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Education:

Doctor of Philosophy, May 2004. Biological & Agricultural Engineering, Texas A&M University. **Master of Science**, December 2000. Agricultural Engineering, Texas A&M University. **Bachelor of Engineering**, July 1985. Cotton Engineering. Anhui University of Finance & Trade, China.

Professional Experience:

- Professor (2016-Present); Associate Department Head (August 2022-Present): Department of Biological and Agricultural Engineering, North Carolina State University
- Associate Professor (2011-2015): Department of Biological and Agricultural Engineering, North Carolina State University
- Assistant Professor (2005-2010): Department of Biological and Agricultural Engineering, North Carolina State University

Department of Biological and Agricultural Engineering, North Carolina State University

Postdoctoral Research Associate (June-December 2004); Graduate Research/Teaching Assistant (1999-2004); Visiting Scholar (1998-1999)

Department of Biological and Agricultural Engineering, Texas A&M University

Certified Research & Design Engineer (1993-1998); Assistant Engineer (1985-1992) All-China federation of supply and marketing cooperatives Zhengzhou Cotton & Jute Engineering Technology Design and Research Institute, Zhengzhou city, P.R. China

Professional Certifications:

Engineer-In-Training. Certificate No. 33178, Texas Board of Professional Engineers, 2003. Professional Engineer in Cotton Processing. Certificate No. ZZ181993, Cotton Engineering Professional Evaluation Board, Ministry of Commerce, China, 1993.

Awards & Honors:

- 1. 2021-2023; 2013-2017 Appointment by the U.S. Secretary of Agriculture to the USDA Agricultural Air Quality Task Force (AAQTF)
- 2. 2020 BAE Outstanding Research Award, North Carolina State University
- 3. 2019 Award for Excellence in Multistate Research, presented to the technical committee of NE1442. June 3, 2019 by NERA Chair Jody Jellison and NERA Executive Director Richard C. Rhodes III
- 4. 2017-Present: Board of Directors of International Research Center for Animal Environment and Welfare (IRCAEW)
- 5. 2015-Present: University Faculty Scholar
- 6. 2015 Robert W. Bottcher Promising Researcher Award
- 7. 2010 NSF-CAREER award.
- 8. 2010 Merit Award, International Commission of Agricultural and Biosystems Engineering (CIGR)
- 9. 2007 Faculty Research and Professional Development Award. North Carolina State University.
- 10. 2004 ASAE Graduate Student Research Award, 2nd place in Ph.D. Category, American Society of Agricultural Engineers (ASAE).
- 11. 2004 Peary Wilemon-National Cotton Ginners' Scholarship, National Cotton Ginners Association. One of 4 chosen national wide for excellence at university level.
- 12. 2003 Graduate Scholarly Achievement Award, Association of Overseas Chinese Agricultural, Biological and Food Engineers (AOCABFE).
- 2003 Graduate Student Paper Competition Award 3rd Place, Association of Overseas Chinese Agricultural, Biological and Food Engineers (AOCABFE).
- 14. 2001 Outstanding International Graduate Award, Department of Agricultural Engineering, Texas A&M University.

Affiliations:

- 1. Association of Environmental Engineering & Science Professors (AEESP)
- 2. Board of Directors of International Research Center for Animal Environment and Welfare (IRCAEW)
- 3. Member of USDA-NIFA Multi-State Research Project NE1942 "Enhancing Poultry Production Systems through Emerging Technologies and Husbandry Practices"
- 4. Member of USDA-NIFA Multi-State Research Project NCERA101 "Controlled Environment Technology and Use"
- 5. Member of USDA-NIFA Multi-State Research Project NC1211 "Precision Management of Animals for Improved Care, Health and Welfare of Livestock and Poultry"
- 6. American Society of Agricultural and Biological Engineers (ASABE)
 - a. ASABE / PAFS-50 Environmental Air Quality Committee
 - b. ASABE / PAFS-40 Facilities & Systems
 - c. ASABE / PAFS-405 Poultry Housing Committee (Chair 2012-2013)
 - d. ASABE / PAFS-413 Animal Welfare & Care (Secretory 2013-2014)
 - e. ASABE / MS-23/7/3 Cotton Engineering Committee
 - f. ASABE / PAFS-04 Paper Award Committee (Chair 2010-2011, 2020-2021)
- 7. Air and Waste Management Association (AWMA) (2005-2016)
- 8. International Commission of Agricultural Engineering (CIGR)
- 9. Association of Overseas Chinese Agricultural, Biological and Food Engineers (AOCABFE)

Services:

- 1. Proceeding Committee of the 2nd US Precision Livestock Farming Conference (USPLF2023)
- 2. Member of Pork Air Science Policy Advisory Committee (PASPAC) of National Pork Producers Council (NPPC)
- 3. Member of the USDA Agricultural Air Quality Task force (AAQTF) (2013-2017), 2021-2023
- 4. Co-Chairs of Animal Environment and Welfare Proceedings of International Symposium 2021, 2019.
- 5. Associate editor of Transaction of the ASABE
- 6. Division editor of International Journal of Agricultural and Biological Engineering
- 7. Editor-in-Chief (2005-2008): Agricultural Engineering International: the CIGR Ejournal.
- 8. Chair (2007-2008), Vice-Chair (2006-2007), Secretary (2005-2006) of USDA-NIFA S1025 Multi-State Air Quality Research Committee: "Systems for Controlling Air Pollutant Emissions and Indoor Environments of Poultry, Swine, and Dairy Facilities".
- 9. President (2009-2010), Vice-president (2006-2007), executive board member of Association of Overseas Chinese Agricultural, Biological and Food Engineers (AOCABFE)
- 10. Grant review panelist for USDA-AFRI, NSF-CBET, USDA-SBIR; EPA-SBIR; and various state and institutional programs
- 11. Peer Reviewer for (1) Journal of Atmospheric Environment; (2) Journal of Air and Waste Management Association; (3) Journal of Hazardous Materials; (4) Journal of Chemical Engineering Science; (5) Transactions of the ASABE; (6) Journal of Environmental Management; (7) Agricultural Engineering International: the CIGR Ejournal; (8) Journal of Powder Technology; (9) Journal of Biosystems Engineering; (10) Applied Engineering in Agriculture; (11) Journal of Poultry Science; (12) Journal of Environmental Engineering Science; (13) Journal of Computer and Electronics in Agriculture; (14) Atmosphere; (15) Atmospheric Research; (16) International Journal of Agricultural and Biological Engineering; (17) Environmental Research; (18) EST; (19) ESPR; (20) ASHRAE; (21) Applied Poultry Research; (22) Animals

Grants:

- 1. **Wang-Li,** Shi, Classen, Anderson 2018-2023. "Fate, Transport and Transformation of Ammonia Emissions from Animal Feeding Operations and Their Impacts on Air-Soil Health". NSF-CBET. **PI**
- 2. Wang-Li, Oviedo-Rondón, Classen. 2017-2023. "Mitigating Environmental Stress for Enhanced Broiler Production Performance and Welfare" USDA NIFA AFRI. PI
- 3. Shah, Anderson, **Wang-Li** 2020-2022. Using Electrostatic Precipitator to Improve Indoor Air Quality in Cage-free Layer Houses. US Poultry & Egg Association. **Co-PI**
- 4. **Wang-Li** 2019-2020. "Exploring Joint Research and Education Opportunities among Institutions in the US and China on Innovations at the Nexus of Food-Energy-Water System (INFEWS) for Sustainable Food Animal Production". NCSU Internationalization Seed Grant. **PI**

- 5. Nelson, **Wang-Li**, Kolar, Noble, Oviedo-Rondón, Sharara 2019-2023 "FACT: Pigs, Poultry, the Planet and data-driven Problem Solving (P4)". USDA NIFA REEU. **Co-PI**
- 6. Shah, **Wang-Li**, Stikeleather, Kolar, Castillo. 2014-2017. "Engineered Windbreak Wall Vegetative Strip System to Reduce Pollutant and Odor Emissions from Mechanically-Ventilated Broiler and Swine Barns" USDA NRCS CIG Grant. **Co-PI**.
- 7. **Wang-Li**, Zering, Oviedo, Jones. 2014-2017. "Creating eLearning in NIFA Challenge Areas to transform education of controlled environment animal production (eCAEAP) for sustainability" USDA-NIFA-HEC (Subaward to the OSU). **PI**.
- 8. Shah, **Wang-Li**, Oviedo. 2014-2015. "Develop and Test Ammonia-Oxygen Monitoring System for Poultry Houses". U.S. Poultry and Egg Association. **Co-PI**
- 9. Wang, L. 2010-2017. "CAREER: Fate and Transport of Aerosols from Animal Feeding Operations" funded by NSF-CBET. PI.
- 10. Wang-Li, L.2012-2013. "Low Cost Ammonia Monitor for Agricultural Emissions". USDA-NIFA-SBIR. Subcontract to Mesa Photonics, LLC. PI
- 11. Williams, M.C., J. Brake, M. Koci, C. Stark, L. Wang. 2010-2013. "Systems Approach to Reduce Ammonia and Particulate Emissions from Poultry Production Facilities" funded by USDA-NIFA-SRGP. Co-PI.
- 12. Williams, M.C., L. Wang, S. Shah, M. Rice. 2009-2012. "Coordinated Analysis to Facilitate Technology Transfer to Meet Emission Requirements for Next Generation Livestock & Poultry Production Facilities" funded by USDA-NIFA-002216. **Co-PI**.
- 13. Wang, L., and D. Beasley. 2008-2011. "Characterizations of Particulate Matter Emitted from Egg Production Facilities: Sources *versus* Public Exposure" funded by USDA-NRI. **PI**.
- 14. Zering, K., L. Wang, L. Bull, E. vanHeugten and S. Liehr. 2008 2010. "Environmentally Sustainable Swine and Poultry Production Systems for the Future" funded by USDA-CSREES-001366. Co-PI.
- 15. **Wang, L**. 2007-2010. "The National Air Emission Monitoring Study (NAEMS) Southeast Layer Site" funded by the Agricultural Air Research Council (AARC) under the EPA Air Quality Compliance Agreement for Animal Feeding Operations. **PI**.
- 16. **Wang, L**. 2007-2008. "Development of Bio-Aerosol Responding/Notifying System (BARNS)". Funded by NC State University Faculty Research and Professional Development Program. **PI**.
- 17. Bull, L., C.M. Williams, L. Wang and S. Shah. 2006-2009. "Poultry and Livestock Air Quality Research Initiative" funded by USDA-CSREES. Co-PI.
- 18. Burton, M. and L. Wang. 2007-2010. "Longevity and Dispersal Of Glyphosate-Resistant Palmer Amaranth Pollen". Cotton Incoporated, Inc. Co-PI.
- 19. Oviedo-Rondón, E.O., L. Wang, B. Sheldon, G. Havenstein and C.M. Williams. 2006-2007 "Ozonation to Reduce Ammonia Odor and Pathogens in Broiler Houses" funded by Animal and Poultry Waste Management Center (APWMC). **Co-PI**.

Graduated Students Advised/Chaired:

- 1. Sam Cherotich 2022-2025. PhD. Dissertation: Deposition of Gas phase NH3 and Particle Phase NH4+
- 2. Suraiya Akter 2018-2022. **Ph.D.** Dissertation: *Mitigating Heat Stress for Enhanced Broiler Performance and Welfare*. <u>In-progress</u>
- 3. Bin Cheng. 2013-2018. Ph.D. Dissertation: Dynamics of Rural & Urban Atmospheric Chemical Conditions & Inorganic Aerosols. Completed
- 4. Yijia (Zhao) Dietrich. 2014-2019. **Ph.D**. Dissertation: Precursor Gases to Inorganic PM_{2.5} in North Carolina: CMAQ Modeling with An Improved Ammonia Emission Inventory for Animal Agriculture. <u>Complete</u>
- 5. Jiancheng Han. 2014-2016. **Ph.D**. Dissertation: Assessment of Regional Impacts of AFO Air Emissions: GIS Plus Dispersion Modeling Approach. Incomplete
- 6. Qianfeng Li. 2008-2012. **Ph.D**. Dissertation: Particulate Matter from an Egg Production Facility: Emission, Chemistry and Local Dispersion. Completed
- 7. Zifei Liu. 2005-2009. **Ph.D**. Dissertation: Measurement and Modeling Ammonia Emissions from Broiler Litter. Completed
- 8. Blake Stratton 2021-2023. **M.S**. Thesis: Formation of Secondary Inorganic PM_{2.5} as Impacted by Ammonia Emissions from Animal Feeding Operations (AFOs). In-progress
- 9. Derek West 2017-2020. M.S. Thesis: Responses of Broiler Live Performance, Welfare Parameters, Litter Characteristics, and Air Emission to Air Velocity Treatments under Hot Summer Condition. Completed

- 10. Feifan Kong 2016-2018. **MBAE**. Responses of Laying Hen Performance to the Environmental & Management Factors. <u>Completed</u>
- 11. Yuting Zheng. 2014-2015. **M.S.** Thesis: Development of eLearning modules on Controlled Environment Animal Production (eCEAP): Broiler Specifics. Incomplete
- 12. Aditya Padavagod Shivkumar. 2012-2014. M.S. Thesis: Flow Testing and CFD Modeling of a Poultry Engineering Chamber Complex for Animal Environment, Air Quality and Animal Welfare Studies. Completed
- 13. Manqing Ying. 2010-2012. M.S. Thesis: Measurement and Modeling Plume Shape of Air Emissions from Animal Housing Systems: Applications of CFD and AERMOD. Completed
- 14. Di Hu. 2010-2012. **M.S.** Thesis: Temporal and Spatial Variations of Bioaerosol Concentrations Emitted from an Egg Production Farm in Southeastern U.S. Completed
- 15. Zihan Cao. 2007-2009. **M.S**. Thesis: Determination of Particle Size Distribution of PM Emitted from a Layer Operation in Southeast U.S. Completed

Other Research Mentorship:

Graduate Committees

- 1. Yuri Villa, 2022. **M.S.** in BAE. Recirculation Electrostatic Precipitator for Particulate Matter Control in Cage Free layer Houses
- 2. Derek Uemura, 2020. M.S. in BAE. Responses of Turkey body temperatures to air velocity treatments
- 3. Najawa Alnsour, 2019. **PhD.** in Soil Science. "Bi-Directional Exchange of Ammonia from Soils in Row Crop Agro-ecosystems"
- 4. Ali Ajami, 2019. **PhD** in BAE. "Windbreak Wall-Vegetative Strip System to Reduce Air Emission from Mechanically-Ventilated Livestock Barns".
- 5. Yi Xu 2013. **PhD**. in poultry Science. "Interaction of Dietary Coarse Corn with Litter Conditions on Broiler Live Performance and Gastrointestinal Tract Function".
- 6. Sang Ryong Lee, 2010. **PhD.** in Soil Science. "Understanding Ammonia Emissions from Swine Animal Feeding Operations in North Carolina"
- 7. Kai Wang. 2011. **PhD**. in MEA. "Multiscale Multi-Pollutant Air Quality Modeling: Incorporation of Dust Treatments into CMAQ and Application for Criteria and Hazardous Air Pollutants"
- 8. Tianheng Lin. 20115. **MS**. in BAE. "Development and testing of an ammonia-oxygen monitoring system for poultry houses".
- 9. Richard Potter. 2013. **MS.** in MEA. "Understanding, characterizing and modeling ammonia dispersion near CAFOs"
- 10. Matthew Hood. 2011. **MS.** in BAE. "Design and operation of a biofilter for treatment of swine house pit ventilation exhaust".
- 11. Allison Stark. 2011. **MS.** in Crop Science. "Influence of distance from source and height above canopy on Palmer Amaranth pollen distribution"
- 12. Haiyan Yao. 2009 MS in BAE, "Ammonia emission from stored broiler cake"

• Postdoctoral Research Associates

- 1. Ryan Homles, 2019-2021
- 2. Qianfeng Li. 2007-2010

• High-school and Undergraduate Summer Internships

- 1. Jackson Evans, BAE, NCSU, 2022
- 2. Nyawira Nyota, BAE, NCSU, 2021, female and minority
- 3. Francia Wang, Green Hope high school, 2021, female
- 4. Joseph Ma, Enloe high school, 2019
- 5. Sherry Liu, Enloe high school, summer of 2017, Female
- 6. Etinosa Obanor, NC School of Science and Mathematics (NCSSM), 2013, female and minority
- 7. Beata Eaton, AET, NCSU, 2019, female
- 8. Spencer Shiltehead, BAE, NCSU, 2019
- 9. Kandall Grumbles, BAE, NCSU 2018, female
- 10. Sarah Crandell, BAE, NCSU 2018, female
- 11. Sabriya Dobbins, NCSU, 2015, female and minority
- 12. Julia Alexandra Burroughs, NCSU, 2014, female
- 13. Symphony Roberts, NCSU, 2013, female and minority
- 14. Cheryl Odametey, NCSU, 2013, female and minority

15. Heather Jones, Meredith College, 2011, female

- REEU Fellows
 - 1. Elise Rose Laudenslager, 2019

• Visiting Scholars

- 1. Hongchao Jiao, 2019-2020, Shangdong Agricultural University, China
- 2. Ying Ying Liu, 2018-2019, Nanjing Agricultural University, China
- 3. Yan Qian, 2017-2018, Nanjing Agricultural University, China
- 4. Xiuguo Zou, 2016-2017, Nanjing Agricultural University, China
- 5. Fei Hu, 2015-2016, Nanjing Agricultural University, China

Peer Reviewed Journal Articles:

- 1. Cheng, B., L. Wang-Li^{*}, J. Classen, P. Bloomfield. 2022. Performance of a Thermodynamic Model for Predicting Inorganic Aerosols in the Southeastern U.S. *Journal of Aerosol & Air Quality Research*. In review.
- Akter, S. Y. Liu, B. Cheng, J. Classen, E. Oviedo, L. Wang-Li*. 2022. Impact of Air Velocity Treatments under Summer Conditions: Part II-Heavy Broilers' Behavior Responses. *Animals*. 2022,12,1050. <u>https://doi.org/10.3390/ani12091050</u>
- Dai, X., X. Wang, A, Wang, P. Bao, L. Wang-Li, H. Xiao, K. Wang. 2022. Identification of sizesegregated bioaerosol community and pathogenic bacteria in a tunnel-ventilated layer house: Effect of manure removal. *Water Air Soil Pollut*. (2022)233:85. <u>https://doi.org/10.1007/s11270-022-05536-6</u>
- Akter, S. B. Cheng, D. West, Y. Liu, Y. Qian, X. Zou, J. Classen, H. Cordova, E. Oviedo, L. Wang-Li*. 2022. Impact of Air Velocity Treatments under Summer Conditions: Part I-Heavy Broiler Surface Temperature Response *Animals*. 2022, 12, 328. <u>https://doi.org/10.3390/ani12030328</u>.
- 5. Cheng, B., L. Wang-Li^{*}, J. Classen, N. Meskhidze, P. Bloomfield. **2021**. Partitioning of NH₃-NH₄⁺ in the Southeastern U.S. *Atmosphere*. Volume 12, Issue12, 1681. <u>https://doi.org/10.3390/atmos12121681</u>
- Hu, F., B. Cheng, L. Wang-Li*. 2021. Characteristics of Particulate Matter Emissions from Swine and Poultry Production Houses in the United States. *Transaction of ASABE*. 64(5): 1569-1579. <u>https://doi.org/10.13031/trans.14622</u>
- Cheng, B., A. Padavagod Shivkumar, L. Wang-Li*. 2021. Inverse AERMOD and SCIPUFF dispersion modeling for farm level PM₁₀ emission rate assessment. *Transaction of ASABE* 64(3): 801-817. <u>https://doi.org/10.13031/trans.14311</u>
- 8. Wang, X. X. Dai, A, Wang, L. Wang-Li, M. Yang, H. Xiao, Y. He, K. Wang. 2021. Size-segregated physicochemical properties of inhalable particulate matter in a tunnel-ventilated layer house in China. *Environmental. Research.* <u>https://doi.org/10.1016/j.envres.2021.112064</u>
- Cheng, B., L. Wang-Li*, J. Classen, N. Meskhidze, P. Bloomfield. 2020. Spatial and temporal variations of atmospheric chemical conditions in the Southeastern U.S. *Atmospheric Research*. Volume 248 (2021)105190. <u>https://doi.org/10.1016/j.atmosres.2020.105190</u>
- Ajami, A., S. B. Shah, L. Wang-Li, P. Kolar, M. S. Castillo. 2019. Windbreak Wall-Vegetative Strip System to Reduce Air Emissions from Mechanically-Ventilated Livestock Barns – Part 3: Layer House Evaluation. Water, Air, & Soil Pollution. <u>https://doi.org/10.1007/s11270-019-4345-0</u>.
- Ajami, A., S. B. Shah, L. Wang-Li, P. Kolar, M. S. Castillo. 2019. Windbreak Wall-Vegetative Strip System to Reduce Air Emissions from Mechanically-Ventilated Livestock Barns – Part 2: Swine House Evaluation. Water, Air, & Soil Pollution. <u>https://doi.org/10.1007/s11270-019-4335-2</u>
- 12. Wang-Li*, L., Y, Xu, A.P. Shivkumar, C.M. Williams, J. Brake. 2019. Effect of dietary coarse corn inclusion on broiler live performance, litter characteristics, and ammonia emission. *Journal of Poultry Science*. <u>https://doi.org/10.1016/j.psj.2019.10.010</u>
- 13. Cheng, B., L. Wang-Li^{*}, J. Classen, N. Meskhidze, P. Bloomfield. **2019**. Spatial and temporal variations of PM_{2.5} mass closure and inorganic PM_{2.5} in the Southeastern U.S. *Journal of Environmental Science and Pollution Research*. <u>https://doi.org/10.1007/s11356-019-06437-8</u>
- 14. Cheng, B., and L. Wang-Li^{*}. 2019. Responses of secondary inorganic PM_{2.5} to precursor gases in an ammonia abundant area in North Carolina. *Journal of Aerosol & Air Quality Research*. https://doi.org/10.4209/aaqr.2018.10.0384
- 15. Cheng, B., and L. Wang-Li^{*}. 2019. Spatial and temporal variations of PM_{2.5} in North Carolina. *Journal of Aerosol & Air Quality Research*. Vol.19, Issue 4:698-710. https://doi.org/10.4209/aaqr.2018.03.0111

- Wang, K., S. Dai, L. Wang. 2017. Research progress on pollution and monitoring technology of particulate matter from livestock and poultry farms. *Transactions of Chinese Society of Agricultural Machinery*. Volume 48 issue 6: 232-241. <u>https://doi.org/10.6041/j.issn.1000-1298.2017.06.030</u>
- 17. Ying, M.; L. Wang-Li*, L.F. Stikeleather, J. Edward. 2017. Modeling plume-rise of air emissions from animal housing systems: inverse AERMOD. *Journal of Environmental Protection*. Vol.8 No.11, 1254-1269.
- Ying, M.; L. Wang-Li*, L.F. Stikeleather, J. Edward. 2017. Measurements and visualization of the fluid field of the plume from an animal housing ventilation fan. *Journal of Environmental Protection*. Vol.8 No.11, 1296-1311.
- Lin, T. S.B. Shah, L. Wang-Li, E. O. Oviedo-Rondon, J. Post. 2016. Development of MOS sensorbased NH₃ Monitor for Use in Poultry Houses. *Computer and Electronics in Agriculture*, 127: 708-715.
- Padavagod Shivkumar, A. L. Wang-Li*, S.B. Shah, L.F. Stikeleather, M. Fuentes. 2016. Performance analysis of a poultry engineering chamber complex for animal environment, air quality, and welfare studies. *Transaction of the ASABE*. Vol.59(5):1371-1381
- Hu, D. L. Wang-Li*, O.D. Simmons, J.J. Classen, J.A. Osborne. 2016. Size distributions of bioaerosols in the vicinity of an egg production facility in Southeast U.S. *Environmental Engineering Science*. Volume 33, Number 4, 215-223.
- Wang, K. Q. Li, L. Wang-Li*., I. Kilic, B.W. Bogan, C-H. Xiao, J-Q. Ni, A.J. Heber. 2016 National air emissions monitoring study's Southeast layer site: Part V. hydrogen sulfide and VOCs. *Transaction of the* ASABE. Vol.59(2):681-693.
- 23. Hu, D. L. **Wang-Li***, O.D. Simmons, J.J. Classen, and J.A. Osborne. **2015.** Spatiotemporal variations of bioaerosols in the vicinity of an animal feeding operation facility in the U.S. *Journal of Environmental Protection.* 6, 614-627.
- Hood, M., S.B. Shah, P. Kolar, L. Wang-Li, L. Stikeleather. 2015. Biofiltration of ammonia and GHGs from Swine Gestation Barn Pit Exhaust. *Transaction of the ASABE*. Vol. 58(3): 771-782.
- 25. Wang-Li, L. 2015. Insights to the formation of secondary inorganic PM_{2.5}: current knowledge and future needs. *International Journal of Agricultural and Biological Engineering*. Vol. 8, No.2 (2015). DOI: 10.3965/j.ijabe.20150802.1810
- Li, Q.-F., L. Wang-Li*, R.K.M. Jayanty, and S. B. Shah. 2015. Elemental Composition and Chemical Mass Closure of Fine Particulate in an Animal Feeding Operation Facility and Its Vicinity. *Journal of Environmental Protection*. 6, 409-425.
- Li, Q.-F., L. Wang-Li*, Z. Liu, R.K.M. Jayanty, S. B. Shah, and P. Bloomfield. 2014. Major ionic composition of fine particulate matter in an animal feeding operation facility and its vicinity. *Journal of AWMA*. 64(11):1279-1287.
- Hu, D. L. Wang-Li*, O.D. Simmons, J.J. Classen, J.A. Osborne and G.E. Byfield. 2014. Bioaerosol concentrations and emissions from tunnel ventilated high-rise layer operation houses in the United States. *Transaction of ASABE*. Vol. 57(3):915-925.
- Li, Q.-F., L. Wang-Li*, R.K.M. Jayanty, S. B. Shah, and P. Bloomfield. 2014. Ammonia concentrations and modeling inorganic particulate matter in the vicinity of an egg production facility. *Journal of Environmental Science and Pollution Research*. Vol21, 6(2014):4675-4685
- Wang-Li, L., Q-F. Li, K. Wang, B.W. Bogan, J-Q. Ni, E.L. Cortus, and A.J. Heber. 2013. National air emissions monitoring study's Southeast layer site: Part Lsite characteristics and monitoring methodology. *Transaction of the ASABE*. 56(3):1157-1171.
- Li, Q-F., L. Wang-Li*, K. Wang, L. Chai, E.L. Cortus, I. Kilic, B.W. Bogan, J-Q. Ni. A.J. Heber. 2013. National air emissions monitoring study's Southeast layer site: Part II. particulate matter. *Transaction of the ASABE*. 56(3):1173-1184.
- 32. Wang-Li., L., Q-F. Li, L. Chai, E. L. Cortus, K. Wang, I. Kilic, B.W. Bogan, J-Q. Ni, A.J. Heber. 2013. National air emissions monitoring study's Southeast layer site: Part III.ammonia concentrations and emissions. *Transaction of the ASABE*. 56(3):1185-1197.
- Li, Q-F., L. Wang-Li*, B.W. Bogan, K. Wang, L. Chai, J-Q. Ni. A.J. Heber. 2013. National air emissions monitoring study's Southeast layer site: Part IV.effects of farm management. *Transaction of* the ASABE. 56(3): 1199-1209.
- 34. Wang-Li, L. 2013. Techniques for characterization of particulate matter emitted from animal feeding operations. Peer-reviewed book chapter of "Evaluating Veterinary Pharmaceutical Behavior in the Environments". Chapter 2, pp15-39. American Chemical Society (ACS). DOI: 10.1021/bk-2013-1126.ch002.

- 35. Li, Q-F., L. Wang-Li*, R.K.M. Jayanty, S.B. Shah. 2013. Organic and elemental carbons in atmospheric fine particulate in an animal agriculture intensive area in North Carolina: estimation of secondary organic carbon concentration. *Open Journal of Air Pollution*. 2013, 2:7-18
- Wang-Li, L., Q. Li, G.E. Byfield. 2013. Identifications of bioaerosols released from an egg production facility in Southeast U.S. *Journal of Environmental Engineering Science*. 30(1):2-10.
- Wang-Li, L., Cao, Z. M. D. Buser, D. Whitelock, C.B. Parnell and Y. Zhang. 2013. Techniques for measuring particle size distribution of particulate matter emitted from animal feeding operations. *Atmospheric Environment*. 66(2013)25-32.
- 38. Wang-Li, L., Z. Cao, Q. Li, Z. Liu, and D.B. Beasley. 2013. Concentration and particle size distribution of particulate matter emitted from tunnel ventilated high-rise layer operation houses. *Atmospheric Environment.* 66 (2013)8-16.
- Jones, H.W., L. Wang-Li, B. Y. Boroujeni. 2012. Impact of downwind sampling location and sampling height on inverse-Gaussian dispersion modeling of air emissions from animal feeding operations: a theoretical study. *International Journal of Agricultural and Biological Engineering*. Vol.5 No.4 (2012):39-46.
- Li, Q.-F., L. Wang-Li*, J.T. Walker, S. B. Shah, P. Bloomfield and R.K.M. Jayanty. 2012. Particulate matter in the vicinity of an egg production facility: concentrations, statistical distributions and upwind and downwind comparison. *Transaction of the ASABE*. Vol.55(5):1965-1973.
- Li, Q-F., L. Wang-Li*, Z. Liu, and A.J. Heber. 2012. Field evaluation of particulate matter measurements using tapered element oscillating microbalance in a layer house. *Journal of Air and Waste Management Association*. 62(3):322-335.
- Start, A.M., M.G. Burton, D.L. Jordan, R.J. Richardson, J.F. Spears, S.T. Hoyle and L. Wang-Li. 2012. Influence of distance from source and height above canopy on Palmer Amaranth pollen distribution. *Crop Management*. DOI:10.1094/Cm-2012-0524-01-RS
- 43. Li, Q-F., L. Wang-Li*, S.B. Shah, R.K.M. Jayanty, and P. Bloomfield. 2011. Fine particulate matter in a high-rise layer house and its vicinity. *Transaction of the ASABE*. Vol. 54(6):2299-2310.
- 44. Yao, H. S.B. Shah, D.H. Willits, P.W. Westerman, L. Wang-Li, and T.K. Marshall. 2011. Ammonia emissions from broiler cake stockpile in a naturally ventilated shed. *Transaction of the ASABE*. Vol.54(5): 1893-1904.
- 45. Liu, Z., L. Wang-Li*, D.B. Beasley and S.B. Shah. 2011. Validation and uncertainty analysis of an ammonia emission model for broiler litter. *Transaction of the ASABE*. Vol.54(3):1054-1057.
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- Stratton, B. S. Akter, W. Shi, J. Classen, K. Anderson, L. Wang-Li. 2022. Formation of Secondary Inorganic PM_{2.5} as Impacted by Ammonia Emissions from Animal Feeding Operations. An ASABE Annual International Meeting (AIM) Presentation 2200830. Presented at 2022 ASABE AIM, July 17-20, Houston, TX.
- Akter, S. L. Wang-Li, J. Classen, E. Oviedo, C. Sayde. 2022. Retractable Baffle Design to Promote Wind Chill Effects for Heavy Broiler Heat Stress Mitigation: CFD Modeling. An ASABE Annual International Meeting (AIM) Presentation 2200584. Presented at 2022 ASABE AIM, July 17-20, Houston, TX.
- 3. Villa, Y. S. Shah, **L. Wang-Li**, K. Anderson, G. Ellington, P. Kolar. 2022. Modleinh a Recirculating Electrostatic Precipitator for a Cage Free Layer. An ASABE Annual International Meeting (AIM) Presentation 2201211. Presented at 2022 ASABE AIM, July 17-20, Houston, TX.
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- 66. **Wang-Li**, L. Q. Li, J.-Q. Ni, E.L Cortus, C.A. Diehl, A.J. Heber. 2011. National air emissions monitoring study-Southeast layer site: site specifics and methods. Presented at 2011ASABE annual international conference.
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- 84. Wang, L., Q. Li, R. K. Esch, O. D. Simmons, J. Classen, D. B. Beasley. 2009. Biological Characteristics of Aerosols Emitted from a Layer Operation in Southeast U. S. Paper No. 096358. Presented at the 2009ASABE Annual International Meeting. June 21 – June 24. Reno, Nevada.
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- Liu, Z., L. Wang, D.B. Beasley. 2006. A review of emission models of ammonia released from broiler houses. Paper No.064101. Presented at the 2006 ASABE Annual International Meeting, Portland, OR.
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- 102.Parnell, C.B., S.C. Capareda, J.D. Wanjura, M.D. Buser, L. Wang, B.W. Shaw, R.E. Lacey, and S. Molloy. 2005. Impacts of Regulating PM coarse Emissions from Agricultural Operations. Paper No.054009. Presented at the 2005ASAE Annual International Meeting, Tampa, FL.
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- 105.Wang, L., C.B. Parnell, D.B. Parker, R.E. Lacey, B.W. Shaw and J.D. Wanjura. 2004. Engineering Basis for Odor Dispersion Modeling - Part I: Preliminary Evaluation of ISCST3 for Predicting Downwind Odors. Presented at the 2004 CIGR International Conference in Beijing. Paper No.30-219A., Beijing, China.
- 106.Wang, L., J. D. Wanjura, W. B. Faulkner, C. B. Parnell, B.W. Shaw, R.E. Lacey, M.D. Buser, and S. C. Capareda. 2004. Study of "Baffle Type Pre-separator Plus Cyclone" Abatement Systems For Cotton Gins. ASAE Paper No.044017. Presented at the 2004 ASAE /CSAE Annual International Meeting, Ottawa, Canada.
- 107.Shaw, B.W., R.E. Lacey, S.C. Capareda, C.B. Parnell, J.D. Wanjura, L. Wang and W.B. Faulkner. 2004. Application of the National Ambient Air Quality Standards (NAAQS) in Urban Versus Rural Environments. Presented at the 2004 ASAE /CSAE Annual International Meeting, Ottawa, Canada.
- 108. Wang, L., C. B. Parnell, B.W. Shaw, R.E. Lacey, M.D. Buser, L.B. Goodrich and S. C Capareda. 2004. A Theoretical Approach to Correcting PM₁₀ Over-sampling Problem for Agricultural Dust. In *Proceedings of 2004 Beltwide Cotton Production Conferences*, National Cotton Council, San. Antonio, TX.
- 109.Capareda, S. C., L. Wang, C. B. Parnell, and B.W. Shaw. 2004. Particle Size Distributions of Particulate Matter Emitted by Agricultural Operations – Impacts on FRM PM₁₀ and PM_{2.5} Concentration Measurement. In *Proceedings of 2004 Beltwide Cotton Production Conferences*, National Cotton Council, San. Antonio, TX.

- 110.Shaw, B. W, R.E. Lacey, S. C Capareda, C. B. Parnell, J. D. Wanjura and **L. Wang.** 2004. Application of the National Ambient Air Quality Standards (NAAQS) in Urban Versus Rural Environments. In *Proceedings of 2004 Beltwide Cotton Production Conferences*, National Cotton Council, San. Antonio, TX.
- 111.Wang, L., J. D. Wanjura, C. B Parnell, R.E Lacy and B. W. Shaw. 2003. Performance Characteristics of Low-Volume PM₁₀ Inlet and TEOM Continuous PM Sampler. ASAE Paper No. 034118. Presented at the 2003 ASAE Annual International Meeting, Las Vegas, Nevada.
- 112. Wang, L., C. B. Parnell, R.E. Lacy and B. W. Shaw, 2003. Analysis of Cyclone Collection Efficiency. ASAE Paper No. 034114. Presented at the 2003 ASAE Annual International Meeting, Las Vegas, Nevada.
- 113. Wang, L., J. D. Wanjura, T.E. Stiggins, C. B. Parnell, R.E. Lacy and B. W. Shaw. 2003. Evaluation of PM₁₀ Pre-separator for Low-volume Sampling. In *Proceedings of 2003 Beltwide Cotton Production Conferences*, National Cotton Council, Nashville, TN.
- 114.Parnell, C. B., B. W. Shaw, **L. Wang**, S. C. Capareda. 2003. Particle Size Distributions of Emitted by Agricultural Operations Impacts on FRM PM₁₀ and PM_{2.5} Concentration Measurements. Paper presented for selected EPA staff during the Third International Conference on Air Pollution from Agricultural Operations, Sheraton Imperial Hotel and Convention Center, Research Triangle Park, North Carolina, October 12-15, 2003, Sponsored by the American Society of Agricultural Engineers (ASAE), St Joseph, MI.
- 115.**Wang, L.**, M. D. Buser, C. B. Parnell and B. W. Shaw. 2002. Effect of Air Density on Cyclone Performance and System Design. ASAE Paper No. 024216. Presented at the 2002 ASAE Annual International Meeting/CIGR XVth World Congress, Chicago, Illinois.
- 116. **Wang, L.**, C. B. Parnell and B. W. Shaw. 2002. Theoretical Study of the Particle Collection Mechanism in the Outer Vortex of a Cyclone. In *Proceedings of 2002 Beltwide Cotton Production Conferences*, National Cotton Council, Atlanta, GA.
- 117. **Wang, L.**, C. B. Parnell and B. W. Shaw. 2001. A Theoretical Approach for Predicting Number of Turns and Cyclone Pressure Drop. ASAE Paper No. 014009. Presented at the 2001 ASAE Annual International Meeting, Sacramento, CA.
- 118. Wang, L., C. B. Parnell and B. W. Shaw. 2001. Analysis of Cyclone Pressure Drop. In *Proceedings of 2001* Beltwide Cotton Production Conferences, National Cotton Council, Anaheim, CA.
- 119. Wang, L., C. B. Parnell and B. W. Shaw. 2000. 1D2D, 1D3D, 2D2D Cyclone Fractional Efficiency Curves for Fine Dust. In *Proceedings of 2000 Beltwide Cotton Production Conferences*, National Cotton Council, San Antonio, TX.
- 120.**Wang, L.**, C. B. Parnell and B. W. Shaw. 1999. Performance Characteristics for the 1D2D, 2D2D, 1D3D and Barrel Cyclones. ASAE Paper No.994195. Presented at the 1999 ASAE Annual International Meeting, Toronto, Canada.

Invited Speeches & Seminars:

- 1. **Wang-Li, L.** 2021. *NexGen SWINE*: Next Generation Swine Production for Resiliency and Sustainability. Presented at 2021 CALS Emerging Research Showcase Future-Ready Farms. November 11, 2021.
- 2. **Wang-Li, L.** 2021. Food Animal Production and Air Quality. A lecture for Students at West Roman Middle School, May 6, 2021
- 3. **Wang-Li, L.** 2021. Environmental Control of Swine Production Houses: Ventilation Fundamentals. Presented at 2021 International Workshop on Swine Production. October 15, 2021, Jinju South Korea. Gyeongnam Agricultural Meister College.
- 4. **Wang Li, Li.** Layer Farm Environmental Management: Air Emission Characteristics. Invited talk at 2021 Georgia Layer Conference. September 27, 2021.
- 5. **Wang-Li, L.** Air Quality and Animal Production Systems Engineering for Enhancement of Sustainability. Invited talk at S1074 Multi-state Project Annual Meeting. November 20, 2020.
- Wang-Li, L. Poultry Engineering Chamber Complex for Animal Environment, Air Quality and Welfare Studies. <u>Invited Expert Talk at</u> 5th International Workshop on Precision Environmental Control (V WIAP), State University of Campinas (UNICAMP), Brazil, November 4-9, 2019.
- 7. **Wang-Li, L**. Role of Agriculture in Air Pollution. <u>Invited Expert Talk</u> at 2nd Annual UCSF Fresno Symposium on Air Pollution and Climate Change, April 8, 2017. Fresno, CA.

- 8. **Wang-Li, L.** "Ambient Air Quality Monitoring and Air Emission Measurements in the United States: Technologies & Regulations". <u>Invited Expert Talk</u> at 2014 International Conference on Environment and Energy" (ICEE-2014), Hyderabad, India. December 15-17, 2014.
- Wang-Li, L. "Contributions of precursor gas emissions to the formation of secondary atmospheric PM_{2.5}: ammonia gas and ammonium aerosols". <u>Invited presentation</u> at *the 5th International Conference on Environmental Technology and Knowledge Transfer*. Hefei, China. May 15-16, 2014.
- 10. **Wang-Li, L.** "Contributions of poultry ammonia emissions to the formation of secondary inorganicPM_{2.5} and possible haze problem". <u>Invited seminar</u> at the Institute of Animal Science, Chinese Academy of Agricultural Sciences, Beijing, China. May 14, 2014.
- 11. Wang,-Li, L. "Ammonia emission inventory development and formation of secondary aerosols". <u>Invited lectures</u> at Shanghai Academy of Environmental Sciences, Shanghai, China. October 14-17, 2013.
- 12. Wang-Li, L. "The U.S. model of intensive poultry production systems: current status and challenges". <u>Invited speech</u> at a poultry production workshop jointly hosted by the Institute of Animal Science, Chinese Academy of Agricultural Science (IAS-CAAS) and Hubei Academy of Agricultural Science, Institute of Animal Science and Veterinary Medicine. Wuhan, China. October 25, 2013.
- 13. **Wang-Li, L**. "Techniques for air quality monitoring and air emission measurements: application limitations in AFO environments". <u>Invited lecture at Zhejiang University</u>, Hangzhou, China. May 28, 2012.
- 14. **Wang-Li, L**. "Energy efficiency and environmental management for broiler production systems". <u>Invited keynote speech</u> at "*China Broiler Production System Technology Forum*" hosted by Anhui Agricultural University. Hefei, China. May 24, 2012.
- 15. **Wang-Li, L**. "Challenges in measuring mass concentration of particulate matter under different source characteristics and environmental conditions". <u>Invited presentation</u> at *the 4th International Conference on Environmental Technology and Knowledge Transfer*. Hefei, China. May 24-25, 2012.
- 16. **Wang-Li, L**. "Vertically integrated U.S. broiler industry: grow-out housing system design, management practices and environmental impacts". <u>Invited keynote</u> speech at "*China Broiler Production System-Poultry Feeding Operation Environmental Control Workshop*", Nanchang, China. June 16, 2011.
- 17. **Wang-Li, L.** "Impacts of broiler grow-out housing design and management on air quality and productivity". <u>Invited keynote speech</u> at "*Hubei Forum on Broiler Production Technology*", Suizhou, China. June 19, 2011.
- 18. Wang-Li, L. "Agriculture air quality research in action". <u>Invited presentation</u> to a group of 25 visitors from China Agricultural University. College of Agriculture and Life Science, NCSU. November 3, 2011.
- Wang-Li, L. et al. "Techniques for determining particle size distribution of particulate matter: laser diffraction *vs.* electrical sensing zone". <u>Invited presentation</u> at the 242nd American Chemical Society (ACS) National Meeting in Denver, CO. August 30, 2011.
- 20. **Wang, L**. "U.S. Poultry Operation System and Associated Environmental Management Practices: Current Status and Future Direction". <u>Invited seminar</u> at the Institute of Animal Science, Chinese Academy of Agricultural Sciences, China. July 14, 2010.
- 21. Wang, L. "Air Quality Monitoring and Air Emission Measurements in U.S.-Technologies and Regulations". <u>Invited lecture</u> at Fudan University, Shanghai, China. May 20, 2010.
- 22. **Wang, L.** "Air Quality Research in the U.S.-Monitoring, Modeling and Mitigation" <u>Invited lecture</u> at Shanghai Jiaotong University, Shanghai, China. May 19, 2010.
- 23. **Wang, L.** "Agricultural Air Quality Measurements in U.S.-Current Status and Future Direction". <u>Invited lecture</u> at Huazhong Agricultural University, Wuhan, China. May 17, 2010.
- 24. **Wang, L**. "Air emission from AFOs: current studies and future directions". Invited seminar at NCDENR Air Quality Division. October 12, 2009.
- 25. **Wang, L.** "Agricultural air quality in action". <u>Invited presentation</u> for the 4th China Environment Forum of Chinese Association for Science and Technology (CAST)-NC Chapter. February 20, 2009.
- 26. Wang, L. "Agricultural Air Quality: Current Status and Future Needs. <u>Invited presentation</u>, seminar series of NCSU Student Chapter of the Air & Waste Management Association, November 29, 2006.
- 27. Wang, L. "Challenges and Opportunities in Agricultural Air Quality Engineering" to invited presentation to NCSU ASABE Student Club, September 22, 2005