

# Lili He

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**Research interest: development and application of innovative analytical techniques in agriculture, environmental and food areas.**

**Key words: Surface-enhanced Raman spectroscopy, chemical imaging, X-ray-fluorescence spectroscopy**

## Education

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May 2007 - Dec 2009	Ph.D. - Food Science	University of Missouri-Columbia
Sept 2004 - June 2006	Master in Agronomy - Plant Pathology	Zhejiang University
Sept 2000 - June 2004	Bachelor in Agronomy - Plant Protection	Zhejiang University

## Positions and employment

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Jan 2018 – present	Associate Professor, Department of Food Science, University of Massachusetts, Amherst, MA
Jan 2020 -June 2020	Visiting Associate Professor. Department of Food Science and Technology, National University of Singapore, Singapore.
Sept 2012- Dec 2017	Assistant Professor, Department of Food Science, University of Massachusetts, Amherst, MA
Nov 2009-Aug 2012	Postdoc/research associate, Department of Food Science and Nutrition, University of Minnesota, Saint Paul, MN

## Honors/awards

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- Top 5% highly cited author in Royal Society of Chemistry's analytical portfolio of journals 2019
- Top downloaded paper in Journal of Raman Spectroscopy 2018-2019
- Most-cited paper of 2017 Journal of Food Science in Toxicology and Chemical Food Safety section
- 2017 UMass Faculty Convocation Award
- 2016 Talented 12 by C&EN, the official magazine of American Chemical Society
- 2016 Samuel Cate Prescott Award by Institute of Food Technologists
- 2016 Young Investigator Award by Eastern Analytical Symposium
- Most-cited paper of 2016 Journal of Food Science in Toxicology and chemical food safety section
- Most-cited paper of 2014 Journal of Food Science in Toxicology and chemical food safety section
- 2015 Young Scientist Award by American Chemical Society-Agricultural and Food Chemistry Division
- 2015 UMass Faculty Exceptional Merit Award
- 2012 Young Scientist Award by International Union of Food Science and Technology
- Top ten articles in Analyst July 2011

- Most-cited paper of 2008 Journal of Food Science in Toxicology and chemical food safety section

### Other experience and services

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- Editor, Analytical Science Advances (2020-present)
- Director, Raman, IR, and XRF Core Facility at UMass (2019-present)
- Editorial board member, Journal of Food Science (2019-present)
- Director, Phi Tau Sigma – Food Science Honor Society (2018-2019)
- Panel member, NSF Chemical Measurement and Imaging (2016)
- Member, IFT Emerging Leaders Network program (2016)
- Member, IFT Higher Education Review Board (HERB) Readiness Task Force (2016)
- Member, International Academy of Food Science and Technology Early Career Scientists Section (2016-present)
- Guest editor, Journal of Chemistry (2015)
- Faculty advisor, ACS-AGFD international student UMass chapter (2014-present)
- President, Phi Tau Sigma UMass Chapter (2013-2018)
- Panel member, NSF SBIR/STTR Phase I (2013)
- Editorial board member, Food Research International (2013-present)

### Selected Grants (last 5 years as PI)

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- USDA-NIFA, 02/01/15-01/31/19, Role: PI, \$444,200  
Title: Development of a label-free SERS mapping-based platform for multi-bacterial detection in food
- USDA-NIFA, 2/01/15-01/31/19, Role: PI, \$499,500  
Title: Investigate the interactions between silver nanoparticles and leafy vegetables using surface enhanced Raman spectroscopic mapping
- USDA-NIFA, 11/01/15-10/31/19, Role: PI, \$473,628.20  
Title: In situ and real time monitoring and characterization of pesticide residues on and in fresh produce using SERS
- PepsiCo Inc., 01/01/18-9/31/18, Role: PI, \$65,315  
Characterization, detection and quantification of stevia complex using surface-enhanced Raman spectroscopy
- BASF Inc., 12/01/17-12/31/18, Role: PI, \$150,000  
1) Investigation of release kinetics of microencapsulated pesticides by surface enhanced Raman spectroscopy  
2) Investigation of pesticide penetration into leaves

### Selective Publications in last 5 years (total number is 100)

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1. Qu, Yanqi, Minqi Wang, Shijun Huang, Eric A. Decker, D. Julian McClements, and **Lili He\***. "Head-space Characterization and Quantification of Aromatic Organosulfur Compounds in Garlic Extracts Using Surface-Enhanced Raman Scattering with a Mirror-in-a-Cap Substrate." Journal of AOAC International (2020).<https://doi.org/10.1093/jaoacint/qsaa021>

2. Wang, Panxue, Xuejie Wang, Yan Sun, Guoli Gong, Mingtao Fan, and **Lili He\***. "Rapid identification and quantification of the antibiotic susceptibility of lactic acid bacteria using surface enhanced Raman spectroscopy." *Analytical Methods* 12, no. 3 (2020): 376-382.
3. Zhang, Zhiyun, Ming Xia, Chuanxin Ma, Huiyuan Guo, Wenhao Wu, Jason C. White, Baoshan Xing, and **Lili He\***. "Rapid organic solvent extraction coupled with surface enhanced Raman spectroscopic mapping for ultrasensitive quantification of foliarly applied silver nanoparticles in plant leaves." *Environmental Science: Nano* 7, no. 4 (2020): 1061-1067.
4. Qu, Yanqi, and **Lili He\***. "Development of a facile rolling method to amplify an analyte's weak SERS activity and its application for chlordane detection." *Analytical Methods* 12, no. 4 (2020): 433-439.
5. Lin, Zhuangsheng, and **Lili He\***. "Recent advance in SERS techniques for food safety and quality analysis: a brief review." *Current Opinion in Food Science* 28 (2019): 82-87.
6. Yang, Tianxi, Yanqi Qu, Michael Hickey, Weicang Wang, Bin Zhao, Shuilian Bi, Guodong Zhang, and **Lili He\***. "Mapping of Pesticide Transmission on Biological Tissues by Surface Enhanced Raman Microscopy with a Gold Nanoparticle Mirror." *ACS Applied Materials & Interfaces* 11, no. 47 (2019): 44894-44904.
7. Gao, Siyue, and **Lili He\***. "Development of a filtration-based SERS mapping platform for specific screening of *Salmonella enterica* serovar Enteritidis." *Analytical and Bioanalytical Chemistry* 411, no. 29 (2019): 7899-7906.
8. Tu, Qin, Tianxi Yang, Yanqi Qu, Siyue Gao, Zhiyun Zhang, Yilei Wang, Jinyi Wang, and **Lili He\***. "In situ colorimetric detection of glyphosate on plant tissues using cysteamine-modified gold nanoparticles." *Analyst* (2019). 144, 2017-2025.
9. Yang, Tianxi, Jeffery J. Doherty, Huiyuan Guo, Bin Zhao, John M. Clark, Baoshan Xing, Ruyan Hou, and **Lili He\***. "Real-time monitoring of pesticide translocation in tomato plants by surface-enhanced Raman spectroscopy." *Analytical chemistry* (2019). 91, 3, 2093-2099
10. Tu, Qin, Michael E. Hickey, Tianxi Yang, Siyue Gao, Qingmiao Zhang, Yanqi Qu, Xinyi Du, Jinyi Wang, and **Lili He\***. "A simple and rapid method for detecting the pesticide fipronil on egg shells and in liquid eggs by Raman microscopy." *Food Control* (2019). 96. 16-21.
11. Zhang, Zhiyun, Huiyuan Guo, Chuanxin Ma, Ming Xia, Jason C. White, Baoshan Xing, and **Lili He\***. "Rapid and efficient removal of silver nanoparticles from plant surfaces using sodium hypochlorite and ammonium hydroxide solution." *Food Control* 98 (2019): 68-73.
12. Guo, Huiyuan, Leigh C. Hamlet, **Lili He\***, and Baoshan Xing\*. "A field-deployable surface-enhanced Raman scattering (SERS) method for sensitive analysis of silver nanoparticles in environmental waters." *Science of The Total Environment* 653 (2019): 1034-1041.
13. Wang, Chunrong, Zhiyun Zhang, and **Lili He\***. "Development of a headspace solid-phase microextraction–surface-enhanced Raman scattering approach to detect volatile pesticides." *Journal of Raman Spectroscopy* 50.1 (2019):6-14.
14. Gao, Siyue, Brooke Pearson, and **Lili He\***. Mapping bacteria on filter membranes, an innovative SERS approach. *Journal of microbiological methods* 147 (2018): 69-75.
15. Gukowsky, Joshua C., Chen Tan, Zexiang Han, and **Lili He\***. Cysteamine-Modified Gold Nanoparticles as a Colorimetric Sensor for the Rapid Detection of Gentamicin. *Journal of food science* (2018).83,6, 1831-1638.
16. Gukowsky, Joshua C., Tonya Xie, Siyue Gao, Yanqi Qu, and **Lili He\***. Rapid identification of artificial and natural food colorants with surface enhanced Raman spectroscopy. *Food Control* 92 (2018): 267-275.
17. Haoxin Chen, Chunrong Wang, Zhiyun Zhang, and **Lili He\***. Combining Headspace Solid-Phase Microextraction and Surface-Enhanced Raman Spectroscopy To Detect the Pesticide Fonofos in Apple Juice. *Journal of food protection*. 81, no. 7 (2018): 1087-1092.
18. Pearson, Brooke, Alexander Mills, Madeline Tucker, Siyue Gao, Lynne McLandsborough, and **Lili He\***. "Rationalizing and advancing the 3-MPBA SERS sandwich assay for rapid detection of bacteria in environmental and food matrices." *Food Microbiology* (2017). 72, 89–97.

19. Tianxi Yang, Jeffery Doherty, Bin Zhao, Amanda J. Kinchla, John M. Clark, and Lili He\*. 2017. Effectiveness of Commercial and Homemade Washing Agents in Removing Pesticide Residues on and in Apples. *Journal of Agricultural and Food Chemistry*. 65 (44), pp 9744–9752.
20. Huiyuan Guo, **Lili He\***, Baoshan Xing\*. Applications of Surface-Enhanced Raman Spectroscopy on Nanoparticle Analysis in the Environment. *Environmental Science: Nano*, 2017, DOI: 10.1039/C7EN00653E.
21. Yanqi Qiu, Chen Tan, Zhiyun Zhang, **Lili He\***. A facile solvent mediated self-assembly silver nanoparticle mirror substrate for quantitatively improved surface enhanced Raman scattering. *Analyst*, 2017, 142(21), 4075-4082.
22. Brooke Pearson, Panxue Wang, Alexander Mills, Shintaro Pang, Lynne McLandsborough, **Lili He\***. Innovative sandwich assay with dual optical and SERS sensing mechanisms for bacterial detection. *Analytical Methods*, 2017, 9(32), 4732-4739.
23. Tan, C., Zhang, Z., Qu, Y. and **He, L.\***, 2017. Ag<sub>2</sub>O/TiO<sub>2</sub> Nanocomposite Heterostructure as a Dual Functional Semiconducting Substrate for SERS/SEIRAS Application. *Langmuir*. 33 (22), pp 5345–5352.
24. Zhao, B., Cao, X., De La Torre-Roche, R., Tan, C., Yang, T., White, J.C., Xiao, H., Xing, B. and **He, L.\***, 2017. A green, facile, and rapid method for microextraction and Raman detection of titanium dioxide nanoparticles from milk powder. *RSC Advances*, 7(35), pp.21380-21388.
25. Hou, R., Tong, M., Gao, W., Wang, L., Yang, T., & **He, L.\*** (2017). Investigation of degradation and penetration behaviors of dimethoate on and in spinach leaves using in situ SERS and LC-MS. *Food Chemistry*. 237:305-311.
26. Yang, T., Zhao, B., Kinchla, A. J., Clark, J. M., & **He, L.\*** (2017). Investigation of Pesticide Penetration and Persistence on Harvested and Live Basil Leaves Using Surface-Enhanced Raman Scattering Mapping. *Journal of Agricultural and Food Chemistry*, 65(17), 3541-3550.
27. Zhang, Ye, Shaojie Zhao, Jinkai Zheng\*, and **Lili He\***. "Surface-enhanced Raman spectroscopy (SERS) combined techniques for high-performance detection and characterization." *TrAC Trends in Analytical Chemistry* (2017). <http://dx.doi.org/10.1016/j.trac.2017.02.006>
28. Zheng, J., Zhao, C., Tian, G., & **He, L.\***. (2017). Rapid screening for ricin toxin on letter papers using surface enhanced Raman spectroscopy. *Talanta*, 162, 552-557.
29. Panxue Wang, Shintaro Pang, Brooke Pearson, Yayoi Chujo, Lynne McLandsborough, Mingtao Fan, **Lili He\***. 2017. Rapid concentration detection and differentiation of bacteria in skimmed milk using surface enhanced Raman scattering mapping on 4-mercaptophenylboronic acid functionalized silver dendrites. *Analytical and Bioanalytical Chemistry*. 409,8,2229-2238.
30. Yang, T., Wang, P., Guo, H., **He, L.\***, 2016. Surface-Enhanced Raman Spectroscopy: A Tool for All Classes of Food Contaminants. Reference Module in Food Sciences. Elsevier, pp. 1–8. doi: <http://dx.doi.org/10.1016/B978-0-08-100596-5.21090-1>
31. Victoria Boushell, Shintaro Pang and **Lili He\***. 2016. Aptamer Based SERS Detection of Lysozyme on a Food Handling Surface. *Journal of Food Science*.82,1, 225-231.
32. Chen Tan, Zhiyun Zhang, **Lili He\***. 2016. Rapid detection of TiO<sub>2</sub> (E171) in table sugar using Raman spectroscopy. *Food Additives & Contaminants: Part A*. 1-9.
33. Zhang, Hua; Zheng, Jinkai; Liu, Anna; Xiao, Hang\*; **He, Lili\***. Label-free imaging and characterization of cancer cell responses to polymethoxyflavones using Raman microscopy". *Journal of Agriculture and Food Chemistry*. 64 (51), pp 9708–9713
34. Siyue Gao, Zhiyun Zhang, **Lili He\***. 2016. Filter-based surface enhanced Raman spectroscopy for rapid and sensitive detection of the fungicide ferbam in water. *International Journal of Environmental Analytical Chemistry*. 96,15, 1495-1506.
35. Tianxi Yang, Bin Zhao, Ruyan Hou, Zhiyun Zhang, Amanda J. Kinchla, John M. Clark, and **Lili He\***. 2016. Evaluation of the penetration of multiple classes of pesticides in fresh produce using surface-enhanced Raman scattering mapping. *Journal of Food Science*. 81,11, T2891–T2901.

36. Pang, Shintaro, Tianxi Yang, and **Lili He\***. 2016. "Review of surface enhanced raman spectroscopic (SERS) detection of synthetic chemical pesticides." *TrAC Trends in Analytical Chemistry*. doi:10.1016/j.trac.2016.06.017.
37. Zhiyun Zhang, Huiyuan Guo, Thomas Carlisle, Arnab Mukherjee, Amanda Kinchla, Jason C. White, Baoshan Xing, and **Lili He\***. 2016. Evaluation of Postharvest Washing on Ag NPs Removal from Spinach Leaves. *Journal of Agriculture and Food Chemistry*. 64 (37), pp 6916–6922.
38. Huiyuan Guo, Baoshan Xing\*, Jason C. White, Arnab Mukherjee and **Lili He\***. 2016. Ultra-sensitive Determination of Silver Nanoparticles by Surface-enhanced Raman Spectroscopy after Hydrophobization-Mediated Extraction. *Analyst*. 141, 5261-5264.
39. Hou, R. Y., Zhang, Z., Pang, S., Yang, T., Clark, J. M., & **He, L\***. (2016). Alteration of the non-systemic behavior of the pesticide ferbam on tea leaves by engineered gold nanoparticles. *Environmental science & technology*. 50 (12), pp 6216–6223.
40. Zhiyun Zhang, Huiyuan Guo, Yingping Deng, Baoshan Xing and **Lili He\***. Mapping gold nanoparticles on and in edible leaves in situ using surface enhanced Raman spectroscopy. *RSC Advances*. 2016. 2016. 6, 60152-60159.
41. Yang, Tianxi, Zhiyun Zhang, Bin Zhao, Ru-Yan Hou, Amanda Kinchla, John M. Clark, and **Lili He\***. "Real-time and in situ monitoring of pesticide penetration in edible leaves by surface-enhanced Raman scattering mapping." *Analytical Chemistry*. 2016, 88 (10), pp 5243–5250.
42. Guo H, Xing B\*, Hamlet LC, Chica A, **He L\***. Surface-enhanced Raman scattering detection of silver nanoparticles in environmental and biological samples. *Science of The Total Environment*. 2016;554:246-52.
43. Ma, Changchu, Hang Xiao, and **Lili He\***. "Surface-enhanced Raman scattering characterization of monohydroxylated polymethoxyflavones." *Journal of Raman Spectroscopy* (2016). 2016, 47(8), 901-907.
44. Panxue Wang, Shintaro Pang, Juhong Chen, Lynne McLandsborough, Sam R. Nugen, Mingtao Fan and **Lili He\***. 2016. Label-free mapping of single bacterial cells using surface-enhanced Raman spectroscopy. *Analyst*, 2016,141, 1356-1362.
45. Shintaro Pang and **Lili He\***. 2016. Understanding the Competitive Interactions in the Aptamer–Gold Nanoparticle Based Colorimetric Assays using Surface Enhanced Raman Spectroscopy (SERS). *Analytical Method*. 2016,8, 1602-1608.
46. Huiyuan Guo, Baoshan Xing\* and **Lili He\***. 2016. Development of a filter-based method for detecting silver nanoparticles and their heteroaggregation in aqueous environments by surface-enhanced Raman spectroscopy. *Environmental Pollution*. 211, 198–205.