## Publications

### Journal Articles

1. Zhan, Y. H., F. Yin, C. Yue, J. Zhu, Z. P. Zhu, M. Zou, H. M. Dong. 2020. Effect of pretreatment on hydraulic performance of the integrated membrane process for concentrating nutrient in biogas digestate from swine manure. Membranes 10(10): 249. <https://doi.org/10.3390/membranes10100249>.
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3. Guo, Y., S. Aggrey, A. Oladeinde, J. Johnson, G. Zock. L. Chai (2021). A Machine Vision-Based Method Optimized for Restoring Broiler Chicken Images Occluded by Feeding and Drinking Equipment. Animals.11 (1), 123.
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12. Knight, R.M., Tong, X., Zhao, L., Manuzon, R.B., Darr, M.J., Heber, A.J., Ni, J.-Q., 2021. Particulate matter concentrations and emission rates at two retrofitted manure-belt layer houses. Trans. ASABE. 64 (3), 829-841. http://doi.org/10.13031/trans.14337.
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39. Zach R. Staley, Christopher Y. Tuan, Kent M. Eskridge, and Xu Li. 2021. Using the heat generated from electrically conductive concrete slabs to reduce antibiotic resistance in beef cattle manure. Science of the Total Environment, 768:144220.
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93. Tong, X., L.Y. Zhao, A. Heber, and J. Ni. 2020. Development of a farm-scale, quasi-mechanistic model to estimate ammonia emissions from commercial manure-belt layer houses. Biosystems Engineering, 196, 67-87.

### Conference Proceedings

1. Zhu, J. 2020. Solids, Ammonia, and Carbon\Nitrogen Ratio on Anaerobic Co-Digestion of Poultry Litter and Wheat Straw, and Kinetics Modeling of Continuous Operation Using Batch Experimental Data. ASABE Annual International Meeting paper#: 2001666. July 10-13. Virtual.
2. Zhang, R. and A. Edalati. Carbon Sequestration and Soil Heath Improvement in Almond Orchards Using Dairy Manure and Woody Biomass Compost, Almond Board of California Biomass Workgroup Meeting. August 4, 2020.
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28. Zelt, M., and A.M. Schmidt. Understand. Adapt. Preserve. Increasing knowledge and motivating behavioral changes among food producers and consumers to preserve the efficacy of antibiotics through the iAMResponsible™ Project. The 6th World One Health Congress (virtual event). October 30 - November 3, 2020.
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32. Zach Staley, Christopher Tuan, Kent Eskridge, Noelle Mware, and Xu Li. 2020. Using the heat generated from electrically conductive concrete slabs to reduce antibiotic resistance in beef cattle manure. ASABE Annual International Conference, Omaha, NE, July 12-15
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46. Salehin, M., N. Rajan, K. Casey, J. Mowrer, P. Tomlinson, M. Bagavathiannan. 2020. Greenhouse gas emissions and soil moisture and temperature dynamics in response to different cover crops in organic cotton system. In: Proc of the ASA, CSSA and SSSA International Annual Meetings | Virtual, Nov 08-11. 2020. [Abstract & Virtual Presentation]
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52. Li, P., J.A. Koziel, J. Zimmerman, J. Zhang, T.-Y. Cheng, W. Yim-Im, M. Lee, B. Chen, S.J. Hoff, W.S. Jenks. Treatment of Airborne PRRSV Transmission with UV Light: Proof-of-concept. ASABE Paper 210153. 2021 ASABE Annual International Meeting, virtual, July 2021.
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60. Lee, M.; J.A. Koziel, W. Murphy, W.S. Jenks, B. Chen, P. Li, C. Banik, B. Fonken, R. Storjohann. Design, testing, and commissioning of mobile laboratory for mitigation of gaseous emission from livestock barns with photocatalysis. ASABE Paper 210075. 2021 ASABE Annual International Meeting, virtual, July 2021.
61. Lee, M.; J.A. Koziel, W. Murphy, W.S. Jenks, B. Chen, P. Li, C. Banik. Pilot-scale evaluation of UV-A & UV-C photocatalytic treatment for mitigating odorous gas emissions from swine manure. Paper 210076. 2021 ASABE Annual International Meeting, virtual, July 2021.
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63. Bokowa, A., Diaz, C., J.A. Koziel. Summary and Overview of the Odour Regulations Worldwide. NOSE2021, 7th International Conference on Environmental Odour Monitoring and Control. Giardini Naxos - Taormina, Italy, April 2021.
64. O’Brien, S.C., J.A. Koziel, C. Banik, A. Białowiec. Improving the Sustainability of Bioethanol Production by Integrating Thermochemical Treatment of Dried Distillers Grains with Solubles. National Conference on Undergraduate Research, virtual, April 2021.
65. Bonds, D., J.A. Koziel, C. Banik, M. De, B. Chen, A. Singh, M. Licht. Improving the sustainability of animal and crop production agriculture: evaluation of biochar-swine manure mixture impact on soil nutrient availability and plant uptake. National Conference on Undergraduate Research, virtual, April 2021.
66. Trabue, S.L., Kerr, B.J., Scoggin, K.D., Andersen, D., Van Weelden, M. 2021. Swine diets impact manure characteristics and gas emissions: Part II protein source. Science of the Total Environment 763: 144207.
67. Hwang, O., Scoggin, K., Andersen, D., Ro, K, Trabue, S. 2021. Swine manure dilution with lagoon effluent impact on odor reduction and manure digestion. Journal of Environmental Quality 50(2): 336-349.
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### Thesis/Dissertations

1. Barzee, T. 2020. Processing and Utilization of Anaerobic Digestate as Biofertilizer for Production of Crops and Microalgae. PhD Dissertation. University of California, Davis.
2. Daly, S., 2020. Biochemical methane potential testing and modelling for insight into anaerobic digester performance. Ph.D. dissertation. Purdue University, West Lafayette, Indiana.
3. Hosseini Taleghani, A. 2021. Degradation of Veterinary Antibiotics in Swine Manure via Anaerobic Digestion. Ph.D. Thesis. University of Missouri, Columbia, MO.
4. Ademola Ajayi-Banji. 2020. Optimization of methane yield in solid-state anaerobic co-digestion of dairy manure and corn stover. Ph.D. Dissertation, North Dakota State University.
5. Kayla Hintze. Economic Feasibility of Mixed Species Grazing to Improve Rangeland Productivity. Masters Thesis. Oklahoma State University. May 2021.
6. PhD Dissertation: Investigation on Methods and Mechanisms of Bacterial Reduction in Agricultural Wastewater, Sunghwa Han, January 2021. Committee Chair: Zong Liu
7. Peiyag Li. Mitigation of airborne PRRSV transmission with UV light treatment: Proof-of-concept. Master’s Thesis, Iowa State University, Ames, IA, USA, May 2021.
8. Knight, R., J. S. Hocter, S. R. Milliken, M. J. Herkins, and L.Y. Zhao. 2020. Field evaluation of an electrostatic precipitator for PM mitigation in poultry facilities. Presentation at 2020 online ASABE Annual International Meeting, July 13th to 15th, 2020.

### Extension and Outreach

1. Information dissemination on alternative manure management program was produced including a practice based webinar and seven fact sheets (https://cdqap.org/ammp-outreach-project/) .
2. Whole farm nutrient balance educational outreach materials were developed and delivered at Golden State Dairy Management Conference https://ucanr.edu/sites/CAdairyconference/Agenda/ and repeated for the World Ag Expo dairy extravaganza.
3. Youtube posting of the 2021 Healthy Soils in Almond Orchards Virtual Field Day originally held on March 18, 2021 for UC Davis' research on the creation of soil amendments from dairy manure and almond woody biomass and their application to orchard soils.
4. Chai, L. 2021. Cage-free Hen House Floor Egg Management. Poultry Tips. UGA Poultry-Extension.https://site.extension.uga.edu/poultrytips/2021/01/cage-free-hen-house-floor-egg-management/
5. Chai, L.,\* and C. Ritz. 2020. Dust Control with Engineering Systems in Poultry Houses. UGA Extension Bulletin. C1024. Page 1-6.
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7. Chai, L.\* 2019. Suppressing dust in cage-free henhouse with the sprinkling system. Poultry Tips. UGA Poultry Extension.
8. Chen, L., H. Tejida. 2021. Estimating the Efficiency and Cost of an On-Farm Centrifuge Separator. UI Extension BUL 991 (available at BUL991 Estimating the Efficiency and Cost of an On-Farm Centrifuge Separator (uidaho.edu))
9. Chen, L., M. Vermeer. 2020. Idaho Environmental/Nutrient Management Program (E/NMP) Basics. UI Extension BUL 967. (Available at: https://www.extension.uidaho.edu/detail.aspx?IDnum=2510&title=Search&category1=Search&category2=NULL)
10. Rogers, E., Fronczak, S., Tirrell, B., Safferman, S., Dong, Y, Bradford, B., Kirk, D., & Harrigan, T. (2020). Supply chain Disruptions in the Dairy Industry How do I Manage Excess Raw Milk on My Farm from an Agronomic and Environmental Perspective? Michigan State University Extension. 4/24/2020. <https://www.canr.msu.edu/resources/supply-chain-disruptions-in-the-dairy-industry>.
11. Cortus, E. 2020. Manure's contribution to carbon footprints. Journal of Nutrient Management 1(2): 22-23.
12. Canter, T., T.-T. Lim, and J. Zulovich. 2021. Nutrient recovery system for dairy farms: Dissolved air flotation and multi-disk press. https://extension.missouri.edu/publications/eq303
13. Canter, T., T.-T. Lim, and T. Chockley. 2021. Considerations of pull-plug sedimentation basin for dairy manure management. https://extension.missouri.edu/eq302 [Received the American Society of Agricultural and Biological Engineers Educational Aids Blue Ribbon Awards (2021)]
14. Mware, N.A. Antimicrobial Resistance in Developing Countries: Current State and Controlling Strategies. lpelc.org. June 19, 2020. https://lpelc.org/antimicrobial-resistance-in-developing-countries-current-state-and-controlling-strategies/
15. Nixon, K. Are there alternatives to antibiotics? lpelc.org. July 3, 2020. https://lpelc.org/are-there-alternatives-to-antibiotics/ Zelt, M. How do you like your steak? lpelc.org. August 6, 2020. https://lpelc.org/how-do-you-like-your-steak/
16. Schmidt, A.M, K. Nixon, L. Hernandez, M. McKasy, and L. Johnson. Communicating Science Using the Science of Communication. lpelc.org. August 18, 2020. https://lpelc.org/communicating-science-using-the-science-of-communication/
17. Harris, A. An array of veterinary antibiotics has been found in water and soil samples. lpelc.org. September 17, 2020. https://lpelc.org/an-array-of-veterinary-antibiotics-has-been-found-in-water-and-soil-samples/
18. Zelt, M. Antibiotic resistance higher in environments impacted by human or animal waste. lpelc.org. November 2, 2020. https://lpelc.org/antibiotic-resistance-higher-in-environments-impacted-by-human-or-animal-waste/
19. Henning, E. Application of organic fertilizers increases antibiotics in soil. lpelc.org. November 23, 2020. https://lpelc.org/application-of-organic-fertilizers-increases-antibiotics-in-soil/
20. Henning, E. Composting can reduce antimicrobial resistance in manure. lpelc.org. December 14, 2020. https://lpelc.org/composting-can-reduce-antimicrobial-resistance-in-manure/
21. Trout, Z. The growth of antibiotic resistance has become a serious threat to human health. lpelc.org. February 25, 2021. https://lpelc.org/the-growth-of-antibiotic-resistance-has-become-a-serious-threat-to-human-health/
22. Lutt, A. We can learn a lot from poop. Lpelc.org. April 27, 2021. <https://lpelc.org/we-can-learn-a-lot-from-poop/>
23. On November 12, 2020, we presented on virtual fencing technology to upcoming ag leaders from around the state at the Oklahoma Ag Leadership Program XX
24. On May 12, 2021, we presented Virtual Fencing to Control Cattle for Improved Ecosystem Services to a joint meeting of the EPA Region 6 Regional Science Council and EPA Region 6 Ag Committee.
25. Mixed-Species Grazing a Potential Opportunity to Improve Rangeland Productivity AND Increase Profits. Extension Fact Sheet. Forthcoming.
26. Yang, X., Thaler, R., Samuel, R. (2020). Optical Dust Meters May Misestimate Dust Concentrations in Animal Barns. South Dakota State University (SDSU) extension P-00180.
27. Samuel, R., Yang, X., Zangaro, C., Darrington, J. (2020). Air Infiltration in Swine Barns. South Dakota State University (SDSU) extension P-01011.
28. Samuel, R., Yang, X., Zangaro, C., Darrington, J. (2020). Basic Ventilation System Design for Pork Producers. South Dakota State University (SDSU) extension P-01012.
29. Samuel, R., Yang, X., Zangaro, C., Darrington, J. (2020). Understanding Fan Performance Metrics and Variability. South Dakota State University (SDSU) extension P-01013.
30. Z. Liu, An Introduction to Manure Composting - Advantages and Concerns. Dairy committee meeting, April 2021, Comanche, TX
31. Z. Liu, An Introduction to Anaerobic Digestion, Pros and Cons of Installing an Anaerobic Digestor. Dairy committee meeting, October 2020, Comanche, TX
32. Z. Liu, Manure Solids Management Options and New Technologies. DOPA (East Texas), October 2020, Sulphur Springs, TX
33. Z. Liu, Delivery of Extension Educational Material through Virtual Reality (VR) Videos. DOPA (East Texas), October 2020, Sulphur Springs, TX
34. Z. Liu, An Introduction to Anaerobic Digestion. DOPA (East Texas), October 2020, Sulphur Springs, TX
35. Z. Liu, Manure Solids Management Options and New Technologies. DOPA (Central Texas), July 2020, Stephenville, TX
36. Z. Liu, Delivery of Extension Educational Material through Virtual Reality (VR) Videos. DOPA (Central Texas), July 2020, Stephenville, TX
37. Sharara, M., H. Aguirre-Villegas, R.A. Larson, J. Sanford, Z. Liu, & L. Schott. Pelleting Animal Manures. University of Wisconsin-Extension, Publication No. TBD, in review.
38. Larson, R.A., H. Aguirre-Villegas, M. Sharara, J. Sanford, Z. Liu, & L. Schott. Screw Press Solid Liquid Separation of Manure. University of Wisconsin-Extension, Publication No. TBD, in review.
39. Aguirre-Villegas, H., R.A. Larson, M. Sharara, J. Sanford, Z. Liu, & L. Schott. Anaerobic Digestion of Animal Manure. University of Wisconsin-Extension, Publication No. TBD, in review.
40. Sanford, J.R. & R.A. Larson. 2020. Use of Compost by Municipalities and Homeowners. University of Wisconsin-Extension, Publication No. I-A484.
41. 2021 – Ames Tribune - News article: ‘Why does cannabis smell like skunk? This Iowa State professor has answers’, Apr 2021.
42. 2021 – Business Wire - News article: ‘Byers Scientific, Iowa State University, and Odor Experts Identify the Volatile Chemical Compound Responsible for Cannabis Odor Complaints’, Mar 2021.
43. 2021 – Leopold Center for Sustainable Agriculture – 2020 Annual Report. Project report article: “Livestock Odor, Nutrient Recycling and Crop Production Improvement Linked Through Biochar”, Feb 2021.
44. 2021 – KTIC Radio show article: Iowa Researchers Find UV Light Shows Promise in Mitigating PRRS, Feb 2021.
45. 2021 – ISU News Service. News article: “Mitigation of PRRS transmission with UV light”, Feb 2021.
46. 2021 – U.S. Department of Energy. Office of Science. Stakeholders News article: “Iowa State Researchers Finds Biochar Mitigates Manure-related Odors and Emissions”, Feb 2021.
47. 2021 – National Hog Farmer. News article: “Evaluating-manure-additives-odor-mitigation”, Jan 2021.
48. 2021 – National Hog Farmer. News article: “Mitigation of PRRS transmission with UV light”, Jan 2021.
49. 2020 – KPVI News. Impact statement “ Biochar Mitigates Manure Emissions”. Dec 2020.
50. 2020 – Land-Grant Impacts. Impact statement “Iowa State Research Finds Biochar Mitigates Manure-related Odors and Emissions”. Nov 2020.
51. 2020 – The South African Pork Producers’ Organisation (SAPPO). News article: “Biochar Mitigates Manure-Related Odors and Emissions on Pig Farms”, Nov 2020.
52. 2020 - ISU College of Agriculture and Life Sciences News. News article “Iowa State Researchers Find Biochar Mitigates Manure-related Odors and Emissions”, Nov 2020.
53. 2020 – The Waukon Standard. News article “Iowa State Researchers Find Biochar Mitigates Manure-related Odors and Emissions”, Nov 2020.
54. 2020 – Farm Journal’s Pork. News article: “Biochar Mitigates Manure-Related Odors and Emissions on Pig Farms”, Nov 2020.
55. Zhao. L.Y. 2020. Challenges threatening sustainable egg production in the United States. Ohio’s Country Journal. Jan. 2020, Page 21 and 31.

### Other

1. Chen, L., M. de Haro-Marti, and L. Schott. 2020. Video titled Secondary Solid Separation Technology for Dairy: Centrifuge. Pacific Northwest and Mountain West Regional Nutrient Cycling, Soil Health, and Food Safety Conference (virtual, October 27-29, 2020).
2. De Haro-Marti, M., L. Schott, and L. Chen. 2020. Video titled Ammonia and Odor Reduction: Drag Hose and Injection System and Zeolite Filter on an Idaho Dairy. Pacific Northwest and Mountain West Regional Nutrient Cycling, Soil Health, and Food Safety Conference (virtual, October 27-29, 2020).
3. Schott, L., L. Chen, and M. de Haro-Marti. 2020. Video titled Dairy By product Management: Cover Crops and Alternative Cropping Systems. Pacific Northwest and Mountain West Regional Nutrient Cycling, Soil Health, and Food Safety Conference (virtual, October 27-29, 2020).
4. The U.S. Environmental Protection Agency (EPA) selected Oklahoma State University (OSU) to receive $877,596 in funding through a “Farmer to Farmer” grant. The funding will go toward our project titled Virtual Fencing to Control Cattle for Improved Ecosystem Services.
5. Yang, X. (2020). Dry handling systems are being proactively discussed for livestock manure management. The Advocators (Q3, 2020). Sioux Nation Ag Center, Sioux Falls, SD.
6. Online Extension Webtools: Animal Mortality Composting Check (available Fall 2020): <https://tammi.tamu.edu/animal-mortality-composting-check/>
7. Koziel, J.A. Keynote Lecture. Updates on the development of the ASTM standard regarding environmental odor assessment. NOSE, International Conference on Environmental Odour Monitoring & Control Italy, virtual, April 2021.