Curriculum Vitae

Hang Liu, Ph.D.

Associate Professor
Department of Apparel, Merchandising, Design and Textiles
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EDUCATION

Ph.D.

Textile Sciences University of Georgia Athens, GA, USA
Dissertation: Development and Characterization of Antimicrobial Biodegradable Nanofibers for Surgical Sutures via Electrospinning

M.S.

Textile Engineering Dong Hua University Shanghai, China
Thesis: Modification of Wool Fibers for Enhanced Strength and Luster

B.S.

Textile Engineering China Textile University Shanghai, China
Applied Computer Sciences China Textile University Shanghai, China

PROFESSIONAL EXPERIENCE

08/2021 – present	**Associate Professor** Department of Apparel, Merchandising, Design and Textiles (AMDT) Biological System Engineering (Affiliate) Material Science and Engineering (Affiliate) Washington State University (WSU)
08/2015 – 07/2021	**Assistant Professor**, AMDT, WSU
08/2013 - 05/2015	**Clinical Assistant Professor**, AMDT, WSU
08/2008 - 12/2012	**Research Associate**, AMDT, WSU
08/2003 - 05/2008	**Graduate Teaching and Research Assistant**, University of Georgia

RESEARCH

Dr. Hang Liu's research focuses on the development of functional textiles for smart wearables and environmentally friendly materials for textiles/packaging/composites. Examples of research projects are

(1) recycling post-consumer cotton waste via environmentally friendly and economical processes to manufacture biodegradable regenerated fibers and foams, (2) processing biobased and biodegradable polymers for film production as packaging materials, (3) functional fiber development via wet spinning and electrospinning, and (4) 3D printing functional fabrics for wearable devices. As the lead PI and co-PI, she has received over $12.6 million research funding to support her research from various agencies, including the National Science Foundation, the US Department of Agriculture, the US Environment Protection Agency, the Walmart Foundation, the Murdock Charitable Trust, and industry sponsors.

Grant Received

1. Functionalizing Recycled Cotton Based Foams for Broader Applications" ($79,257; Cotton Incorporated; 1/2025-12/2025; **PI: Liu, H.)**
2. Extraction and Separation of Lignocellulosic Biopolymers from Biomass Residue for High-Value Bioproducts" ($150,000; USDA Sun Grant Western Region; 12/2024 – 6/2025; **PI: Liu, H.,** Co-PI: Yu, L.)
3. Developing Bacterial Cellulose Based Wound Dressing – Phase I ($26,246; Helix, LLC)
4. CAREER: Processing Intrinsically Conductive Polymers for Fibers ($528,627; **NSF CAREER**; 3/2022 – 2/2027; **PI: Liu, H**.)
5. End-of-life of Plastic Mulches ($8,000,000; USDA-SCRI; 10/2022 – 09/2026; PI: Lisa DeVetter; **Co-PI: Liu, H.**, et al.; $800,000 to Liu)
6. Recycling cotton waste for lightweight foams ($78,000; Cotton Incorporated; 1/2024 – 12/2024; **PI: Liu, H.**)
7. Processing Agricultural Biomass into Value-added Products ($80,000; CAHNRS ERI; 7/2023 - 6/2025; **PI: Liu, H**.; Co-PI: Yu, L.)
8. Project-Based Learning to Enhance Student Learning Gains ($38,762; Cotton Incorporated; 1/2023 -12/2023; **PI: Liu, H**.)
9. Textile Waste Reduction - Secondary Uses for Hospitality Industry Linens ($41,900; WA Department of Commerce; 01/2023- 06/2023; PI: Patricia Townsend, **Co-PI: Liu, H**., & Martha Atkins;)
10. IUCRC Phase II - Center for Bioplastics and Biocomposites [CB^2]" ($414,950; NSF; 8/1/2021-7/31/2026; PI: Yadama, V.; **Co-PI: Liu, H.**)
11. Cellulose Nanocrystals/Indigo Reinforced PLA Functional Films ($12,008; NSF – IUCRC; 01/2022 – 05/2022; **PI: Liu, H**.)
12. Recycling Cotton Waste for Nanocellulose ($14,916; ADVANCE Program; 1/1/2021-12/31/2021; **PI: Liu, H**.)
13. Sustainability and Performance of Cotton ($49,000; Cotton Incorporated; 1/1/2021-12/31/2021; **PI: Liu, H**.; Co-PI: Lou, Xingqiu)
14. Improving Interfacial Bonding and Understanding the Effects of Mechanical Recycling on Thermoplastic/Natural Fiber Composites ($7,090; CB2; 1/1/2020 -12/31/2021; PI: Yadama, V.; **Co-PI: Liu, H**.)
15. Developing Smart Wearable Sensors ($2,500; CAHNRS Undergraduate Research Internship; 2021; **PI: Liu, H**.)
16. Producing Nanocellulose Reinforced Lightweight Composites Using an Integrated One-step

Process from Cotton Waste Fabrics" ($69,780; Cotton Incorporated; 1/1/2020 -12/31/2020; **PI: Liu, H.;** Co-PI: Wang, J.W., Wolcott, M., Zhong, T.H.)

17. In-Service Training for Biodegradable Mulch ($74,580; USDA SARE; 2020; P.I.: Mile, C; **Co-PIs: Liu, H.**, *et al.*)
18. New Technologies and Improved End-of-Life Management for Agricultural Plastics ($49,796; USDA SCRI Planning; 9/1/2019 – 8/31/2020; P.I.: DeVetter, L.; **Co-PI: Liu, H.**, *et al.*) (**Working Group Lead**: Polymer Science and Formulations)
19. Developing Functional Maternity Hospital Gowns ($25,000; WSU Office of Commercialization; 1/1/2020 -12/31/2020; P.I.: Hwang, C.M.; **Co-PI: Liu, H.**)
20. Science-based Innovative Teaching and Active Learning ($48,828; Cotton Incorporated; 1/1/2020 – 12/31/2020; P.I.: Chi, T., **Co-PI: Liu, H**. *et al*.)
21. Nanocellulose Extracted from Cotton Waste ($69,761; Cotton Incorporated; 1/1/2019 – 12/31/2019; **PI: Liu, H**.; Co-PI: Wang, J.W., Wolcott, M., Zhong, T.H., Walker, C., Johnson, D.)
22. Promote Knowledge Retention and Enhance Learning Outcomes ($2,500; WSU Undergraduate Education Curriculum Grant; 2019; **PI: Liu, H**.)
23. Infusing Cotton Innovation and Sustainability Education ($48,612; Cotton Incorporated; 1/1/2019 – 12/31/2019; P.I.: Chi, T., **Co-PI: Liu, H**.)
24. 3D Printing of Conductive Fabrics ($2,500; CAHNRS Undergraduate Research Internship; 2019; **PI: Liu, H**.)
25. Environmentally Friendly Cotton/Cellulose Waste Recycling ($120,000; Murdock Charitable Trust and WSU Office of Commercialization; 09/2018 -08/2019; **PI: Liu, H**., Co-PI: Zhang, J.W.; Chi, T.)
26. Injection Molded Aerospace Interior Parts Using Lightweight Thermoplastic Polymer Composites ($92,004; Joint Center for Aerospace Technology Innovation; 07/2018 - 06/2019) (**PI: Liu, H**., Co-PI: Zhang, J.W.)
27. Enhancing Mechanical Strength of Regenerated Fibers from Cotton Waste through Drawing ($30,000; WSU Office of Commercialization; 4/1/2018 -9/30/2018; **PI: Liu, H.**)
28. Innovative Pedagogy in Teaching Textile Classes ($40,847; *Cotton Incorporated*; 02/2018 - 12/2018; **PI: Liu, H.**)
29. Environmentally-friendly Treatment of Hemp Fibers ($6,775; *Private Donor;* 2018; **PI: Liu, H.**)
30. Upcycling Post-Consumer Cotton Waste ($365,557; Walmart U.S. Manufacturing Innovation Fund; 03/2017 ~ 02/2020) (**PI: Liu, H.**, Co-P.I.: Zhang, JW and Chi, T.)
31. Collaborative Curriculum Development and Assessment ($139,455; USDA AFRI HEC; 02/2017 ~ 01/2020) (PI: Chi, T., **Co-PI: Liu, H**., McCracken, V., Salusso, C.)
32. Self-weighing, Self-powered Smart Sensing Textiles ($49,906; Washington State University – Office of Commercialization; 01/2017 ~ 12/2017) (**PI: Liu, H**., Co-PI: Gupta, S., Schiavenato, M.)
33. Enzyme Treatment on Cotton Waste Recycling ($2,500; CAHNRS Undergraduate Research Internship; 2017; **PI: Liu, H**.)
34. Chitin Nanofibers for High-performance Solvent-based Coating and Film ($56,963; NSF I/UCRC

Center for Bioplastics and Biocomposites; 1/2017 ~ 12/2017) (PI: Wang, JW, **Co-PI**: Zhong, T.H., Wolcott, M.P., **Liu, H.**)

35. Recycling Post-Consumer Cotton Waste for Value-added Regenerated Fibers ($14,951; Environmental Protection Agency; 08/2016 ~ 07/2017) (**PI: Liu, H.**, Co-PI: Chi, T., Zhang, J.W.)
36. Novel Side-by-Side Conductive Nanofiber by Electrospinning ($1,985; WSU – AMDT Seed Grant; 1/2017 ~ 12/2017) (**PI: Liu, H**.)
37. Photoselective Nets: an agro-textile study ($2,500; CAHNRS Undergraduate Research Internship; 2016; **PI: Liu, H**.)
38. An Integrated Approach to Effective Teaching and Learning ($6,904; Samuel H. and Patricia W. Smith Teaching and Learning Endowment; 06/2014 ~ 05/2015) (**PI: Liu, H**.)
39. Biodegradable Mulches for Specialty Crops Produced under Protective Covers ($1,999,002; US Department of Agriculture; 07/2008 ~ 12/2012) (P.D.: Inglis, D., Mile, C.) (**Key Project Investigator**)

Refereed Journal Publication

1. Zhao, Z., Liu, W., & Liu, H. (2025). Flexible and Durable Direct Ink Writing 3D-Printed Conductive Fabrics for Smart Wearables. *ACS omega*, *10*(14), 14138-14149.
2. Liyanage, T. H., Dada, O. I., Abeysinghe, S., Liu, H., Yu, L., & Chen, S. (2025). Digestibility and fate of biodegradable plastic mulch films in thermophilic anaerobic digestion. *Chemosphere*, *379*, 144411.
3. Beattie, M., Menconi, G., Liu, H., Townsend, P., & Aitken, M. (2024). Corporate social responsibility and hotel textile waste.
4. Zhang, J., Liu, H., Sablani, S. S., & Wu, Q. (2024). Recycling Functional Fillers from Waste Tires for Tailored Polystyrene Composites: Mechanical, Fire Retarding, Electromagnetic Field Shielding, and Acoustic Insulation Properties—A Short Review. *Materials*, 17(11), 2675.
5. Liu, W., Liu, H., Zhao, Z., Liang, D., Zhong, W. H., & Zhang, J. (2023). A novel structural design of cellulose-based conductive composite fibers for wearable e-textiles. *Carbohydrate Polymers*, 321, 121308.
6. Lin, S., Liu, W., Fu, X., Luo, M., Liu, H., & Zhong, W. H. (2023). An all-protein aerogel with a nanofiber/foam structure for versatile air filtration. *Materials Today Chemistry*, 34, 101760.
7. Chi, T., Frattali, A., Liu, H., & Chen, Y. (2023). Regenerated Cellulose Fibers (RCFs) for Future Apparel Sustainability: Insights from the US Consumers. *Sustainability*, 15(6), 5404.
8. Liang, D., Liu, W., Zhong, T., Liu, H., Dhandapani, R., Li, H., ... & Wolcott, M. (2023). Nanocellulose reinforced lightweight composites produced from cotton waste via integrated nanofibrillation and compounding. *Scientific Reports*, 13(1), 2144.
9. Wang, X., Mattupalli, C., Chastagner, G., Tymon, L., Wu, Z., Jung, S., Liu, H. & DeVetter, L. W. (2023). Physical characteristics of soil-biodegradable and nonbiodegradable plastic mulches impact conidial splash dispersal of Botrytis cinerea. *Plos one*, 18(5), e0285094.
10. Chi, T., Adesanya, O., Liu, H., Anderson, R., & Zhao, Z. (2023). Renting than Buying Apparel: US Consumer Collaborative Consumption for Sustainability. *Sustainability*, 15(6), 4926.
11. Liu, W., Chang, Y. C., Hao, C., **Liu, H.,** Zhang, J., Mielewski, D., & Kiziltas, A. (2022). Improving Thermal Reprocessability of Commercial Flexible Polyurethane Foam by Vitrimer Modification of the Hard Segments. *ACS Applied Polymer Materials.*
12. Liu, W., Chang, Y. C., Zhang, J., & **Liu, H.** (2022). Wet-Spun Side-by-Side Electrically Conductive Composite Fibers. *ACS Applied Electronic Materials*, 4(4), 1979-1988.

13. Zhong, T., Liu, W., & **Liu, H.** (2021). Green electrospinning of chitin propionate to manufacture nanofiber mats. *Carbohydrate Polymers*, 118593.
14. Cho, H. S., Jang, E., **Liu, H.**, & Cho, G. (2021). Applicability of poly (3, 4-ethylenedioxythiophene): Poly (styrene sulfonate) impregnated polyurethane nanoweb as a transmission line for smart textiles. *Textile Research Journal*, *91*(11-12), 1253-1262.
15. Zhong, T., Wolcott, M. P., **Liu, H.**, & Wang, J. (2021). Acidic Ethanol/Water Casting Approach to Improve Chitin Nanofibril Dispersion and Properties of Propionylated Chitin Biocomposites. *ACS Sustainable Chemistry & Engineering*, *9*(8), 3289-3299.
16. Chi, T., Ganak, J., Summers, L., Adesanya, O., McCoy, L., **Liu, H.**, & Tai, Y. (2021). Understanding perceived value and purchase intention toward eco-friendly athleisure apparel: Insights from US millennials. *Sustainability*, *13*(14), 7946.
17. Cho, H. S., Jang, E., **Liu, H.**, & Cho, G. (2020). Applicability of poly (3, 4-ethylenedioxythiophene): poly (styrene sulfonate) impregnated polyurethane nanoweb as a transmission line for smart textiles. *Textile Research Journal*, 0040517520975633.
18. Ganak, J., Chen, Y., Liang, D., **Liu, H.**, & Chi, T. (2020). Understanding US millennials' perceived values of denim apparel recycling: insights for brands and retailers. *International Journal of Sustainable Society*, *12*(4), 267-290.
19. Zhang, H., Flury, M, Miles, C., **Liu, H.**, & DeVetter, L. (2020) Deterioration of soil-biodegradable plastic mulch in a perennial raspberry production system. Horticulturae.
20. Zhong, T., Wolcott, M. P., **Liu, H**., Glandon, N., & Wang, J. (2020) The influence of pre-fibrillation via planetary ball milling on the extraction and properties of chitin nanofibers. *Cellulose*, 1-12. https://doi.org/10.1007/s10570-020-03186-7
21. Liu, W., Zhong, T., Liu, T., Zhang, J., & **Liu, H**. (2020). Preparation and characterization of electrospun conductive Janus nanofibers with polyaniline. *ACS Applied Polymer Materials*. https://doi.org/10.1021/acsapm.0c00364
22. Zhang, H., Miles, C., Ghimire, S., Benedict, C., Zasada, I., **Liu, H**., & DeVetter, L. (2020). Plastic mulches improved plant growth and suppressed weeds in late summer-planted floricane-fruiting raspberry. *HortScience*, *1*(aop), 1-8.
23. Zhong, T., Dhandapani, R., Liang, D., Wang, J., Wolcott, M. P., Van Fossen, D., & **Liu, H.** (2020). Nanocellulose from recycled indigo-dyed denim fabric and its application in composite films. *Carbohydrate Polymers*, 116283.
24. Zhong, T., Wolcott, M. P., **Liu, H.**, & Wang, J. (2020). Propionylation-modified chitin with improved solubility in green ethanol/water binary solvents for sustainable film and coating applications. *Journal of Cleaner Production*, 119458.
25. Liu, W., Zhang, J., & **Liu, H**. (2019). Conductive Bicomponent Fibers Containing Polyaniline Produced via Side-by-Side Electrospinning. *Polymers*, 11(6), 954.
26. Liu, W.C., Liu, S.Y., Liu, T., Liu, T., Zhang, J.W., **Liu, H.** (2019) Eco-Friendly Post-Consumer Cotton Waste Recycling for Regenerated Cellulose Fibers. *Carbohydrate Polymers*, DOI: 10.1016/j.carbpol.2018.10.046.
27. Liu, T., Zhang, S., Hao, C., Verdi, C., Liu, W., **Liu, H.**, & Zhang, J. (2019). Glycerol Induced Catalyst-Free Curing of Epoxy and Vitrimer Preparation. *Macromolecular rapid communications*, *40*(7), 1800889.
28. Jang, E., **Liu, H.**, & Cho, G. (2019). Characterization and exploration of polyurethane nanofiber webs coated with graphene as a strain gauge. *Textile Research Journal*, 0040517519844604.
29. Zhong, T., Wolcott, M. P., **Liu, H.**, & Wang, J. (2019). Developing chitin nanocrystals for flexible packaging coatings. *Carbohydrate polymers*, 226, 115276.
30. Hwang, C., **Liu, H.,** & Salusso, C. J. (2019). Social responsibility initiative: examining the influence of a collaborative service learning project on student learning. *International Journal of Fashion Design, Technology and Education*, *12*(3), 356-363.

31. Chi, T., Gerard, J., Dephillips, A., **Liu, H.,** & Sun, J. (2019). Why US Consumers Buy Sustainable Cotton Made Collegiate Apparel? A Study of the Key Determinants. *Sustainability*, 11(11), 3126.
32. Zhang, S., Liu, T., Hao C., Wang L.W., Han, J., **Liu, H**., Zhang J.W. (2018) Preparation of a Lignin-based Vitrimer Material and Its Potential Use for Recoverable Adhesives. *Green Chemistry*, 20, 2995-3000.
33. Zhang, X., Liu, S.Y., **Liu, H**., Zhang, J.W., Yang, X. (2017) Molecular Dynamics Simulation of the Mechanical Properties of Multilayer Graphene Oxide Nanosheets. *RSC Advances*, 2017, 7, 55005.
34. Yu, T., Xu, Z., Liu, S., **Liu, H**., Yang, X. (2017). Enhanced hydrophilicity and water-permeating of functionalized graphene-oxide nanopores: Molecular dynamics simulations. *Journal of Membrane Science*. 550, 510-517. (IF: 8.742)
35. Lee, E., Kim, I., **Liu, H.**, Cho, G. (2017) Exploration of AgNW/PU Nanoweb as ECG Textiles Electrodes and Comparison with Ag/AgCl Electrodes, *Fibers and Polymers*, 18(9), 1749-1753.
36. Zhu, R., Yadama, V., **Liu, H**., Harper, DP., Lin, R. (2017) Fabrication and Characterization of Nylon 6/Cellulose Nanofibrils As-spun Nanocomposite Filaments, *Composite: Part A. Applied Science and Manufacturing*, 97, 111-119.
37. Liu, WC., Liu, T., **Liu, H**., Xin, JN., Zhang, JW., Muhidinov, ZK., and Liu, LS. (2017) Properties of poly(butylene adipate0co-terephthalate) and sunflower head residue biocomposites. *Journal of Applied Polymer Science*, 134 (13), 44644.
38. Liu, WC., Liu, T., Liu, T, Liu T., Xin, J., Hiscox, WC., **Liu, H**., Liu, L, Zhang, JW., (2017) Improving Grafting Efficiency of Dicarboxylic Anhydride Monomer on Polylactic Acid by Manipulating Monomer Structure and Using Comonomer and Reducing Agent, *Industrial & Engineering Chemistry Research,* 56 (14), 3920-3927.
39. Cowan, J., Saxton, A.M., **Liu, H**., Leonas, K.K., Inglis, D., and Miles, C. (2016) Visual Assessments of Biodegradable Mulch Deterioration Are Not Indicative of Changes in Mechanical Properties. *HortScience*, 51(3), pp.245-254.
40. Fu, Y., Zhang, J.W., **Liu, H**., Hiscox, B., and Gu, Y., (2013) "Ionic Liquid-Assisted Exfoliation of Graphite Oxide for Simultaneous Reduction and Functionalization to Graphene with Improved Properties", Journal of Materials Chemistry A., 1(7), 2663-2674.
41. Fu, Y., Maguire, R., **Liu, H**., and Zhong, WH., (2011) "Special wetting behavior of a graphitic nanofiber-modified epoxy generalized for rough textured fabric surfaces", Colloid and Polymer Science, 289 (2), 141–148.
42. Fu, Y., **Liu, H**., and Zhong, WH., (2010) "Wetting Characteristics of Epoxy Resins Modified by Graphitic Nanofibers with Different Functional Groups", Colloids and Surfaces A: Physicochem. Eng. Aspects, 369 (1), 196–202.
43. **Liu, H**. & Leonas, K., (2010) "Weight Loss and Morphology Changes of Electrospun Poly(ε-caprolactone) Yarns During *in vitro* Degradation", Fibers and Polymers, 11(7), 1024-1031.
44. **Liu, H**., Leonas, K., and Zhao, Y.P., (2010) "Antimicrobial Properties and Release Profile of Ampicillin from Electrospun Poly(ε-caprolactone) Nanofiber Yarns", Journal of Engineered Fibers and Fabrics, 5(4), 10-19.
45. Gupta, M., Cook, F., Etters, N., Wu, XL., and **Liu, H.**, (2010) "Aqueous Processes for Dyeing Generic, Unmodified Polypropylene Fibers", Journal of Engineered Fibers and Fabrics, 5(2), 27-39.
46. **Liu, H**., Etters, N. and Leonas, K., (2006) "Dyeing of Polypropylene Fibers with Vat Dyes", Journal of Donghua University, 23 (5), 15-19.
47. **Liu, H.** & Lu, K., (2002) "Study on the Influence of Slenderizing on the Mechanic Properties of Wool Fibers", Beijing Textile Journal, 23 (5), 51-53.

48. Lu, K., **Liu, H**. & Yu, CW., (2002) "Wool Luster Properties and Formation Mechanism by Drawing Process", Journal of Textile Research, 23 (6), 18-19.
49. **Liu, H.** & Lu, K., (2001) "Developing trends of Clothing Fibers and Fabrics in the 21st Century", Journal of Shanghai Wool and Flax Technology, 4, 2-5.

Conference Proceedings and Abstracts

1. Zhao, Z.H., Liu, H., Integrating 3D Printing in the Development of Durable Textile-based Smart Wearables, International Textiles and Apparel Association Annual Conference, November 20-23, 2024, Long Beach, CA.
2. Liu, H., Multifunctional Conductive Fibers with A Novel Heterostructure, American Association & Conference of Textile Chemists and Colorists Discovery Summit, October 6-8, 2024, Savannah, GA.
3. Liu, H., et al., Eco-Friendly Chemical Recycling Post-Consumer Cotton Waste for Value-Added Fibers and Foams, REMADE Circular Economy Tech Summit, April 10-11, 2024, Washington D.C.
4. Liu, H., Liu, W.C., Intrinsically Conductive Polymer Fibers for Smart Wearables. *American Association of Textile Chemists and Colorists Discover Summit*, September 2023, Greenville, SC.
5. Zhao, Z.H., Liu, H., Development of flexible and functional textile-based sensor using 3D printing technology for vehicle's interior. *Plastics in Electric & Autonomous Vehicles*, April 2023, Troy, MI.
6. Zhao, Z.H., Liu, H., Development of flexible and functional wearable textile sensors using 3D printing technology. Washington State University Showcase, March 2023, Pullman, WA.
7. Huynh, H., **Liu, H.**, Ch, T., What drive U.S. young consumers to purchase sustainable apparel? An empirical study. 2022. *International Textile and Apparel Association Annual Conference*, October 2022, Denver, CO.
8. Zhao, Z.H., Liang, D., **Liu, H**., Utilizing 3D printing technology to develop elastic auxetic structures. 2020. In *International Textile and Apparel Association Annual Conference Proceedings* (Vol. 77, No. 1). Iowa State University Digital Press.
9. Frattali, A., Tai, Y. N., Yu, Y., **Liu, H**., & Chi, T. (2020, December). Regenerated Cellulose Fibers (RCF) for Future Apparel Sustainability: Insights from the US Consumers. In *International Textile and Apparel Association Annual Conference Proceedings* (Vol. 77, No. 1). Iowa State University Digital Press.
10. Liang, D., Zhao, Z.H., Liu, WC., **Liu. H**., 3D printed conductive fabrics using FDM and DIW printers. 2019. International Textile and Apparel Association Annual Conference. October 26-29; Las Vegas, NV.
11. Wright, A., **Liu, H.**, Influence of Enzyme Pre-treatment on Cotton Waste Recycling. 2018. International Textile and Apparel Association Annual Conference. November 6-9; Cleveland, OH.
12. **Liu, H.**, Innovative Pedagogy for Improved Student Learning in Textiles. 2018. International Textile and Apparel Association Annual Conference. November 6-9; Cleveland, OH.
13. Chi, T., **Liu, H**., Salusso, C., McCracken, V., Understanding the Essential Employability Knowledge and Skills Needed for Textile and Apparel College Graduates: A Triangular Design Approach. 2018. International Textile and Apparel Association Annual Conference. November 6-9; Cleveland, OH.
14. Liu, W.C., **Liu, H.**, Zhang, J.W., Conductive Bicomponent Fibers Containing Polyaniline Produced by Electrospinning. 2018. Fiber Society 2018 Fall Conference. October 29-31; Davis, CA.
15. Engle, K. J., **Liu, H**., Effectiveness of Environmentally Friendly Retting Techniques on Industrial Hemp. 2017. International Textile and Apparel Association Annual Conference. 11/15-18; St. Pertersburg, FL.
16. Perry, A., **Liu, H**., Lee, J., How relationships among antecedents and purchase intention of

wearable technology are changed in five samples. 2017. International Textile and Apparel Association Annual Conference. 11/15-18; St. Pertersburg, FL.

17. Engle, K.J., **Liu, H.** Study on Physical and Mechanical Properties of Agricultural Netting Products. 2016. International Textile and Apparel Association Annual Conference. 11/8 -11/12; Vancouver, BC.
18. Gupta, S., Panat, R., Heo, D., **Liu, H**., (2016) A Multi-Sensor Ambient Powered Bio-patch with Nanofiber 3D Printed Electronics on Textile and Flexible TFT Technology. 2016 Flex Conference, San Jose, CA.
19. D. Wood, **H. Liu**, C. Salusso. Production and Characterization of Bacterial Cellulose Fabrics. 2015. International Textile and Apparel Association Annual Conference 2015. 11/11 - 11/24; Santa Fe, NM. (Nominated for Paper of Distinction Award)
20. Leonas, K.K., Wadsworth, L., **Liu, H.**, Hayes, D.G., Wallace, R., Miles, C., Cowan, J., Wszelaki, A., Martin, J., Inglis, D. November 2-6, 2011. Degradable Agricultural Mulch, a Technical Textile: Year 1 of a Comprehensive Field Study. International Textile and Apparel Association Annual Conference, Philadelphia, PA.
21. Leonas, K.K., **Liu, H**., Cowan, J., Hayes, D.G., Wadsworth, L., Wallace, R., Miles, C., Wszelaki, A., and Inglis, D. Jan 4–7, 2011. Degradable mulch for agriculture: Year 1 of a field study. Proceedings Beltwide Cotton Conference: Nonwovens Symposium, Atlanta, GA
22. Leonas, K.K., **Liu, H**., Cowan, J., Hayes, D.G., Wadsworth, L.C., Wallace, R., Miles, C., Wszelaki, A., Martin, J. and Inglis, D. May 23–25, 2011. Degradable mulch for agriculture: Yr 1 comprehensive analysis of a field study. The Fiber Society Spring 2011 Conference, The Hong Kong Polytechnic University, Hong Kong.
23. Hayes, D.G., Wadsworth, L.C., Wszelaki, A., Martin, J., Washington, T., Pannell, C.T., Wallace, R., Leonas, K.K. **Liu, H**., Miles, C. and Inglis, D.A. August 7–10, 2011. Poly(lactic acid)-based biodegradable mulches for "Green" agriculture. American Society of Agricultural and Biological Engineering (ASABE) Annual Meeting, Louisville, KY
24. Leonas, K.K., Wadsworth, L., **Liu, H**., Hayes, D.G., Wallace, R., Miles, C., Cowan, J., Wszelaki, A., Martin, J., Inglis, D. 2011. Degradable Agricultural Mulch, a Technical Textile: Year 1 of a Comprehensive Field Study. International Textile and Apparel Association Annual Conference for November 2–6, in Philadelphia, PA.
25. Inglis, D., Miles, C., Belasco, E., Brodhagen, M., Corbin, A., Espinola-Arredondo, A., Hayes, D., Jones, R., Lee, J., Leonas, K., **Liu, H**., Marsh, T., Moore-Kucera, J., Wadsworth, L., Wallace, R., Walters, T., and Wszelaki, A., "Biodegradable Mulches for Specialty Crops Produced Under Protective Covers", Annual Meeting American Society Horticultureal Sciences, August 2-5, 2010, Palm Desert, CA.
26. Hayes, D.G., Wadsworth, L.C., Wszelaki, A., Martin, J., WA, T., Pannell, T., Wallace, R., Leonas, K.K., **Liu, H**., Miles, C., and Inglis, D., Poly(lactic acid)-based biodegradable mulches for "Green" Agriculture. 18th Annual Meeting of the Bio Environmental Polymer Society, October 13-16, 2010, Toronto, Canada.
27. **Liu, H**. & Leonas, K., "The influence of spinning parameters on electrospun nanofibers", International Textile and Apparel Association annual meeting, Schaumburg, IL, November 2008.
28. **Liu, H**. & Leonas, K., "The influence of liquid contamination on the bacteria filtration efficiency of surgical face masks", International Textile and Apparel Association annual meeting, Los Angeles, CA, November 2007.
29. **Liu, H**, Etters, N., & Leonas, K., "Dyeing of Polypropylene Fibers with Vat Dyes", 2006 International Forum on Textile Science & Engineering for Doctoral Candidate, Shanghai, China, November 2006.
30. **Liu, H.,** "Development and Characterization of Antimicrobial biodegradable Suture Materials by Electrospinning", Quint State Consortium, Knoxville, TN, February 2006.

31. Lu, K. & **Liu, H**., "Studies on Improving the Color Fastness of Wool Fibers Dyed by Color-tea", International Wool Textile Conference, Xi'an, China, September 2002.
32. **Liu, H**., "The developing trends of clothing industry in clothing raw material and garment suiting", Proceedings of Shanghai International Fashion Culture Festival, 2001.

Invited Speaker

1. Liu, H., "Driving Innovation in Textile Waste Recycling in Academia: Research, Education, and Collaboration", Washington State Department of Ecology, May 13, 2025.
2. **Liu, H**., "Chemical Recycling of Post-Consumer Waste", Northeast Recycling Council, September 2024.
3. **Liu, H**., "Multifunctional Sensors for Smart Wearable", International Conference on Clothing and Textiles, Korea, May 2024.
4. **Liu, H.**, "Developing Textile Fiber/Fabric for Smart Wearables", Washington State University Resource Council, January 2024.
5. **Liu, H**., "Environmentally Friendly Post-Consumer Waste Recycling Technology", Washington State Department of Ecology – Recycling Development Center, January 2024.
6. **Liu, H**., Chi, T., Kilduff, P. & Leonas, K., "Global market trends and opportunities for medical textiles and healthcare products", Industrial Fabrics Association International Expo, Charlotte, NC, October 2008.

Patents

1. "Environmentally Friendly Cellulose Waste Recycling". U.S. 16/612,510, Issued September 12, 2023
2. Technology
   Recycling Cotton Waste to manufacture Regenerated Fibers Marketing, Disclosed to University: February 21, 2017; Liu, H. (Inventor), Zhang, J. (Inventor), Liu, W. (Inventor)
3. Trademark
   Trademark, United States "Recycling Cotton Waste to manufacture Regenerated Fibers". In Preparation January 1, 1900.
4. Patent:
   "Environmentally Friendly Cellulose Waste Recycling". 3609924
   European Patent Convention (EPC), Portugal
   Issued May 11, 2018, approved December 29, 2021.

   European Patent Convention (EPC), Turkey
   Issued May 11, 2018, approved December 29, 2021.

   European Patent Convention (EPC), United Kingdom
   Issued May 11, 2018, approved December 29, 2021.

   National Phase, European Patent Office
   Issued May 11, 2018, approved December 29, 2021.

"Environmentally Friendly Cellulose Waste Recycling". 405419,
National Phase, India
Issued May 11, 2018, approved August 31, 2022.

European Patent Convention (EPC), Germany
"Environmentally Friendly Cellulose Waste Recycling". 602018028899.6,
Issued May 11, 2018, approved December 29, 2021.

National Phase, China
"Environmentally Friendly Cellulose Waste Recycling". ZL201880032051.9,
Issued May 11, 2018, approved November 23, 2021.

TEACHING

Courses Taught

1. AMDT [PSCI] 210 Textile (3 credits Lecture + 1 credit Lab) (Redeveloped to meet WSU Science UCORE requirements)
2. AMDT [M] 315 Textile Product Analysis (new course developed)
3. AMDT 515 Textile Product Development and Innovation (new course developed)
4. AMDT 495 Instructional Practicum – Undergraduate Teaching
5. AMDT 596 Instructional Practicum – Graduate Teaching
6. AMDT 498 Special Topics - Independent Study/Student Study Tours
7. AMDT 598 Special Topics in Apparel and Textiles - Independent Study

MENTORSHIP

1. Graduate Thesis/Dissertation Committees
   - Master student thesis chair (11 students: Wangcheng Liu, Kaitlyn Engle, Dan Liang, Zihui Zhao, Yuh-Fen Yu, Justin Janke, Juan Doria, Kundavi Thanda, Wenqing Hu, Dallas Martin, Nehemiah Stone Duran)
   - Master student committee member (15 students)
   - Ph.D. student dissertation chair (7 students: Wangcheng Liu, Dan Liang, Zihui Zhao, Haohui Ye, Brian Bliss, Yeyi Song, Yalong Liu)
   - Ph.D. student dissertation committee member (5 students)
2. Post-doc Research Associate: (Tian Liu, Tuhua Zhong, Ashutos Parhi, Jinlong Zhang, Yishuai Huang)
3. Undergraduate Research
   - Honors' Thesis (2 students)
   - Undergraduate Research Auvil Scholarship mentor (1 student) (2017 - 2018)
   - NARA SURE and REU undergraduate summer internship mentor (7 non-WSU undergraduate students; 2018, 2019; 2021, 2022)

- CAHNRS and AMDT Undergraduate Research Internship (12 students) (2016, 2017, 2019, 2021, 2022, 2023, 2024)
- Louis Stokes Alliance for Minority Participation (LSAMP) Undergraduate Research Mentor (1 student) (2018-2019)
- Material Science and Engineering 425 CAPSTONE undergraduate research project (1 student) (2019)

4. U.S. Environmental Protection Agency P3 Engineering Design Competition Team (2016 – 2017)
5. WSU I-Corp Fall 2017 (Mentor) (1 graduate and 2 undergraduate students) & Fall 2016 (Mentor) (2 graduate and 1 undergraduate students)
6. CAHNRS Global Citizenship Program Mentor (1 student) (2017 - 2018)
7. CAHNRS Ignite Student Mentor (1 student) (2018)

SERVICE

University

1. Faculty Senate (2023 - 2026)
2. Review Panel, WSU Office of Research - RA & 10K Grant Competition (2024)
3. Member, Search Committee, Learning Coordinator, Center for Civil Engagement. (Fall 2023)
4. Member, Search Committee, Learning Coordinator, Center for Civil Engagement. (Spring 2023)
5. Co-Site Director WSU, Center for Bioplastics and Biocomposites (CB2) (NSF IUCRC). (2020 - 2023)
6. Member, Faculty Senate Library Committee. (2017 - 2023)
7. Panelist, WSU Research Week - Entrepreneurship, industry engagement, and technology transfer webinar. (October 2021).
8. Judge for WSU Showcase for Undergraduate Research and Creative Activities (SURCA) (2015, 2016, 2017, 2018, 2019, 2021, 2022)
9. Judge for the WSU Graduate and Professional Student Association Research Expo (2020)
10. Judge for the Future City Competition (2016)

College

1. Member, CAHNRS Associate Dean in Research Search Committee (2025)
2. Member, CAHNRS Strategic Plan Committee - Advance Excellence (2024)
3. Panelist, College of Agricultural, Human, and Natural Resource Sciences (CAHNRS) Promotion & Tenure Webinar (2023)
4. Member, CAHRNS Human Development Awards and Recognition Committee (2021- Present)
5. Member, CAHNRS Promotion and Tenure Advisory Committee (2021 - 2024)
6. Member, CAHNRS Faculty Research Advisory Committee (2017 - 2024).

7. Panelist, CAHNRS Promotion & Tenure Webinar (2022)
8. Co-Chair, Hatch Umbrella Group: Health and Well-being (2017 - 2022)
9. Member, Agriculture Research Center Assistant Director Search Committee (2018)
10. CAHNRS Safety Committee (2015 & 2016)
11. CAHNRS Scholarship Reviewer (2015, 2016, 2019, 2023)
12. CAHNRS Call-A-Thon (2018)

Department / Unit

1. Chair, AP mentoring Committees for assistant professors (3 faculty) (2021 – Present)
2. Chair, Search Committee, Career Track Assistant Professor in Design/Product Development (Nov. 2024 – May 2025)
3. Chair, AP Peer Teaching Evaluation Committees (Yini Chen, Siming Guo) (Sep.2024 – May 2025)
4. Recruiting Events: Meeting future students and families (2018 – Present)
5. Member, AMDT Graduate Faculty (2015 – Present)
6. Chair, Search Committee, Assistant Professor in Design/Product Development (June 2022 – April 2023)
7. Chair, Search Committee, Assistant Professor in Merchandising (June 2021 – April 2022)
8. Member, AMDT New faculty assistant/associate professor search committee (2016, 2017, 2019)
9. Judge for AMDT Fashion Show (2016, 2017)
10. AMDT graduate student travel grant reviewer (2016)
11. AMDT strategic plan working group (2016)
12. AMDT Tour guide for Make It with Wool competition (2017)

Professional Services

1. Chair Elect, Multi-State NC170 Group (2024 - 2025)
2. Associate Editor, AATCC Journal of Research (2023 - Present)
3. Member, Nomination Committee, Textile and Apparel Programs Accreditation Commission (TAPAC), United States of America. (2024)
4. NSF Proposal Review Panel (2018, 2019, 2020, 2023, 2024)
5. DOE Proposal Reviewer (2024, 2025)
6. Member, Board of Commissioner, Textile and Apparel Programs Accreditation Commission, United States of America. (2022)
7. Ad-Hoc Reviewer, External Reviewer for USDA Forest Service Research Scientist. (2021).
8. Proposal Review Panel for The National Academies of Science, Engineering, Medicine (2018, 2019, 2020)
9. Journal Reviewers for 30+ journals, including CTRJ

10. Conference Proceeding and Full Paper Review for ITAA

Public/Community Service

1. Member, Pullman High School Family and Consumer Science Advisory Committee (2019 - Present)
2. Created an educational video to promote green chemistry and sustainability research/career.
3. Science Enrichment Activities in local public schools (2020 – present)
4. Identified fiber content of an ancient quilt for the Northwest Museum of Arts & Culture. (2016)

HONORS AND AWARDS (SELECTED)

1. International Textile and Apparel Association - Mid-Career Award (2024)
2. NSF CAREER Award (2022)
3. International Textile and Apparel Association - Rising Star Award (2020)
4. Students' Favorite Professor - One of the 10 student nominated favorite professors in CAHNRS at WSU. (2016)
5. Student Research Award - Association of Textile Chemists & Colorists Foundation. (2007)
6. Dissertation Completion Award - University of Georgia. (2007)
7. Graduate Travel Assistance - University of Georgia. (2007)
8. Foreign Travel Assistance - University of Georgia Research Foundation. (2006)
9. Outstanding Paper Prize - Paper Competition at the International Forum on Textile Science & Engineering. (2006)
10. International Engineering Design Competition 2nd place - Association of Textile Chemists & Colorists. (2006)
11. Rosabelle Carr Koelsche Scholarship - University of Georgia. (2005)
12. Virginia Wilbanks Kilgore Scholarship - University of Georgia. (2004)
13. Virginia Wilbanks Kilgore Scholarship - University of Georgia. (2003).
14. Excellent Master Thesis – Donghua University (2002)
15. Sang Ma Scholarship - Hong Kong Sang Ma Foundation Organization. (2001)
16. Outstanding Graduate Student Leader - Donghua University. (2001)
17. Outstanding Female Student - Donghua University (2000)
18. IWS Scholarship - International Wool Secretariat. (2000)
19. Outstanding College Student of Shanghai - Shanghai Municipal Government. (1999)
20. IWS Scholarship - International Wool Secretariat. (1998)

MEDIA REPORTS

1. The **environmentally friendly post-consumer cotton waste recycling** technology developed was reported by 10+ media, including the Sourcing Journal, The United States Conference of Mayors, Washington State Magazine, WWWD, Spokesman-Review, WSU News, and CAHNRS Highlights. (Potential audience reach is over 10 million.)
2. Research related to **smart wearable/conductive fibers development** has received broad attention from various news outlets and was reported by Sourcing Journal, Science News, Science Daily, Yahoo!Lifestyle, SciTechDaily, TexFash, New Atlas, T. EVO News, Textile

Evolution, Phys.org, AZO Materials, Elitac Wearables, Knitting Views, Apparel Views, Researchnews.com, EurekAlert!, Linnseed.com, Ioomia.com, ElectronicsOnline, WSU Insider, CAHNRS Highlights, etc. (Potential audience reach is over 40 million.)

3. Frequently accept interviews and explain science concepts to the Ask Dr. Universe program.