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EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
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, artificial intelligence (AI), precision agriculture, farm automation, Global Navigation Satellite System (GNSS), 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, 2011-12. Received a 2011 Silver Chapter Award. Also awarded $150 from the GSD International Executive Committee for the Chapter Enhancement Award.
– 2006, 2007, 2008, 2011 Certificate of Appreciation, Invited reviewer, American Society of Agricultural and Biological Engineers (ASABE)
– 2007-present. Honorary Scientist, appointed by the Rural Development Administration, Korea
– 2013. ASABE IET (Information and Electrical Technologies) Best Paper Award.
– 2017-20. University of Florida Research Foundation (UFRF) Professorship
– 2017-20. University of Florida Term Professorship
– 2020-present. Fellow, ASABE
– 2021-present. Editor-in-Chief in the Smart Agriculture Section in Sensors journal.

GRANTS RECEIVED (LAST 4 YEARS)

– Innovative yield mapping system using hyperspectral and thermal imaging for precision tree crop management, 2014-2018. BARD. PI.

– Automated strawberry flower counting system using machine vision for yield prediction. 2017-18. Florida Strawberry Research and Education Foundation. PI.

– Monitoring wetness of strawberry plants using thermal imaging for the Strawberry Advisory System (SAS). 2018-19. PI.

– Automated strawberry flower counting system using machine vision for yield prediction. 2018-19. Florida Strawberry Research and Education Foundation. PI.

– Development of obstacle recognition technology for path tracking. 2018-2022. Tong Yang Moolsan. PI.

– Strawberry yield prediction models based on imagery information. 2019-2020. Florida Strawberry Research and Education Foundation. PI.

– Monitoring wetness of strawberry plants using thermal imaging for the Strawberry Advisory System (SAS). 2019-20. PI.

– Novel smartphone vision tool to improve spider mite monitoring in strawberry and almond. 2019-2023. USDA NIFA Foundational and Applied Science. PI.

– Monitoring wetness of strawberry plants using thermal imaging for the Strawberry Advisory System (SAS). 2020-21. PI.

– Monitoring strawberry plant wetness using color and thermal imaging for the Strawberry Advisory System (SAS). 2021-22. PI.

– Monitoring strawberry plant wetness using color imaging and artificial intelligence for the Strawberry Advisory System (SAS). 2022-23. PI.

REFEREED PUBLICATIONS (LAST 4 YEARS)

1. Gan, H., W.S. Lee, V. Alchanatis, R. Ehsani, and J. K. Schueller. 2018. Immature green citrus fruit detection using color and thermal images. *Computers and Electronics in Agriculture* 152: 117-125.
2. Gan, H., W.S. Lee, and V. Alchanatis. 2018. A photogrammetry-based image registration method for multi-camera systems - with applications in images of a tree crop. Biosystems Engineering 174: 89-106.
3. Kim, D.-W., H. S. Yun, S.-J. Jeong, Y.-S. Kwon, S.-G. Kim, W. S. Lee, and H.-J. Kim. 2018. Modeling and testing of growth status for Chinese cabbage and white radish with UAV-based RGB imagery. *Remote Sens. 10*(4): 563. https://doi.org/10.3390/rs10040563.
4. Lu, J., W. S. Lee, H. Gan, and X. Hu. 2018. Immature citrus fruit detection based on local binary pattern feature and hierarchical contour analysis. Biosystems Engineering 171: 78-90.
5. Shimwela, M. M., Schubert, T. S., Albritton, M., Halbert, S. E., Jones, D. J., Sun, X., Roberts, P. D., Singer, B. H., Lee, W. S., Jones, J. B., Ploetz, R. C., and van Bruggen A. H. C. 2018. Regional spatial-temporal spread of citrus huanglongbing is affected by rain in Florida. Phytopathology. http://dx.doi.org/10.1094/PHYTO-03-18-0088-R.

6. Shimwela, M. M. , Halbert, S. E., Keremane, M. L., Mears, P., Singer, B., Lee, W. S., Jones, J. B., Ploetz, R. C., and van Bruggen A. H. C. 2018. In-grove spatio-temporal spread of citrus huanglongbing and its psyllid vector in relation to rain. https://doi.org/10.1094/PHYTO-03-18-0089-R

7. Shuaibu, M., W. S. Lee, J. K. Schueller, P. Gader, Y. K. Hong, and S. Kim. 2018. Unsupervised hyperspectral band selection for apple Marssonina blotch detection. *Computers and Electronics in Agriculture* 148: 45-53.

8. Wang, C., W. S. Lee, X. Zou, D. Choi, H. Gan, and J. Diamond. 2018. Detection and counting of immature green citrus fruit based on the Local Binary Patterns (LBP) feature using illumination-normalized images. *Precision Agriculture* Doi: 10.1007/s11118-018-9574-5.

9. Zhang, Y., W. S. Lee, M. Li, L. Zheng, M. A. Ritenour. 2018. Non-destructive recognition and classification of citrus fruit blemishes based on ant colony optimized spectral information. Postharvest Biology and Technology, 143: 119-128.

10. Ding, Y., W. S. Lee, and M. Li. 2018. Feature extraction of hyperspectral images for detecting immature green citrus fruit. Frontiers of Agricultural Science & Engineering 5(4): 475-484. https://doi.org/10.15302/J-FASE-2018241.

11. Tan, K., W. S. Lee, H. Gan, and S. Wang. 2018. Recognising blueberry fruit of different maturity using histogram oriented gradients and colour features in outdoor scenes. Biosystems Engineering, 176: 59-72. https://doi.org/10.1016/j.biosystemseng.2018.08.011.

12. Kang, Y. S., C. S. Ryu, S. R. Jun, S. H. Jang, J. W. Park, H. Y. Song, T. K. Sarkar, S. H. Kim, and W. S. Lee. 2018. Distinguishing between closely related species of Allium and of Brassicaceae by narrowband hyperspectral imagery. Biosystems Engineering, 176: 103-113. https://doi.org/10.1016/j.biosystemseng.2018.10.003.

13. Jang, S. H., Y. K. Hwang, H. J. Lee, J. S. Lee, W. S. Lee, Y. H. Kim. 2018. Shortwave infrared hyperspectral imaging can predict moisture content in grafted cucumber seedlings. Korean Journal of Horticultural Science & Technology, 36(6): 831-840.

14. Chen, Y., W. S. Lee, H. Gan, N. Peres, C. Fraisse, Y. Zhang, and Y. He. 2019. Strawberry yield prediction based on a deep neural network using high-resolution aerial orthoimages. Remote Sensing, 11, 1584. doi:10.3390/rs11131584.

15. Lin, P. W. S. Lee, Y. M. Chen, N. Peres, and C. Fraisse. 2019. A deep-level region-based visual representation architecture for detection strawberry flowers in an outdoor field. Precision Agriculture, https://doi.org/10.1007/s11119-019-09673-7.

16. Zhang, Y., M. Li, L. Zheng, Q. Qin, W. S. Lee. 2019. Spectral features extraction for estimation of soil total nitrogen content based on modified ant colony optimization algorithm. Geoderma 333: 23-34.

17. Shimwela, M. M., Halbert, S. E., Keremane, M. L., Mears, P., Singer, B., Lee, W. S., Jones, J. B., Ploetz, R. C., and van Bruggen A. H. C. 2019. In-grove spatio-temporal spread of citrus huanglongbing and its psyllid vector in relation to weather. Phytopathology, 109: 418-427. https://doi.org/10.1094/PHYTO-03-18-0089-R.

18. Askey, B. C., R. Dai, W. S. Lee, and J. Kim. 2019. A noninvasive, machine learning based method for monitoring anthocyanin accumulation in plants using digital color imaging. Applications in Plant Sciences, 7(11): e11301. https://doi.org/10.1002/aps3.11301.

19. Mizuta, K, S. Grunwald, M. A. Phillips, W. P. Cropper, W. S. Lee, and G. M. Vasques. 2019. New indication method using pedo-econometric approach. Data Envelopment Analysis Journal, 4(2): 207-241. http://dx.doi.org/10.1561/103.00000028.

20. Park, S. H., Y. K. Hong, M. Shuaibu, S. Kim, and W. S. Lee. 2020. Detection of apple Marssonina blotch with PLSR, PCA, and LDA using outdoor hyperspectral imaging. *Spectral Analysis* 40(4): 1309-1314.

21. Queiroz, D. M., E. D. T. Santos, W. S. Lee, and J. K. Schueller. 2020. Development and testing of a low-cost portable apparent soil electrical conductivity sensor using a BeagleBone Black. *Applied Engineering in Agriculture* 35(3): 341-355.

22. Swarup, A., W. S. Lee, N. Peres, and C. Fraisse. 2020. Strawberry plant wetness detection using color and thermal imaging. J. of Biosystems Engineering. Published online: 10 February 2021. https://doi.org/10.1007/s42853-020-00080-9.

23. Gan, H., W. S. Lee, V. Alchanatis, and A. Abd-Elrahman. 2020. Active thermal imaging for immature citrus fruit detection. Biosystems Engineering 198: 292-303. https://doi.org/10.1016/j.biosystemseng.2020.08.015.

24. Kim, W.-S., W. S. Lee, and Y.-J. Kim. 2020. A review of the applications of the Internet of Things (IoT) for agricultural automation. Journal of Biosystems Engineering. Published November 26, 2020. https://doi.org/10.1007/s42853-020-00078-3.

25. Woo, S., D. D. Uyeh, J. Kim, Y. Kim, S. Kang, K. C. Kim, S. Y. Lee, Y. Ha, and W. S. Lee. 2020. Analyses of work efficiency of a strawberry-harvesting robot in an automated greenhouse. Agronomy 10(11): 1751. https://doi.org/10.3390/agronomy10111751.

26. Kim, W.-S., D.-H. Lee, Y.-J. Kim, T. Kim, W. S. Lee, C.-H. Choi. 2021. Stereo-vision-based crop height estimation for agricultural robots. *Computers and Electronics in Agriculture* 181 (2021) 105937. https://doi.org/10.1016/j.compag.2020.105937.

27. Uyeh , D. D., J. Kim, S. Lohumi, T. Park, B.-K. Cho, S. Woo, W. S. Lee, and Y. Ha. 2021. Rapid and non-destructive monitoring of moisture content in livestock feed using a global hyperspectral model. *Animals* 11, 1299. https://doi.org/10.3390/ani11051299.

28. Xie, C., and W. S. Lee. 2021. Detection of citrus black spot symptoms using spectral reflectance. *Postharvest Biology and Technology* 180, 111627. https://doi.org/10.1016/j.postharvbio.2021.111627.

29. Zhou, X., W. S. Lee, Y. Ampatzidis, Y. Chen, N. Peres, C. Fraisse. 2021. Strawberry maturity classification from UAV and near-ground imaging using deep learning. *Smart Agricultural Technology* Volume 1, 2021, 100001. https://doi.org/10.1016/j.atech.2021.100001.

30. Zhou, X., Y. Ampatzidis, W. S. Lee, C. Zhou, S. Agehara, and J. K. Schueller. 2022. Deep learning-based postharvest strawberry bruise detection under UV and incandescent light. *Computers and Electronics in Agriculture* 202 (2022) 107389. https://doi.org/10.1016/j.compag.2022.107389.