASAE Paper No. 014089. St. Joseph, MI: ASAE.

Anastasiou, C. J.J. Classen, S.K. Liehr, and S. Ranjithan. 2001. Design of animal waste management strategies to achieve regional environmental objectives. In Havenstein, G.B. (ed) Proceedings of the International Symposium Addressing Animal Production and Environmental Issues, Research Triangle Park, NC, October 3-5, 2001.

Bennett, T.A., J.J. Classen, and S.K. Liehr. 2001. Design of laboratory-scale sequencing batch reactor for testing operational strategies for swine waste treatment. In Havenstein, G.B. (ed) Proceedings of the International Symposium Addressing Animal Production and Environmental Issues, Research Triangle Park, NC, October 3-5, 2001.

Classen, J.J., J.M. Rice, and R. Sherman-Huntoon. 2001. Vermicomposting as an animal waste management component. In Havenstein, G.B. (ed) Proceedings of the International Symposium Addressing Animal Production and Environmental Issues, Research Triangle Park, NC, October 3-5, 2001.

Elmer, K.A., C.A. Rimbach, R.W. Bottcher, K.D. Zering, J.J. Classen, E. van Heugten, J.M. Rice, J. Gregory, J. Hardesty, F.J. Humenik, J. Greco, 2001. Design of a belt system for removal of waste from swine buildings. In Havenstein, G.B. (ed) Proceedings of the International Symposium Addressing Animal Production and Environmental Issues, Research Triangle Park, NC, October 3-5, 2001.

Larsen, J.M., J.J. Classen, and S.K. Liehr. 2001. Developing and testing a dinitrogen gas collection method for swine lagoons. In Havenstein, G.B. (ed) Proceedings of the International Symposium Addressing Animal Production and Environmental Issues, Research Triangle Park, NC, October 3-5, 2001.

Liehr, S.K., J.J. Classen. 2001. Evaluation of the Bion Technologies, Inc. system for treating swine waste. In Havenstein, G.B. (ed) Proceedings of the International Symposium Addressing Animal Production and Environmental Issues, Research Triangle Park, NC, October 3-5, 2001.

Elmer, K.A., Rimbach, C.A., Bottcher, R.W., Humenik, F.J., Classen, J.J., Rice, J.M., van Kempen, T.A., van Heugten, E., Zering, K.D., Gregory, J., Hardesty, J. 2001. Development of an energy efficient swine building using conveyor belts for manure handling. Proceedings: VI International Livestock Environment Symposium, p.749-757. St. Joseph, MI: ASAE.

Cheng, J., B.A. Bergmann, J.J. Classen, A.M. Stomp, and J.W. Howard, 2000. Nutrient removal from swine wastewater by duckweed – *Spirodela punctata*. Proceedings of the 1st World Congress of the International Water Association, 3-7 July, 2000, Paris, France.

Liehr, S.K., C. Anastasiou, J.J. Classen, J.M. Rice. 2000. Comparison of design strategies for nitrogen removal from animal waste using constructed wetlands. Proceedings of the 7th International Conference on Wetland Systems for Water Pollution Control, Orlando, FL, November 11-16, 2000.

Classen, J.J., J. Cheng, B.A. Bergmann, and A.M. Stomp. 2000. Lemna gibba growth and nutrient uptake in response to different nutrient levels. Proceedings of the Eighth International Symposium on Animal, Agricultural, and Food Processing Waste, Oct. 9-11, Des Moines, Iowa. p. 40-45.

Price, M.S., J.J. Classen, G.A. Payne, 1999. Removal of copper and zinc from swine wastewater by *Aspergillus niger*. Society for Industrial Microbiology National Meeting, August 1-6, Arlington, VA.. p 119.

Classen, J.J. and J.R. Bicudo, 1999. Two alternative treatments for flushed swine waste. In Havenstein, Gerald B. (ed) Proceedings of the 1999 North Carolina State University Animal Waste

Management Symposium, Jan 27-28, Cary, NC. pp 14-21.

Khare, N., J.J. Classen, F.J. Hmenik, K.D. Zering, and S.A. Cavanaugh, 1999. Protocol for proposal evaluation. In Havenstein, Gerald B. (ed) Proceedings of the 1999 North Carolina State University Animal Waste Management Symposium, Jan 27-28, Cary, NC. pp 314-315.

Liehr, S., J.J. Classen, K.D. Zering, N. Khare, FJ. Humenik, and S.A. Cavanaugh, 1999. Computer assisted animal waste system selection tool (CAAWST). In Havenstein, Gerald B. (ed) Proceedings of the 1999 North Carolina State University Animal Waste Management Symposium, Jan 27-28, Cary, NC. pp 328.

Parker, J.M., L.F. Stikeleather, J.J. Classen, and P.R. Ferket, 1999. A system for on-farm preservation and storage of swine mortalities. In Havenstein, Gerald B. (ed) Proceedings of the 1999 North Carolina State University Animal Waste Management Symposium, Jan 27-28, Cary, NC. pp 338-341.

Price, M.S., J.J. Classen, and G.A. Payne, 1999. Evaluation of fungi for removal of heavy metals from agricultural waste. In Havenstein, Gerald B. (ed) Proceedings of the 1999 North Carolina State University Animal Waste Management Symposium, Jan 27-28, Cary, NC. pp 347-349.

Rivin, J.M., J.J. Classen, A.R. Rubin, and L.D. King, 1999. The composting process characterized by thermodynamics. In Havenstein, Gerald B. (ed) Proceedings of the 1999 North Carolina State University Animal Waste Management Symposium, Jan 27-28, Cary, NC. pp 358-360.

Sherman, R., J.J. Classen, and J.M. Rice, 1999. Vermicompost as an animal waste management component. In Havenstein, Gerald B. (ed) Proceedings of the 1999 North Carolina State University Animal Waste Management Symposium, Jan 27-28, Cary, NC. pp 372-374.

Parker JM; Stikeleather LP; Classen JJ; Ferket PR. 1998. A system for on-farm preservation and storage of swine mortalities. ASAE Paper No. 984132. St Joseph, MI.: ASAE.

Classen, J.J., S.S. Schiffman, H.T. Nagle, R. Gutierrez-Osuna. 1997. Electronic nose evaluation of synthetic hog farm odor. Proceedings of the International Symposium on Ammonia and Odour Control from Animal Production Facilities, p77-82. NVTL: Rosmalen, The Netherlands.

Young, J.S., J.J. Classen, R.W. Bottcher, P.W. Westerman. 1997. Biofiltration system for testing the reduction of odor from swine buildings. Proceedings of the International Symposium on Ammonia and Odour Control from Animal Production Facilities, p521-528. NVTL: Rosmalen, The Netherlands.

Khare, N., J.J. Classen, and D. Pilkington. 1997. Kinetics of whole hog fermentation. ASAE paper No. 974047, St. Joseph, Mich: ASAE.

Young, J.S., R.W. Bottcher, J.J. Classen, P.W. Westerman. 1997. Design, construction, and validation of a pilot-scale biofiltration system for the reduction of swine odor. Presented at the 1997 ASAE Annual International Meeting, Minneapolis, MN, August 10-14.

Kay, Stratford and John J. Classen. 1996. Growth and nutrient uptake by water hyacinths from

swine lagoon effluent. Presented at the national meeting of Aquatic Plant Management Society, July 15-17, 1996, Burlington, VT.

Schiffman, Sue S., John J. Classen, Bahram Kermani, and H. Troy Nagle. Application of an electronic nose to differentiate odors from exhaust fans and lagoon. Presented at the International Conference on Air Pollution from Agricultural Operations, February 7-9, 1996, Kansas City, Missouri.

Classen, John J., Albert Garcia III, Charles M. Kenerley and A. Dale Whittaker. 1992. Fractal analysis of fungal growth. Presented at the 1992 International Winter Meeting of the ASAE, Nashville, TN, December 15-18, 1992. Paper No. 923591 ASAE, 2950 Niles Rd., St. Joseph, MI 49085-9659.

Classen, J.J., T.J. Siebenmorgen, C.L. Griffis, and J.C. Young. 1990. Methane production from hominy waste digestion. Presented at the 1990 International Winter Meeting of the ASAE, Chicago, IL, December 15-18, 1990. Paper No. 906560 ASAE, 2950 Niles Rd., St. Joseph, MI 49085-9659.

Classen, J.J., T.J. Siebenmorgen, and D.R. Davis, 1989. Sterilization of canned foods using high temperature air. Presented at the 1989 International Summer Meeting of the ASAE, Quebec, PQ, Canada, June 25-28, 1989. Paper No. 896118 ASAE, 2950 Niles Rd., St. Joseph, MI 49085-9659.

CONTRACTS AND GRANTS

Classen, J.J., R. Sharma, M. Chinn, K.D. Zering. 2006-2008. Opportunities for biofuel feedstock at the Neuse River Wastewater Treatment Plant. The Urban Water Consortium of the Water Resources Research Institute of the University of North Carolina. \$125,000.

Classen, J.J., J.M. Rice, and L. Bull. 7/2006-6/2008. Swine Lagoon Definition and Measurement. North Carolina Pork Council. \$15,000.

Classen, J.J., J.M. Rice, L. Bull, and A. Grunden. 7/2006-6/2008. Microbial Characterization of the Treatment Zone in Swine Waste Lagoons. North Carolina Pork Council. \$25,000.

Rice, J.M., J.J. Classen, L. Wang, S. Shah, D. Rashash, D. Beasley, and K.D. Zering. 7/2006-6/2008. Covered Lagoons for the Reduction of Odor and Ammonia Volatilization and Conservation and Processing of Nitrogen to a Value Added Product. North Carolina Pork Council. \$25,000

Westerman, P.W., E. van Heugten, J.J. Classen. 7/2006-6/2007. Manure and Nutrient Characterization for Flushed Manure for Use in Design Criteria for Innovative Treatment Technologies. \$11,527.

Classen, J.J., R. Sharma, M. Chinn, and K.D. Zering. 2006. Opportunities for Biofuel Feedstock at the Neuse River Wastewater Treatment Plant. Urban Water Consortium of the Water Resources Research Institute of the University of North Carolina. \$22,407.

Characklis, G.W., J. Cox, G.D. Jennings, J.J. Classen, D. Crawford-Brown, 2006-2008. Northeast Creek Watershed Restoration Plan. Division of Water Quality, North Carolina Department of Environment and Natural Resources, Section 319 Pollution Control Grant from USEPA. Section

319 funds \$200,000; total project funds \$518,340.

Humenik, F.J. R. Sharma, M.D. Boyette, J.J. Classen, K.D. Zering, Y.A. Chen. 11/2005-10/2006. On-Site Biomethanol Production from Swine Waste Digester Methane. National Pork Board. \$40,000.

Classen, J.J., May 9, 2005. Gift to support the waste management research program of Dr. John J. Classen, Starlink Logistics, Inc., \$45,000.

Classen, J.J. and F.J. Humenik, October 1, 2004 to September 30, 2006. Ammonia Harvesting from Alternative Waste Management Systems for Air Quality Protection and Resource Recovery. North Carolina State University Animal & Poultry Waste Management Center, \$14,992. Matching funds provided by the North Carolina Agricultural Research Service, \$14,887 for a total project of \$29,879.

Classen, J.J., April 26, 2004. Gift to support the waste management research program of Dr. John J. Classen, Starlink Logistics, Inc., \$30,000.

Humenik, F. J., J. J. Classen, S. K. Liehr, M. D. Boyette, R. L. Sherman, K. D. Zering and Y. A. Chen, January 2004 to March 2005. Development of marketable by-products from alternative swine waste treatment technologies. Golden Leaf Foundation. \$200,000.

Classen, J.J., F.J. Humenik, J. Spooner, C.M. Williams, L. Bull, May 1, 2003 to December 31, 2003. Verification Testing of The Hoffland Environmental Inc. Separator System for Separation of Manure Solids from Flushed Swine Waste. NSF, International. \$37,883.

Classen, J.J., F.J. Humenik, J. Spooner, C.M. Williams, L. Bull, June 1, 2003 to February 28, 2004. Preparation of The Report of Verification Testing of The Hoffland Environmental Inc. Separator System for Separation of Manure Solids from Flushed Swine Waste. NSF, International. \$20,504.

Classen, J.J., F.J. Humenik, J. Spooner, C.M. Williams, L. Bull, November 1, 2002 to June 30, 2003. Verification Testing of The Brome Agri Maximizer Separator for Separation of Manure Solids from Flushed Swine Waste. NSF, International. \$32,882.

Classen, J.J., F.J. Humenik, J. Spooner, C.M. Williams, L. Bull, November 1, 2002 to June 30, 2003. Preparation of The Report of Verification Testing of The Brome Agri Maximizer Separator for Separation of Manure Solids from Flushed Swine Waste. NSF, International. \$20,651.

Classen, J.J., F.J. Humenik, G. Spooner, C.M Williams, and L.S. Bull. 2002. Verification of the Triton Separator for Separation of Manure Solids From Flushed Swine Waste. NSF, International. \$49,500.

Classen, J.J. and S.S Schiffman. 2001-2002. Initial evaluation of the Carbofil aerobic biological reactor. Carbofil International. \$43,681.

Classen, J.J. and S.K. Liehr. 2001-2002. Evaluation of Alternative Natural Technology's sequencing batch reactor. State of North Carolina's agreement with Smithfield Foods. \$203,730.

Humenik, F.J., J.J. Classen, S.K. Liehr, K.D. Zering, J.M. Rice, and D.C. Rashash. 2001-2002.

Constructed wetland system as an alternative to lagoons for swine waste management. State of North Carolina's agreement with Smithfield Foods. \$562,481.

Hunt, W.F., J.J. Classen, and D.H. Willits. 2001. Converting two environmental engineering courses to distance education format. Distance Education and Learning Technology Applications Division, NCSU. \$17,500.

Humenik, F., R. Bottcher, J. Classen, M. Rice, E. van Heugten and K. Zering. 2001. Construction and evaluation of a belt system for improved swine housing environment and waste utilization. NCSU Animal and Poultry Waste Management Center. \$140,000.

Humenik, F., K. Zering, J. Classen, E. van Heugten and R. Bottcher. 2001. Comparison of new swine manure collection techniques for improved utilization and environmental quality protection. The Missouri Agricultural Experiment Station (Six-State Consortium). \$92,332.

Humenik, F., J. Classen, K. Zering, T. Richards, F. Michel and B. von Bernuth. 2001. Comparison of swine manure collection systems and housing units. National Center for Manure and Animal Waste Management. \$50,000.

Williams, C.M., J.J. Classen, F.J. Humenik, and J. Spooner. 2000-2001. Development of draft protocols for verification of animal waste treatment systems. NSF, International. \$112,773.

Classen, J.J., S.K. Liehr, D.C. Rashash, and K.D. Zering. 2000-2003. Evaluation of the Instream lagoon treatment system. Battelle Memorial Institute. \$159,508.

Liehr, S.K., and John Classen. 2000-2003. Evaluation of the Hoffland Environmental Inc. Waste Management Technology. North Carolina Animal & Poultry Waste Management Center through the North Carolina Department of Environment and Natural Resources \$122,705.

Williams, C.M., J.J. Classen, S.K. Liehr. 4/2000 B 12/2000. Evaluation of the Bion system. National Pork Producers Council. \$579,370.

Bottcher, R.W., J.J. Classen, S.K. Liehr. 1999-2001. Health significance of airborne particles at pork production facilities. National Pork Producers Council. \$50,000.

Classen, J.J., K. Zering, F. Humenik, and C.M. Williams. 1998-1999. A methodology for technical and economic evaluation of innovative waste treatment technologies. North Carolina Pork Council. \$50,000.

Classen, J.J., K. Zering, F. Humenik, and C.M. Williams. 1998-1999. A methodology for technical and economic evaluation of innovative waste treatment technologies. North Carolina Rural Development Center. \$50,000.

Classen, J.J., J. Cheng, R. Sheffield, C.M. Williams, F.J. Humenik. 1998-1999. Lagoon upgrade for reduction of odor and ammonia volatilization. North Carolina Pork Council. \$86,000.

Classen, J.J., A.R. Rubin, L.D. King. 1998-2000. Composting swine manure for nutrient removal. North Carolina Agriculture Foundation, Inc. \$40,000.

Classen, J.J., A.R. Rubin, L.D. King. 1998-2000. Evaluation of alternative compost products. USDA - CSREES, \$16,800.

Classen, J.J., J. Cheng, B.A. Bergmann, A.M. Stomp. 1998-2001. Genetic and engineering improvement of a swine wastewater plant treatment system. USDA CSREES National Research Initiative. \$300,000.

Beasley, D.B., J.J. Classen, and J. Cheng. March 1, 1997 - February 28, 1998. Alternative technologies for swine waste management. USDA. \$200,940.

Classen, John J., Jiayang Cheng, and James C. Barker. July 1, 1997 - June 30, 1998. Evaluation of the Alpha Feed Inc. photosynthetic treatment and utilization system for swine wastewater. North Carolina Agricultural Research Service. \$79,995.

Cheng, Jiayang, Anne-Marie Stomp, John J. Classen, and James C. Barker. July 1, 1997 - June 30, 1998. Duckweed growth for nutrient recovery from swine wastewater. North Carolina Agricultural Research Service. \$98,751.

Classen, John J. and Gary A. Payne. 1997 - 2000. Enhanced microbiological nutrient and heavy metal removal from agricultural waste. North Carolina Animal and Poultry Waste Management Center. \$25,380.

Payne, Gary A. and John J. Classen. 1997 - 2000. Nutrient and heavy metal removal from agricultural waste by microorganisms. North Carolina Agriculture Foundation. Funding of \$17,941 provides a Ph.D. stipend for the first year.

Shelton, James, Robert Mikkelsen, and John J. Classen. 1997-1999. Demonstration and evaluation of anaerobic digestion as an animal waste treatment technology. North Carolina Animal and Poultry Waste Management Center. \$75,000.

Classen, John J., Evan E. Jones, A. Robert Rubin, and Philip W. Westerman. 1997 - 1999. Evaluation / demonstration of the Bion Technologies animal waste treatment system. North Carolina Department of Environment, Health, and Natural Resources. \$58,200.

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