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**Professor**

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**EDUCATION/TRAINING**

<b>INSTITUTION AND LOCATION</b>	<b>DEGREE</b>	<b>YEAR(s)</b>	<b>FIELD OF STUDY</b>
Seoul National University, Korea	B.Sc.	1986	Agricultural Engineering
Seoul National University, Korea	M.Sc.	1988	Agricultural Engineering
University of California, Davis	Ph.D.	1998	Biological & Ag. Engr.
Texas A&M University	Post-Doc	1998-2000	Biological & Ag. Engr.

**EMPLOYMENT HISTORY**

2000-present, University of Florida

2000-2006: Assistant Professor, Dept. of Agricultural and Biological Engineering

2006-2013: Associate Professor, Dept. of Agricultural and Biological Engineering

2013-present: Professor, Dept. of Agricultural and Biological Engineering

**AREAS OF SPECIALIZATION**

My areas of specialization include: sensing systems, precision agriculture, farm automation, Global Positioning System (GPS), geographic information systems (GIS), near infrared spectroscopy (NIRS), image processing, machine vision, yield monitoring/mapping, variable rate fertilizer application, instrumentation, machinery, and agricultural mechanization.

**TEACHING EXPERIENCE**

- Undergraduate: Precision Agriculture, Pesticide Application Technology
- Graduate: Advanced Precision Agriculture, Ag. Chem. Application Technology

**HONORS AND AWARDS**

- Gamma Sigma Delta, The Honor Society of Agriculture, University of Florida Chapter, Member, 2009-present.
  - Past President, 2012-Current.
  - President, 2011-2012. Received a 2011 Silver Chapter Award in recognition of the activities and accomplishments of the Chapter on June 29, 2011. Only five chapters are recognized each year with this designation. Also awarded \$150 from the GSD International Executive Committee for the Chapter Enhancement Award.
  - President-Elect, 2010-2011.
  - Secretary, 2009-2010.
- 2006, 2007, 2008, 2011 Certificate of Appreciation, Invited reviewer, American Society of Agricultural and Biological Engineers (ASABE)
- 2007-2015 Honorary Scientist, appointed by the Rural Development Administration, Korea
- 2008-2009 Who's who in Science and Engineering, 10th Edition, Marquis

- 2007, 2008, and 2009. Marquis Who's Who in Science and Engineering. 10<sup>th</sup> Edition.
- 2013 ASABE IET (Information and Electrical Technologies) Best Paper Award.
- 2016 UF/IFAS FAES Patent Award.

#### **GRANTS RECEIVED**

- Detection algorithm development of apple Marssonina blotch (AMB) using hyperspectral imaging, 2013-2015. Rural Development Agency, Korea. PI.
- Fruit evaluation and early yield mapping using machine vision, 2014-2015. UF/IFAS Citrus Initiative. PI.
- High-throughput screen of seedlings for resistance to citrus greening based on optical sensing, 2014-2015. Citrus Advanced Technology Program (CATP). Co-PI.
- Development of citrus black spot sensing system using multispectral imaging, 2014-2016. USDA SCRI Block Grant. PI.
- Detection of immature green citrus on trees and fruit inspection on a conveyor belt, 2015-2016. UF/IFAS Citrus Initiative. PI.
- Innovative yield mapping system using hyperspectral and thermal imaging for precision tree crop management, 2014-2017. BARD. PI.
- Automated strawberry flower counting system using machine vision for yield prediction. 2016-17. Florida Strawberry Research and Education Foundation. PI.

#### **SELECTED REFEREED PUBLICATIONS (LAST 4 YEARS)**

1. Mishra, A. R., D. Karimi, R. Ehsani and W. S. Lee. 2012. Identification of citrus greening (HLB) using a VIS-NIR spectroscopy technique. *Trans. ASABE* 55(2): 711-720.
2. Li, X., W. S. Lee, M. Li, R. Ehsani, A. Mishra, C. Yang, and R. Mangan. 2012. Spectral difference analysis and airborne imaging classification for citrus greening infected trees. *Computers and Electronics in Agriculture* 83: 32-46.
3. Kumar, A., W. S. Lee, R. Ehsani, L. G. Albrigo, C. Yang, and R. L. Mangan. 2012. Citrus greening disease detection using aerial hyperspectral and multispectral imaging techniques. *Journal of Applied Remote Sensing* 6, 063542, <http://link.aip.org/link/doi/10.1117/1.JRS.6.063542>.
4. Shin, J., W. S. Lee, and R. Ehsani. 2012. Postharvest citrus mass and size estimation using logistic classification model and watershed algorithm. *Biosystems Engineering* 113(1): 42-53.
5. Yang, C., W. S. Lee, and J. G. Williamson. 2012. Classification of blueberry fruit and leaves based on spectral signatures. *Biosystems Engineering* 113(4): 351-362.
6. Ruslan, R., R. Ehsani, and W. S. Lee. 2012. Quantification of total soluble solids and titratable acidity for citrus maturity using VIS-NIR spectroradiometer. *Applied Engr.in Agriculture* 28(5): 735-743.
7. Garcia-Ruiz, F., S. Sankaran, J. M. Maja, W. S. Lee, J. Rasmussen, and R. Ehsani. 2013. Comparison of two aerial imaging platforms for identification of Huanglongbing infected citrus trees. *Computers and Electronics in Agriculture* 91: 106-115. <http://dx.doi.org/10.1016/j.compag.2012.12.002>
8. Yang, C. and W. S. Lee. 2013. Precision agricultural systems. In *Agricultural automation: fundamentals and practices*. Eds. Q. Zhang and F. J. Pierce. CRC Press. Boca Raton, FL, USA.
9. Bansal, R., W. S. Lee, and S. Satish. 2013. Green citrus detection using Fast Fourier Transform (FFT) leakage. *Precision Agriculture* 14(1): 59-70. <http://dx.doi.org/10.1007/s11119-012-9292-3>.
10. Li, H., W. S. Lee, K. Wang, R. Ehsani, and C. Yang. 2013. 'Extended spectral angle mapping (ESAM)' for citrus greening disease detection using airborne hyperspectral imaging. *Precision Agriculture*. <http://dx.doi.org/10.1007/s11119-013-9325-6>.
11. Lee, W. S. 2013. Book review: N. Kondo, M. Monta, and N. Noguchi, *Agricultural robots - mechanisms and practice*, Corona Publishing Co., Ltd. Tokyo, Japan, 2011, xii + 348 pp., ISBN: 978-4-87698-553-1. *Journal of Biosystems Engineering* 38(2): i.
12. Kurtulmus, F., W. S. Lee, and A. Vardar. 2014. Immature peach detection in colour images acquired in natural illumination conditions using statistical classifiers and neural network. *Precision Agriculture* 15: 57-79. <http://dx.doi.org/10.1007/s11119-013-9323-8>.

13. Lee, W. S., and R. Ehsani. 2014. Sensing systems for precision agriculture in Florida. *Computers and Electronics in Agriculture*. [doi:10.1016/j.compag.2014.11.005](https://doi.org/10.1016/j.compag.2014.11.005).
14. Li, H., W. S. Lee, K. Wang, R. Ehsani, and C. Yang. 2014. 'Extended spectral angle mapping (ESAM)' for citrus greening disease detection using airborne hyperspectral imaging. *Precision Agriculture* 15: 162-183. <http://dx.doi.org/10.1007/s11119-013-9325-6>.
15. Li, H., W. S. Lee, and K. Wang. 2014. Identifying blueberry fruit of different growth stages using natural outdoor color images. *Computers and Electronics in Agriculture* 106: 91-101.
16. Ma, H., H. Ji, and W. S. Lee. 2014. Detection of citrus greening based on VIS-NIR spectroscopy and spectral feature analysis. *Spectroscopy and spectral analysis* 34(10): 2713-2718.
17. Pourreza, A. W. S. Lee, E. Raveh, R. Ehsani, and E. Etxeberria. 2014. Citrus Huanglongbing detection using narrow band imaging and polarized illumination. *Trans. ASABE* 57(1): 259-272.
18. Sengupta, S., and W. S. Lee. 2014. Identification and determination of the number of immature green citrus fruit under different ambient light conditions. *Biosystems Engineering* 117: 51-61. <http://dx.doi.org/10.1016/j.biosystemseng.2013.07.007>.
19. Yang, C., W. S. Lee, and P. Gader. 2014. Hyperspectral band selection for detecting different blueberry fruit maturity stages. *Computers and Electronics in Agriculture* 109: 23-31.
20. Khedher Agha, M. K., W. S. Lee, R. A. Bucklin, A. A. Teixeira, and A. R. Blount. 2014. Sorption isotherms for triticale seed. *Trans. ASABE* 57(3): 901-904.
21. Pourreza, A., W. S. Lee, R. Ehsani, J. K. Schueller, and E. Raveh. 2015. An optimum method for real-time in-field detection of Huanglongbing disease using a vision sensor. *Computers and Electronics in Agriculture* 110: 221-232.
22. Pourreza, A., W. S. Lee, E. Etxeberria, and A. Banerjee. 2015. An evaluation of a vision based sensor performance in Huanglongbing disease identification. *Biosystems Engineering* 130: 13-22.
23. Kweon, G., E. D. Lund, C. Maxton, W. S. Lee, and D. B. Mengel. 2015. Comparison of soil phosphorus measurements. *Trans ASABE*. 58(2): 405-414.
24. Li, X., W. S. Lee, M. Li, R. Ehsani, A. R. Mishra, C. Yang, and R. L. Mangan. 2015. Feasibility study on Huanglongbing (citrus greening) detection based on WorldView-2 satellite imagery. *Biosystems Engineering* 132: 28-38.
25. Choi, D., W. S. Lee, R. Ehsani, and F. M. Roka. 2015. A machine vision system for quantification of citrus fruit dropped on the ground under the canopy. *Trans ASABE*. 58(4): 933-946.
26. Li, H., W. S. Lee, and K. Wang. 2016. Immature green citrus fruit detection and counting based on fast normalized cross correlation (FNCC) using natural outdoor colour images. *Precision Agriculture*, DOI 10.1007/s11119-016-9443-z.
27. Zhao, C., W. S. Lee, and D. He. 2016. Immature green citrus detection based on colour feature and sum of absolute transformed difference (SATD) using colour images in the citrus grove. *Computers and Electronics in Agriculture*, 124: 243-253. <http://dx.doi.org/10.1016/j.compag.2016.04.009>.
28. Choi, D., W. S. Lee, R. Ehsani, J. K. Schueller, and F. M. Roka. 2016. Detection of dropped citrus fruit on the ground and evaluation of decay stages in varying illumination conditions. *Computers and Electronics in Agriculture* 127: 109-119.
29. Pourreza, A., W. S. Lee, M. A. Ritenour, and P. Roberts. 2016. Spectral characteristics of citrus black disease. *HortTechnology* 26(3): 254-260.
30. Yun, H. S., S. H. Park, H.-J. Kim, W. S. Lee, K. D. Lee, S. Y. Hong, G. H. Jung. 2016. Use of unmanned aerial vehicle for multi-temporal monitoring of soybean vegetation fraction. *Journal of Biosystems Engineering* 41(2):126-137.
31. Cubero, S., W. S. Lee, N. Aleixos, F. Albert, and J. Blasco. 2016. Automated systems based on machine vision for inspecting citrus fruits from the field to postharvest - A review. *Food and Bioprocess Technology* 9(10): 1623-1639.