

LAV R. KHOT

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Department of Biological Systems Engineering
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PROGRAM FOCUS

Appointment: 75% Research/ 25% Extension

My research and extension program focuses on “Sensing and automation technologies for site specific and precision management of production agriculture”. Special emphasis is towards integration of

- Remote sensing (Unmanned and manned aerial systems)
- Ground-based crop sensing
- Decision support systems and information delivery technologies
- Precise applications of various production inputs
- Agricultural machinery and processes
- Data-based modeling

EDUCATION

MPKV Agricultural University, India	Agricultural Engineering	B.Tech., 2001
C-DAC, Govt. of India	Advance Computing	PG Diploma, 2002
Asian Institute of Technology, Thailand	Agricultural Systems & Engineering	M.Engg., 2004
Iowa State University, IA	Agricultural & Biosystems Engineering	M.S., 2006
North Dakota State University, ND	Agricultural & Biosystems Engineering	Ph.D., 2009

EMPLOYMENT HISTORY

January, 2015- Present	Assistant Professor of Precision Agriculture , Center for Precision & Automated Agricultural Systems, Department of Biological Systems Engineering, Washington State University, WA
June, 2013- December, 2014	Assistant Research Professor , Department of Biological Systems Engineering, Washington State University, WA
June, 2009- May, 2013	Postdoctoral Researcher , Department of Agricultural & Biological Engineering, Citrus Research and Education Center, University of Florida, FL
May, 2006- May, 2009	Graduate Research Assistant , Department of Agricultural & Biosystems Engineering, North Dakota State University, ND
January, 2004- May, 2006	Graduate Research Assistant , Department of Agricultural & Biosystems Engineering, Iowa State University, IA
January, 2003- December, 2004	Research Assistant/Associate , Agricultural Systems & Engineering, Asian Institute of Technology, Thailand
July- December, 2002	Project Facilitation Team Member , NGO: Grass Roots Action for Social Participation, India
February- June, 2002	Programmer , I-Gen Software Pvt. Ltd., India

AWARDS, HONORS, AND FELLOWSHIPS

- 2018 **New Innovator in Food and Agriculture Research**, Foundation for Food and Agriculture Research, Washington DC
- 2018 **Outstanding Reviewer**, Computers and Electronics in Agriculture
- 2018 **Outstanding Reviewer**, Biosystems Engineering
- 2015 **Outstanding Reviewer**, Computers and Electronics in Agriculture
- 2010 **Outstanding Reviewer**, Information & Electrical Technology (IET) division of ASABE journals
- 2008 **Frank Bain Dissertation Fellowship**, North Dakota State University
- 2008 **Non-Faculty Travel Award**, at NDSU to present research work at 2008 ASABE Annual International Meeting, Providence, RI
- 2006 **Non-Faculty Travel Award**, at NDSU to present research at 2006 CSBE/ASABE Conference, SK, Canada
- 2003 **Special Partial Scholarship**, Asian Institute of Technology, Thailand
- 2000 **Brahad Bharti Merit-cum-Scholarship Award**, at B.Tech. (Agricultural Engineering)
- 1999 **Brahad Bharti Merit-cum-Scholarship Award**, at B.Tech. (Agricultural Engineering)

PATENTS/ INVENTION DISCLOSURES

- **US. Patent 20150305254**: Methods and devices for reduction of plant infections. Inventors: Reza J. Ehsani, Jose L. Reyes, Lav R. Khot, Stefani N. Leavitt, Cininta A. Pertiwi, Ahmed Al-Jumaili. (*Licensed to Premier Energy Technology, Inc., GA*).
- **Invention Disclosure-1**: Smart spray analytical system for optimizing spray patterns and air-assist of orchard and vineyard sprayers. Inventors: Lav R. Khot, Gwen-Alyn Hoheisel, Haitham Bahlol. (In the process of filing provisional patent)

BOOK CHAPTERS & REFEREED PUBLICATIONS

(*Corresponding author)

1. **Khot***, **L. R.**, G.-A. Hoheisel, Y. Osroosh, and R. Ehsani. 2017. Ch. 7-Precision technologies for pest and disease management. In *Zhang (Eds.)*, Automation in Tree Fruit Production, *CAB International*, Boston, MA. ISBN 978-1780648507.
2. Zhang*, Q., M. Karkee, and **L. R. Khot**. 2017. Ch. 11-Mechanization and automation for apple production. In *Evans (Eds.)*, Achieving Sustainable Cultivation of Apples, *Burleigh Dodds Science Publishing*, Cambridge, UK. ISBN-13: 9781786760326.
3. Sankaran*, S., **L. R. Khot**, R. Ehsani. 2014. Ch. 7-Mid- and far-infrared spectroscopy. In *Alahakoon et al. (Eds.)*, Imaging with Electromagnetic Spectrum: Applications in Food and Agriculture. *Springer*, New York, NY. ISBN 978-3-642-54887-1.

PUBLICATIONS: RESEARCH

(*Corresponding author: 27; ^λgraduate student/postdoc/visiting scholars advised by Lav Khot)
Google Scholar Metrics: Total number of citations: 1331; H-Index: 14; i10-index: 21

EFFORTS at WSU

1. Sinha^λ, R., **L. R. Khot***, A. Rathnayake, Z. Gao and N. Rayapati. 2019. Visible–near infrared spectroradiometry–based detection of grapevine leafroll–associated virus 3 in a red–fruited wine grape cultivar. *Computers and Electronics in Agriculture*, 162: 165-173.
<https://doi.org/10.1016/j.compag.2019.04.008>

2. Ranjan^λ, R., G. Shi^λ, R. Sinha^λ, **L. R. Khot***, G.–A. Hoheisel and M. Grieshop. 2019. Automated solid set canopy delivery system for large scale spray applications in perennial tree–fruit crops. *Transactions of the ASABE, In Press*. <https://doi.org/10.13031/trans.13258>
3. Sinha^λ, R., **L. R. Khot***, G.–A. Hoheisel, M. Grieshop and H. Y. Bahlol^λ. 2019. Feasibility of a solid set canopy delivery system for efficient agrochemical delivery in vertical shoot positioning trained vineyards. *Biosystems Engineering*, 179: 59-70. <https://doi.org/10.1016/j.biosystemseng.2018.12.011>
4. Chakraborty^λ, M., **L. R. Khot***, S. Sankaran and P. Jacoby. 2019. Evaluation of mobile 3D light detection and ranging based canopy mapping system for tree fruit crops. *Computers and Electronics in Agriculture*, 158: 284-293. <https://doi.org/10.1016/j.compag.2019.02.012>
5. Chakraborty^λ, M., **L. R. Khot*** and R. T. Peters. 2018. Assessing suitability of modified center pivot irrigation systems in corn production using low altitude aerial imaging techniques. *Information Processing in Agriculture*, <https://doi.org/10.1016/j.inpa.2019.06.001>
6. Ranjan^λ, R., A. Chandel^λ, **L. R. Khot***, H. Bahlol^λ, J. Zhou^λ, R. Boydston and P. Miklas. 2019. Irrigated pinto bean crop stress and yield assessment using ground based low altitude remote sensing technology. *Information Processing in Agriculture*, <https://doi.org/10.1016/j.inpa.2019.01.005>
7. Pena Quinones*, A. J., M. Keller, M. R. Salazar-Gutierrez, **L. R. Khot** and G. Hoogenboom. 2019. Comparison between grapevine tissue temperature and air temperature. *Scientia Horticulturae*, 247: 407–420. <https://doi.org/10.1016/j.scienta.2018.12.032>
8. Sinha^λ, R., R. Ranjan^λ, G. Shi^λ, G.-A. Hoheisel, M. Grieshop and **L. R. Khot***. 2019. Solid set canopy delivery system for efficient agrochemical delivery in modern architecture apple and grapevine canopies. *Acta Horticulturae, In Press*.
9. Chandel^λ, A., **L. R. Khot***, Y. Osroosh^λ and R. T. Peters. 2018. Thermal-RGB imager derived in-field apple surface temperature estimates for sunburn management. *Agricultural and Forest Meteorology*, 253-254: 132-140. <https://doi.org/10.1016/j.agrformet.2018.02.013>
10. Osroosh^{λ*}, Y., **L. R. Khot** and R. T. Peters. 2019. Detecting fruit surface wetness using a custom-built low-resolution thermal-RGB imager. *Computers and Electronics in Agriculture*, 157: 509–517. <https://doi.org/10.1016/j.compag.2019.01.023>
11. Osroosh^λ, Y., **L. R. Khot*** and R. T. Peters. 2018. Economical thermal-RGB imaging system for monitoring agricultural crops. *Computers and Electronics in Agriculture*, 147: 34–43. <https://doi.org/10.1016/j.compag.2018.02.018>
12. Sinha^λ, R., **L. R. Khot***, B. Schroeder and S. Sankaran. 2018. FAIMS based volatile fingerprinting for real-time postharvest storage infections detection in stored potatoes and onions. *Postharvest Biology and Technology*, 135: 83-92. <https://doi.org/10.1016/j.postharvbio.2017.09.003>
13. Bahlol^λ, H. Y., R. Sinha^λ, G.–A. Hoheisel, R. Ehsani and **L. R. Khot***. 2018. Efficacy evaluation of horticultural oil based thermotherapy for pear psylla management. *Crop Protection*, 113: 97-103. <https://doi.org/10.1016/j.cropro.2018.07.015>
14. Xu^{*λ}, Y., Z. Gao^λ, **L. R. Khot***, X. Meng and Q. Zhang. 2018. A real-time weed mapping and precision herbicide spraying system for row crops. *Sensors*, 18(12): 4245. <https://doi.org/10.3390/s18124245>
15. Zúñiga C. E., A. P. Rathnayake^λ, M. Chakraborty^λ, S. Sankaran, P. Jacoby and **L. R. Khot***. 2018. Applicability of time-of-flight-based ground and multispectral aerial imaging for grapevine canopy vigour monitoring under direct root-zone deficit irrigation. *International Journal of Remote Sensing*, 39(23): 8818-8836. <https://doi.org/10.1080/01431161.2018.1500047>
16. Boydston*, R., L. D. Porter, B. Chaves-Cordoba, **L. R. Khot** and P. N. Miklas. 2018. The impact of tillage on pinto bean cultivar response to drought induced by deficit irrigation. *Soil & Tillage Research*, 180: 63-72. <https://doi.org/10.1016/j.still.2018.02.011>

17. Jarolmasjed, S., S. Sankaran*, L. Kalcsits and **L. R. Khot**. 2018. Proximal hyperspectral sensing of stomatal conductance to monitor the efficacy of exogenous abscisic acid applications in apple trees. *Crop Protection*, 109: 42-50. <https://doi.org/10.1016/j.cropro.2018.02.022>
18. Jarolmasjed, S., **L. R. Khot** and S. Sankaran*. 2018. Hyperspectral imaging and spectrometry-derived spectral features for bitter pit detection in storage apples. *Sensors*, 18(5): E1561. <http://dx.doi.org/10.3390/s18051561>
19. Sankaran*, S., J. Zhou^λ, **L.R. Khot**, J.J. Trapp, E. Mndolwa and P.N. Miklas. 2018. High-throughput field phenotyping in dry bean using small unmanned aerial vehicle based multispectral imagery. *Computers and Electronics in Agriculture*, 151: 84-92. <https://doi.org/10.1016/j.compag.2018.05.034>
20. Zhou^λ, J., **L. R. Khot***, R. A. Boydston, P. N. Miklas and L. Porter. 2018. Low altitude remote sensing technologies for crop stress monitoring: a case study on spatial and temporal monitoring of irrigated pinto bean. *Precision Agriculture*, 19(3): 555-569. <https://doi.org/10.1007/s11119-017-9539-0>
21. Zúñiga, C. E., **L. R. Khot***, S. Sankaran and P. Jacoby. 2017. High resolution multispectral and thermal remote sensing-based water stress assessment in subsurface irrigated grapevines. *Remote Sensing*, 9(9): 961-976. <https://doi.org/10.3390/rs9090961>
22. Zhou^λ, J., **L. R. Khot***, H. Bahlol^λ, G. Kafle^λ, M. D. Whiting, T. Peters, Q. Zhang, D. Granatstein and T. Coffey. 2017. In-field sensing for crop loss management: efficacy of air-blast sprayer generated crosswind in rainwater removal from cherry canopies. *Crop Protection*, 91: 27-33. <https://doi.org/10.1016/j.cropro.2016.09.010>
23. Sinha^λ, R., **L. R. Khot*** and B. K. Schroeder. 2017. FAIMS based sensing of *Burkholderia cepacia* caused sour skin in onions under bulk storage condition. *Journal of Food Measurement and Characterization*, 11(4): 1578-1585. <https://doi.org/10.1007/s11694-017-9537-y>
24. Sinha^λ, R., **L. R. Khot***, B. Schroeder and Y. Si. 2017. Rapid and non-destructive detection of *Pectobacterium carotovorum* causing soft rot in stored potatoes through volatile biomarkers sensing. *Crop Protection*, 93: 122-131. <https://doi.org/10.1016/j.cropro.2016.11.028>
25. Kalcsits, L.*, G. Mupambi, S. Serra, S. Musacchi, D. Layne, T. Schmidt, M. Mendoza, L. Asteggiano, S. Jarolmasjed, S. Sankaran, **L. R. Khot** and C. Espinoza Zúñiga. 2017. Above and below-ground environmental changes associated with the use of photoselective anti-hail netting in apple. *Agricultural and Forest Meteorology*, 237-238: 9-17. <https://doi.org/10.1016/j.agrformet.2017.01.016>
26. Kafle^λ, G., **L. R. Khot***, S. Jarolmasjed, Y. Si and K. Lewis. 2016. Robustness of near infrared spectroscopy based spectral features for non-destructive bitter pit detection in Honeycrisp apples. *Postharvest Biology and Technology*, 120: 180-192. <https://doi.org/10.1016/j.postharvbio.2016.06.013>
27. Zhou^λ, J., **L. R. Khot***, T. Peters, M. D. Whiting, Q. Zhang and D. Granatstein. 2016. Efficacy of unmanned helicopter in rainwater removal from cherry canopies. *Computers and Electronics in Agriculture*, 124: 161-167. <https://doi.org/10.1016/j.compag.2016.04.006>
28. Kafle^λ, G., **L. R. Khot***, J. Zhou^λ, H. Y. Bahlol and Y. Si. 2016. Towards precision spray applications to prevent rain-induced sweet cherry cracking: understanding calcium washout due to rain and fruit cracking susceptibility. *Scientia Horticulturae*, 203: 152-157. <https://doi.org/10.1016/j.scienta.2016.03.027>
29. Kafle^λ, G., **L. R. Khot***, S. Sankaran, H. Y. Bahlol^λ, J. A. Tufariello and H. H. Hill Jr. 2016. State of ion mobility spectrometry and applications in agriculture: A review. *Engineering in Agriculture, Environment and Food*, 9(4): 346-357. <https://doi.org/10.1016/j.eaef.2016.05.004>
30. Jarolmasjed, S., C. L. Zuniga, S. Sankaran and **L. R. Khot***. 2016. Postharvest bitter pit detection and progression evaluation in 'Honeycrisp' apples using computed tomography images. *Postharvest Biology and Technology*, 118: 35-42. <https://doi.org/10.1016/j.postharvbio.2016.03.014>

31. Jennifer, J. T., C. A. Urrea, J. Zhou^λ, **L. R. Khot**, S. Sankaran and P. N. Miklas*. 2016. Selective phenotyping traits related to multiple stress and drought response in dry bean. *Crop Science*, 56: 1–13. <http://doi.org/10.2135/cropsci2015.05.0281>
32. Zhou^λ, J., **L. R. Khot***, H. Bahlol^λ, R. Boydston, P. N. Miklas and L. Porter. 2016. Evaluation of ground, proximal and aerial remote sensing technologies for crop stress monitoring. *IFAC-PapersOnLine*, 49(16): 22-26. <https://doi.org/10.1016/j.ifacol.2016.10.005>
33. Quirós^λ, J. J., and **L. R. Khot***. 2016. Potential of low altitude multispectral imaging for in-field apple tree nursery inventory mapping. *IFAC-PapersOnLine*, 49(16): 421–425. <https://doi.org/10.1016/j.ifacol.2016.10.077>
34. Sankaran, S., **L. R. Khot*** and A. H. Carter. 2015. Field-based crop phenotyping: multispectral aerial imaging for rapid evaluation of winter wheat emergence and spring stand. *Computers and Electronics in Agriculture*, 118: 372-379. <https://doi.org/10.1016/j.compag.2015.09.001>
35. Sankaran*, S., **L. R. Khot**, C. Z. Espinoza, S. Jarolmasjed, V. R. Sathuvalli, G. J. Vandemark, P. N. Miklas, A. H. Carter, M. O. Pumphrey, N. R. Knowles and M. Pavsek. 2015. Low-altitude, high-resolution aerial imaging systems for row and field crop phenotyping: A review. *European Journal of Agronomy*, 70: 112-123. <https://doi.org/10.1016/j.eja.2015.07.004>
36. **Khot***, **L. R.**, S. Sankaran, A. H. Carter, D. A. Johnson and T. F. Cummings. 2016. UAS imaging based decision tools for arid winter wheat and irrigated potato production management. *International Journal of Remote Sensing*, 37(1): 125-137. <https://doi.org/10.1080/01431161.2015.1117685>

EFFORTS PRIOR to WSU

37. **Khot, L. R.**, R. Ehsani*, J. M. Maja, J. M. Campoy, C. Wellington and A. Al-Jumaili. 2014. Evaluation of deposition and coverage of an air-assisted sprayer, and two airblast sprayers in citrus orchards. *Transactions of the ASABE*, 57(4): 1007-1013.
38. **Khot, L. R.**, R. Ehsani*, L. G. Albrigo, W. Swen, J. C. Neto, J. M. Campoy and C. Wellington. 2014. Variable rate spraying in varied micro-meteorological conditions. *Agricultural Engineering International: CIGR Journal*, 16(1): 90-98.
39. Jadhav, U., **L. R. Khot**, R. Ehsani*, V. Jagdale, and J. K. Schueller. 2014. Volumetric mass flow sensor for citrus mechanical harvesting machines. *Computers and Electronics in Agriculture*, 101: 93-101.
40. Khorramnia, K., **L. R. Khot**, A. R. B. M. Shariff, R. Ehsani*, S. B. Mansor and A. B. A. Rahim. 2014. Oil palm leaf nutrient estimation by optical sensing techniques. *Transactions of the ASABE*, 57(4): 1267-1277.
41. **Khot, L. R.**, R. Ehsani*, G. Albrigo, P. A. Larbi, A. Landers, J. Campoy and C. Wellington. 2012. Air-assisted sprayer adapted for precision horticulture: Spray patterns and deposition assessments in small-sized citrus canopies. *Biosystems Engineering*, 113(1): 76-85.
42. **Khot, L. R.**, R. Ehsani*, G. Albrigo, P. A. Larbi and A. J. Landers. 2012. Spray pattern investigation of an axial-fan airblast precision sprayer using a modified vertical patternator. *Applied Engineering in Agriculture*, 28(5): 647-654.
43. Wellington*, C., J. Campoy, **L. R. Khot** and R. Ehsani. 2012. Orchard tree modeling for sprayer control, tree inventory, and autonomous navigation. *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Workshop on Agricultural Robotics*, Algarve, Portugal, 7–12 October 2012, pp. 5–6.
44. Yamakawa, M., **L. R. Khot**, R. Ehsani* and N. Kondo. 2012. Real-time nondestructive citrus fruit quality monitoring system: development and laboratory testing. *Agricultural Engineering International: CIGR Journal*, 14(3): 117-124.
45. **Khot, L. R.**, S. Sankaran, J. M. Maja, R. Ehsani* and E. W. Schuster. 2012. Applications of nanomaterials in agricultural production and crop protection: a review. *Crop Protection*, 35: 64-

70. [Top 25 Hottest Articles; Most downloaded article in Agricultural Sciences; General, 2013]. <http://www.journals.elsevier.com/crop-protection/most-downloaded-articles/>
46. Miller*, D. R., **L. R. Khot**, A. L. Hiscox, M. Salyani, T. W. Walker and M. Farooq. 2012. Effect of atmospheric conditions on coverage of fogger applications in a desert surface boundary layer. *Transactions of the ASABE*, 55(2): 1-11.
47. Sankaran, S., **L. R. Khot** and S. Panigrahi*. 2012. Biology and applications of olfactory sensing system: a review. *Sensors and Actuators B*, 171-172, 1-17. [Top 25 Hottest Articles; Most downloaded Sensors and Actuators B article; January 2012-January, 2014]. <http://top25.sciencedirect.com/subject/chemistry/6/journal/sensors-and-actuators-b-chemical/09254005/archive/42/>
48. **Khot, L. R.**, S. Panigrahi*, C. Doetkott, Y. Chang, J. Glower, J. Amamcharla, C. Logue and J. Sherwood. 2012. Evaluation of technique to overcome small dataset problems during neural-network based contamination classification of packaged beef using integrated olfactory sensor system. *LWT - Food Science and Technology*, 45(2): 233-240.
49. **Khot, L. R.**, M. Salyani*, M. Farooq, T. W. Walker, R. D. Sweeb, P. A. Larbi, V. Smith, R. Pomolis and C. A. Stoops. 2011. Assessment of aerosol deposition and movement in open field conditions. *Agricultural Engineering International: CIGR Journal*, 31(3): 1-12.
50. **Khot, L. R.**, D. R. Miller, A. L. Hiscox, M. Salyani*, T. W. Walker and M. Farooq. 2011. Extrapolation of droplet catch measurements in aerosol application treatments. *Atomization and Sprays*, 21(2): 149-158.
51. **Khot, L. R.**, M. Salyani* and R. Sweeb. 2011. Solar and storage degradation of oil- and water-soluble fluorescent dyes. *Applied Engineering in Agriculture*, 27(2): 211-216.
52. **Khot, L. R.**, S. Panigrahi* and D. Lin. 2011. Development and evaluation of piezoelectric-polymer thin film sensors for low concentration detection of volatile organic compounds related to food safety applications. *Sensors and Actuators B*, 153(1): 1-10.
53. **Khot, L. R.**, S. Panigrahi* and P. Sengupta. 2010. Development and evaluation of chemoresistive polymer sensors for low concentration detection of volatile organic compounds related to food safety applications. *Sensing and Instrumentation for Food Quality and Safety*, 4(1): 20-34.
54. **Khot, L. R.**, L. Tang*, B. L. Steward and S. Han. 2008. Sensor fusion for improving the estimation of roll and pitch for an agricultural sprayer vehicle. *Biosystems Engineering*, 101(1): 13-20.
55. **Khot, L. R.**, S. Panigrahi* and S. Woznica. 2008. Neural-network-based classification of meat: evaluation of techniques to overcome small dataset problems. *Biological Engineering*, 1(2): 127-143.
56. Panigrahi*, S., Y. Chang, **L. R. Khot**, J. Glower and C. Logue. 2008. Integrated electronic nose system for detection of *Salmonella* contamination in meat. *IEEE Sensor Application Symposium, SAS 2008*: 85-88.
57. **Khot, L. R.**, V. M. Salokhe*, H. P. W. Jayasuriya and H. Nakasima. 2007. Experimental validation of distinct element simulation for dynamic wheel-soil interaction. *Journal of Terramechanics*, 44(6): 429-437.
58. **Khot, L. R.**, L. Tang*, S. Blackmore and M. Nørremark. 2006. Navigational context recognition for an autonomous robot in a simulated tree plantation. *Transactions of the ASABE*, 49(5): 1579-1588.
59. Pathan, P. B., **L. R. Khot** and P. A. Unde*. 2001. Effect of packaging and storage on quality of pomegranate arils, *Beverage and Food World*, 28(11): 8-14.

EFFORTS at WSU: UNDER PEER-REVIEW

60. Gao^λ, Z., Y. Zhao, G.-A. Hoheisel, Q. Zhang and **L. R. Khot***. 2019. Optical sensing for early spring freeze related blueberry bud damage detection: hyperspectral imaging for salient spectral

wavelengths identification. *Computers and Electronics in Agriculture, COMPAG_2018_1123* (Revision submitted).

61. Gao^λ, Z., R. A. Naidu, Q. Zhang and **L. R. Khot***. 2019. Feasibility of early detection of grapevine Leafroll disease in a red-berried wine grape cultivar using hyperspectral imaging. *Computers and Electronics in Agriculture, COMPAG_2018_779* (Resubmit; Revision being prepared).
62. Bahlol^λ, H. Y., A. Chandel, G.-A. Hoheisel, and **L. R. Khot***. 2019. Smart spray analytical system for orchard sprayer calibration: a-proof-of-concept and preliminary results. *Transactions of the ASABE, ITSC-13196-2018* (Revision being prepared).
63. Sinha^λ, R., **L. R. Khot***, G.-A. Hoheisel and M. Grieshop. 2019. Optimal solid set canopy delivery system configured for high-density tall spindle architecture trained apple canopies. *Transactions of the ASABE, MS-13199-2018* (Revision being prepared).
64. Sinha^λ, R., R. Ranjan, **L. R. Khot***, G.-A. Hoheisel and M. Grieshop. 2019. Drift potential from a solid set canopy delivery system and an axial-fan air-blast sprayer during applications in grapevines. *Biosystems Engineering, YBENG_2019_148* (Revision being prepared).
65. Quiros Vargas^λ, J., **L. R. Khot***, R. T. Peters, A. K. Chandel and B. Molaei. 2019. Low Orbiting Satellite and Small UAS based High Resolution Imagery Data to Quantify Crop Lodging: A Case Study in Irrigated Spearmint. *IEEE Geoscience and Remote Sensing Letters, GRSL-00191-2019* (Revision submitted).
66. Shi^λ, G., R. Ranjan and **L. R. Khot***. 2019. Smart sensing system for real-time apple sunburn management: a novel image processing algorithm to estimate fruit surface temperature from thermal infrared and visible imagery data. *Information Processing in Agriculture Journal, IPA_2019_59_Original_V0* (Revision being prepared).
67. Sinha^λ, R., R. Ranjan, **L. R. Khot***, G.-A. Hoheisel and M. Grieshop. 2019. Comparison of within canopy deposition for a solid set canopy delivery system (SSCDS) and an axial-fan airblast sprayer in a vineyard. *Crop Protection, CROPRO-S-19-00319* (Revision being prepared).
68. Mermer, M., G.-A. Hoheisel, H. Y. Bahlol, **L. R. Khot**, D. T. Dalton, L. J. Brewer, M. V. R. Stacconi and V. Walton*. 2018. Characterizing canopy and off-target deposition of three commonly used sprayers in high-bush blueberry production. *Crop Protection, (Under Review)*.
69. Sinha^λ, R., R. Ranjan^λ, H. Y. Bahlol^λ, **L. R. Khot***, G.-A. Hoheisel and M. Grieshop. 2019. Development and performance evaluation of a pneumatic spray delivery based solid set canopy delivery system for high-density apple orchard. *Transactions of the ASABE, MS-13411-2019* (Under review).
70. Bahlol^λ, H., A. Chandel, G.-A. Hoheisel and **L. R. Khot***. 2019. Developing understanding on orchard sprayer air-assists and volume output patterns using smart spray analytical system. *Crop Protection, CROPRO-S-19-00605* (Under review).
71. Sinha^λ, R., J. Quiros Vargas^λ, **L. R. Khot*** and S. Sankaran. 2019. Precision fruit crop production management: robustness of aerial RGB imagery mapped canopy attributes. *Computers and Electronics in Agriculture, COMPAG_2019_688* (Under review).

PUBLICATIONS: EXTENSION

FACT SHEETS/PRODUCTS

1. **Khot***, **L. R.**, G.-A. Hoheisel, and J. Zhou. 2019. FS321 Unmanned aerial systems in agriculture: part 3 (Mid-sized UAS).
2. **Khot***, **L. R.** 2017. FS285E Unmanned aerial systems in agriculture: part 2 (Sensors).
3. **Khot***, **L. R.**, Q. Zhang, M. Karkee, S. Sankaran, K. Lewis. 2016. FS194E Unmanned aerial systems in agriculture: part 1 (systems).

4. (dataset) Saraswat, D., D. E. Martin, L. R. Khot and S. Murray. 2018. UAS User Log. Purdue University. <https://data.nal.usda.gov/dataset/uas-user-log>
- # Hoheisel*, G.-A., **L. R. Khot**, M. Moyer and Steve Castagnoli, 2019. 6 steps to calibrate and optimize airblast sprayers. WSU Extension Fact Sheet (*Under Peer-Review*).

MAGAZINES/ TRADE JOURNALS

5. **Khot, L.**, R. Sinha, G.-A. Hoheisel, and Matthew Grieshop. 2019. Solid set canopy delivery system for WA vineyards. Washington State University - Viticulture and Enology Extension News, Spring 2019. <http://wine.wsu.edu/extension/viticulture-enology-news-veen/>
6. **Khot, L. R.** and R. T. Peters. 2018. Advances in UAS based imagery and its applications in irrigated agriculture. *Irrigation Today Magazine*, April, 2018. pp. 23-24.
7. **Khot, L. R.** 2018. Drone data for agriculture, *Good Fruit Grower Magazine*, <http://www.goodfruit.com/khot-drone-data-for-agriculture/>
8. **Khot, L. R.**, J. Zhou. 2016. Precision Agriculture: Beyond the domain of small UAS. *ASABE Resource Magazine*, 23(3): 20-21.
9. Ehsani, R., José I. Reyes De Corcuera, and **L. Khot**. 2013. The Potential of thermotherapy in combatting HLB. *ASABE Resource Magazine*, 20(6): 18-19.
10. Ehsani, R., José I. Reyes De Corcuera, and **L. Khot**. 2013. Understanding the potential of thermal treatments in combatting HLB. *Citrus Industry*, Sept, 2013. pp.7-8.
11. Ehsani, R., and **L. Khot**. 2012. Over-the-row mechanical harvesting machine for dwarf and young citrus trees. *Citrus Industry*, Sept, 2012. pp. 10-11.

NON-REFEREED PUBLICATIONS

EFFORTS at WSU: PROCEEDING ARTICLES

1. Zhang, C., W. Craine, J. B. Davis, **L. R. Khot**, A. Marzougui, J. Brown, S. Hulbert and S. Sankaran*. 2018. Detection of canola flowering using proximal and aerial remote sensing techniques. Proceedings of SPIE 10664, Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping III; 1066409. <https://doi.org/10.1117/12.2304054>
2. Espinoza, C. Z., **L. R. Khot***, P. Jacoby and S. Sankaran. 2016. Remote sensing based water-use efficiency evaluation in sub-surface irrigated grape vines. Proc. SPIE 9866, Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping, 98660O (May 17, 2016); <https://doi.org/10.1117/12.2228791>
3. Sankaran*, S., **L. R. Khot**, J. Quirós, G. J. Vandemark and R. J. McGee. 2016. UAV-based high-throughput phenotyping in legume crops. *Proc. SPIE* 9866, Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping, 98660G (May 17, 2016); <https://doi.org/10.1117/12.2228550>
4. Chakraborty, M., **L. R. Khot*** and R. T. Peters. 2018. Assessment of crop growth under modified center pivot irrigation systems using small unmanned aerial system based imaging techniques. Proc. of ISPA 14th International conference on Precision Agriculture (June 24-25, 2018) ICPA full paper # 5308.
5. Quirós, J., M. Martello and **L. R. Khot***. 2018. Field grown apple nursery tree plant counting based on small UAS imagery derived elevation maps. Proc. of ISPA 14th International conference on Precision Agriculture (June 24-25, 2018) ICPA full paper # 5152.

EFFORTS at WSU: TECHNICAL CONFERENCE PRESENTATIONS/ ABSTRACTS

1. Sinha, R., R. Ranjan, G. Shi, G.-A. Hoheisel, M. Grieshop and **L. R. Khot***. 2018. Solid set canopy delivery system for efficient agrochemical delivery in modern architecture apple and wine grape canopies. 2nd International Symposium on Innovative Plant Protection in

- Horticulture, 30th International Horticultural Congress, Istanbul, Turkey, August 12-16, 2018 (*Oral Presentation*).
2. Ranjan, R.*, G. Shi, R. Sinha, G.-A. Hoheisel, M. Grieshop and **L. R. Khot**. 2018. Automated solid set canopy delivery system (SSCDS) for commercial scale spraying in tree fruit crops. Paper No. 1801017, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 3. Bahlol, H.*, G.-A. Hoheisel, M. Grieshop and **L. R. Khot**. 2018. Evaluation of Ozone water spray treatments for fruit crop pest management. Paper No. 1801238, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 4. Sinha, R.*, **L. R. Khot**, G.-A. Hoheisel and M. Grieshop. 2018. Optimal solid set canopy delivery system configured for high-density apple orchards in WA State. Paper No. 1801468, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 5. Sinha, R.*, **L. R. Khot**, R. Ranjan, G. Shi, G.-A. Hoheisel and M. Grieshop. 2018. Performance of a scaled-up solid set canopy delivery system in a high-density apple orchard. Paper No. 1801471, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 6. Bahlol, H.*, M. McCoy, G.-A. Hoheisel and **L. R. Khot**. 2018. Comparison of different spray sample collectors for the evaluation of pesticide spray assessment in grapevine. Paper No. 1801611, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Poster Presentation*).
 7. Sinha, R.*, **L. R. Khot**, G.-A. Hoheisel, M. Grieshop and H. Bahlol. 2018. Spray drift potential assessment of solid set canopy delivery system configurations in Washington apple orchards and vineyards. Paper No. 1801478, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Poster Presentation*).
 8. Gao, Z.*, G.-A. Hoheisel, Q. Zhang and **L. R. Khot**. 2018. Deep learning of hyperspectral images for evaluation of blueberry bud's cold hardiness. Paper No. 1801681, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 9. Zhang, C.*, H. Guan, **L. R. Khot**, W. Chen and S. Sankaran. 2018. Proximal and remote sensing methods to evaluate Ascochyta blight disease severity in chickpea. Paper No. 1800939, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 10. Xu, Y., **L. R. Khot**, Z. Gao* and Q. Zhang. 2018. Rapid Fuzzy method of Image Edge Detection for Robust Canopy Characterization. Paper No. 1801507, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 11. Chakraborty, M., **L. R. Khot***, S. Sankaran and P. Jacoby. 2018. Evaluation of mobile 3D time of flight based canopy mapping system for tree fruit crops. Paper No. 1801540, ASABE 2018 Annual International Meeting, Detroit, MI, July 29- Aug 1, 2018 (*Oral Presentation*).
 12. Chakraborty*, M., **L. R. Khot** and R. T. Peters. 2018. Assessment of crop growth under modified center pivot irrigation systems using small unmanned aerial system based imaging techniques. Presentation at 14th International conference on Precision Agriculture, Montreal, Canada. June 24-25, 2018 (*Oral Presentation*).
 13. Quirós, J., M. Martello and **L. R. Khot***. 2018. Field grown apple nursery tree plant counting based on small UAS imagery derived elevation maps. Presentation at 14th International conference on Precision Agriculture, Montreal, Canada. June 24-24, 2018 (*Oral Presentation*).
 14. Ranjan, R., G. Shi, R. Sinha, G.-A. Hoheisel, M. Grieshop and **L. R. Khot**. 2018. Automated crop physiology sensing and integrated solid set canopy delivery system for apple sunburn management. TechConnect World Innovation Conference and Expo 2018, Anaheim, CA, May 13-16, 2018 (*Poster Presentation*).

15. Boydston, R., L. Porter, P. Miklas, B. Chavez-Cordoba and **L. Khot**. 2018. Performance of strip-tilled dry beans under full and deficit irrigation. PNW Direct Seed Association Cropping Systems Conference, Kennewick, WA, January 9-10, 2018 (*Poster Presentation*).
16. Sinha*, R., **L.R. Khot**, G.A. Hoheisel, E. Beers and M. Grieshop. 2017. Optimization of solid set canopy delivery system for efficient delivery of agrochemicals to grapevines in Washington State. Paper No. 1700497, ASABE 2017 Annual International Meeting, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
17. Sinha*, R., **L.R. Khot** and B.K. Schroeder. 2017. Spectrometry based non-destructive detection of onion sour skin caused by *Burkholderia cepacia* under different bulk storage conditions. Paper No. 1700500, ASABE 2017 Annual International Meeting, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
18. Sinha*, R., Z. Gao, A.P. Rathnayake, **L.R. Khot** and R. Naidu. 2017. Visible–near infrared spectroscopy based Grapevine Leafroll–associated virus–3 detection from undetached leaves under field condition. Paper No. 1700499, ASABE 2017 Annual International Meeting, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
19. Chakraborty*, M., M. Azeem Khan*, **L. R. Khot**, R. Troy Peters and R. Sinha. 2017. Low altitude multispectral sensing based evaluation of retrofitted center pivot irrigation systems for site specific adoption in mint and corn production. ASABE 2017 Annual International Meeting, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
20. Gao*, Z., **L. R. Khot**, N. Rayapati and Q. Zhang. 2017. Early Detection of grapevine Leafroll disease by hyperspectral imaging, Paper No. 1700436, ASABE 2017 Annual International Meeting, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
21. Zhao*, Y., Z. Gao, **L. R. Khot**, G.-A. Hoheisel, L. W. DeVetter, Q. Zhang and Y. He. 2017. Assessing blueberry buds damage during cold hardiness using hyperspectral imaging, Paper No. 1700713, ASABE 2017 Annual International Meeting, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
22. Kafle*, G. K., **L. R. Khot**, P. M. Ndegwa and I. Zeb. 2017. Identification of potential near infrared spectral bands for rapid sensing of dairy manure nutrients. 2017 ASABE Annual International Meeting, Spokane, WA, 17-19 July 2017 (*Poster Presentation*).
23. Osroosh*, Y., **L.R. Khot**, and R.T. Peters. 2017. Crop Monitoring System based on Internet of Things for Performance Evaluation of MESA and LESA Irrigation Methods. Presentation No. 1701192, 2017 ASABE Annual International Meeting, Spokane, WA, 17-19 July 2017 (*Oral Presentation*).
24. Bahlol*, H., G.-A. Hoheisel, R. Ehsani and **L. Khot**. 2017. Thermoherapy with horticulture mineral oil for pear psylla management. Presentation No. 1701562, 2017 ASABE Annual International Meeting, Spokane, WA, 17-19 July 2017 (*Poster Presentation*).
25. Bahlol*, H., G.-A. Hoheisel and **L. Khot**. 2017. Development and evaluation of an automated vertical spray patternator for calibration of vineyard air– assist sprayer. Presentation No. 1700750, 2017 ASABE Annual International Meeting, Spokane, WA, 17-19 July 2017 (*Oral Presentation*).
26. Nalavade*, P., M. McCoy, H. Bahlol, G.-A. Hoheisel, **L. Khot** and M. Moyer. 2017. Evaluation of two over-the-row grapevine sprayers for both-side single-pass versus one side multi-pass spray application. Presentation No. 1700711, 2017 ASABE Annual International Meeting, Spokane, WA, 17-19 July 2017 (*Oral Presentation*).
27. Nalavade*, P., G.-A. Hoheisel and **L. Khot**. 2017. Leaf-wetness sensor based drift quantification in tree-fruit production. Presentation No. 1700709, 2017 ASABE Annual International Meeting, Spokane, WA, 17-19 July 2017 (*Oral Presentation*).
28. Rathnayake*, A., C. Zuniga, **L. R. Khot**, S. Sankaran and P. Jacoby. 2017. Applicability of 3D imaging for measuring grapevine plant growth under subsurface drip irrigation. Presentation

- No. 1701180, 2017 ASABE Annual International Meeting, Spokane, WA, 17-19 July 2017 (*Oral Presentation*).
29. Jarolmasjed*, S., **L.R. Khot** and S. Sankaran. 2017. Detecting bitter pit development in apples using hyperspectral imaging, Paper No. 1700741, ASABE 2017 Annual International Meeting, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
 30. Zúñiga*, C., **L.R. Khot**, P. Jacoby and S. Sankaran. 2017. Crop stress monitoring to evaluate sub-surface irrigation treatments in wine grapes using sensors. Paper No. 1700675, ASABE 2017 Annual International Meeting oral presentation, Spokane, WA, July 16-19, 2017 (*Oral Presentation*).
 31. Gao*, Z., R. R. Sinha, A. P. Rathnayake, R. A. Naidu, Q. Zhang and **L. R. Khot**. 2017. In field optical sensing for rapid and non-destructive detection of grapevine Leafroll disease in cabernet sauvignon. International Doctoral Students Conference on ‘Opportunities and Challenges Arises from Global Technological Revolution’, Hangzhou, China. May 23-25, 2017 (*Paper/Oral Presentation*).
 32. Kafle*, G. K., **L. R. Khot**, P. Ndegwa and I. Zeb. 2017. A feasibility study on optical sensing based rapid dairy manure nutrients quantification. Waste to Worth 2017, Cary, NC. April 18-21, 2017, Proceeding link: <https://articles.extension.org/pages/74357/proceedings-from-waste-to-worth-2017> (*Paper/Oral Presentation*).
 33. Sarwar*, A., **L. R. Khot**, and T. R. Peters. 2017. Applicability of low altitude multispectral sensing towards crop and site specific adaptation of LESA. Climate Impacts to water conference, Skamania Lodge, Stevenson, WA. January 25-26, 2017 (*Paper/Oral Presentation*).
 34. **Khot***, **L.R.**, C. Z. Espinoza, S. Sankaran and P. Jacoby. 2017. Role of low altitude remote sensing tools in growing wine grapes with less water. 3rd International Grape Symposium, Hermosillo, Sonora, México. January 26-27, 2017 (*Paper/Oral Presentation*).
 35. Graebner, R., S. Sankaran, **L.R. Khot** and S. Sathuvalli* 2017. Application of high throughput phenotyping tools for germplasm screening in potato. Conference as a part of USDA Specialty Crop Research Initiative Planning Grant, Madison, WI, November 14, 2017 (*Oral Presentation*).
 36. **Khot***, **L. R.**, S. Sankaran, and L. Kalcsits. 2016. Role of sensing technologies in apple bitter pit management. 1st International Apple Symposium, Shaanxi, China. October 10-16, 2016 (*Oral Presentation*).
 37. Mermer*, S., G.-A. Hoheisel, H. Bahlol, **L. R. Khot** and V. M. Walton. 2016. Deposition and spray drift ratio of commercially used sprayers. 7th SETAC World Congress/SETAC North America 37th Annual Meeting, Orlando, FL. November 6-10, 2016 (*Poster Presentation*).
 38. Quirós, J. J., and **L. R. Khot***. 2016. Potential of low altitude multispectral imaging for in-field apple tree nursery inventory mapping. 5th IFAC Conference on Sensing, Control and Automation for Agriculture, Seattle, WA. August 15-17, 2016 (*Oral Presentation*).
 39. Zhou, J., **L. R. Khot***, H. Bahlol, R. Boydston, P. N. Miklas, and L. Porter. 2016. Evaluation of ground, proximal and aerial remote sensing technologies for crop stress monitoring. 5th IFAC Conference on Sensing, Control and Automation for Agriculture, Seattle, WA. August 15-17, 2016 (*Oral Presentation*).
 40. Zhou, J., **L. R. Khot***, R. Boydston, P. N. Miklas, and L. Porter. 2016. Small UAS integrated sensing tools for abiotic stress monitoring in irrigated pinto beans. Abstract # 2115. Proceedings of 13th International Conference on Precision Agriculture (ICPA), St. Louis, MO. July 31-August 3, 2016 (*Paper/Oral Presentation*).
 41. Sinha*, R., **L. R. Khot** and B. Schroeder. 2016. Potato soft rot detection under different bulk storage conditions using Field Asymmetric Ion Mobility Spectrometry (FAIMS). Abstract # 162461524. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).

42. Sankaran*, S., J. J. Quiros, **L. R. Khot**, N. Knowles, and L. O. Knowles. 2016. UAV-based imaging to assess potato emergence in horticulture and breeding programs. Abstract # 162540198. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
43. Zúñiga*, C., S. Jarolmasjed, **L. R. Khot**, N. Knowles, M. J. Pavek, and S. Sankaran. 2016. Water stress tolerance detection in potatoes using visible-near infrared sensing techniques. Abstract # 162461685. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
44. Zhou, J., **L. R. Khot***, T. Peters, M. D. Whiting, Q. Zhang, and D. Granatstein. 2016. Rain-induced cherry fruit cracking prevention: effectiveness of unmanned mid-sized helicopter generated downwash in rainwater removal from Y-trellised tree canopies. Abstract # 162455253. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
45. Zhou*, J., **L. R. Khot**, M. Pavek, and S. Sankaran. 2016. Rapid assessment of hail damage in potato crops using remote sensing technology. Abstract # 162459762. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
46. Kafle*, G. K., **L. R. Khot**, P. M. Ndegwa and I. Zeb. 2016. Evaluation of near infrared spectroscopy for rapid sensing of dairy manure nutrients. Abstract # 62460363. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
47. Jarolmasjed*, S., C. Zúñiga, R.R. Sinha, C. Zhang, L. Kalcsits, **L. R. Khot**, S. Sankaran. 2016. Evaluating effect of location on bitter pit incidence in ‘Honeycrisp’ apples using sensing techniques. Abstract # 162461752. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
48. Bahlol*, H., G.-A. Hoheisel and **L. R. Khot**. 2016. Smart spray analytical system for orchard sprayer calibration: a-proof-of-concept and preliminary results. Abstract # 2460358. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
49. Nalavade*, P., G.-A. Hoheisel, **L. R. Khot** and R. Ehsani. 2016. Development and feasibility evaluation of HMO based thermotherapy technique for effective pear psylla management. Abstract # 2460369. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Oral Presentation*).
50. **Khot, L. R.** J. Zhou*, G. K. Kafle, and H.Y. Bahlol. 2016. Rain induced fruit cracking prevention chemicals washout evaluation from sweet cherry fruits for the precision re-applications. Abstract # 162460340. 2016 ASABE Annual International Meeting, Orlando, FL. July 17- 20, 2016 (*Poster Presentation*).
51. Zhou*, J., **L. R. Khot**, T. Peters, M. D. Whiting, Q. Zhang, and D. Granatstein. 2015. Feasibility study on mid-sized unmanned helicopter downwash based rainwater removal from sweet cherry canopies. Washington State Tree Fruit Association Annual Meeting (111th) Poster Session, Yakima, WA, December 7-9, 2015.
52. Kalcsits*, L., C. Wheeler, L. Asteggiano, S. Jarolmasjed, **L. R. Khot**, D. Layne, M. Mendoza, S. Musacchi, T. Schmidt, S. Sankaran, S. Serra and C. Zuniga. 2015. Colored anti-hail nets alter canopy and soil environment in apple. 2015 Washington State Tree Fruit Association (WSTFA) 111th Annual Meeting, Yakima, WA, Dec. 7-9, 2015 (*Poster Presentation*).
53. Zúñiga* C. E., S. Jarolmasjed, P. Jacoby, **L. R. Khot**, and S. Sankaran. 2015. Role of non-contact sensing for water management in grapevines at different growth stages. 2015 WSTFA 111th Annual Meeting, Yakima, WA, Dec. 7-9, 2015 (*Poster Presentation*).
54. Jarolmasjed*, S., C. E. Zúñiga, S. Sankaran, L. A. Kalcsits, S. Sankaran, and **L. R. Khot**. 2015. Assessment of high-throughput sensing techniques for pre and postharvest apple bitter pit detection. 2015 WSTFA 111th Annual Meeting, Yakima, WA, Dec. 7-9, 2015 (*Poster Presentation*).

55. Jacoby*, P. W., R. T. Peters, S. Sankaran, and **L. R. Khot**. 2015. Advancing water use efficiency in vineyards with subsurface micro-irrigation. *Emerging Technologies for Sustainable Irrigation, Joint ASABE/ Irrigation Association Symposium Proceedings*, Long Beach, CA, Nov. 10-12, 2015.
56. York, Z.*, P. Jacoby, T. Peters, S. Sankaran, **L. R. Khot**, and J. Thompson. 2015. Deep subsurface irrigation in Concord vineyards. Annual Meeting, WA Grape Society November 12-13, 2015 (*Poster Presentation*).
57. Sathuvalli*, V., **L. R. Khot** and S. Sankaran. 2015. Applications of UAVs in potato breeding. Conference on Advances in Field-Based High-throughput Phenotyping and Data Management: Grains and Specialty Crops, Spokane, WA, Nov. 9-10, 2015 (*Oral Presentation*).
58. Trapp*, J. J., S. M. Moghaddam, P. E. McClean, Q. Song, J. Zhou, **L. R. Khot**, S. Sankaran, and P. N. Miklas. 2015. Characterizing traits related to drought tolerance within the durango race of common bean, 2015 Biennial Bean Improvement Cooperative (BIC) Meeting, Niagara Falls, Canada, Nov. 1-4, 2015 (*Oral Presentation*).
59. Zhou*, J., **L. R. Khot**, M. D. Whiting, T. Peters, Q. Zhang, and D. Granatstein. 2015. Assessment of rainwater removal efficiency of an orchard sprayer for preventing cherry cracking. Paper No. 15- 2176427, 2015 ASABE Annual International Meeting, New Orleans, LA, July 26 - 29, 2015 (*Oral Presentation*).
60. Zúñiga, C. L.*, S. Jarolmasjed, **L. R. Khot**, R. Knowles, M. Pavek, and S. Sankaran. 2015. Evaluating abiotic stress in potato cultivars using proximal and remote sensing techniques, Paper No. 152191080, ASABE 2015 Annual International Meeting, New Orleans, LA, July 26-29, 2015 (*Oral Presentation*).
61. Zúñiga, C. L.*, S. Jarolmasjed, **S. Sankaran**, and **L. R. Khot**. 2015. Calcium evaluation in healthy and bitter pit apples using Fourier transform infrared (FTIR) spectroscopic technique, Paper No. 152191056, ASABE 2015 Annual International Meeting, New Orleans, LA, July 26-29, 2015 (*Oral Presentation*).
62. Jarolmasjed, S.*, C. L. Espinoza, **L. R. Khot**, and S. Sankaran. 2015. Visible-near infrared spectroscopy for bitter pit detection in apples, Paper No. 152190895, ASABE 2015 Annual International Meeting, New Orleans, LA, July 26-29, 2015 (*Oral Presentation*).
63. Zhou, J.*, S. Sankaran, **L. R. Khot**, M. Pumphrey, and A. Carter. 2015. Crop height estimation in wheat using proximal sensing techniques, Paper No. 2188566, ASABE 2015 Annual International Meeting, New Orleans, LA, July 26-29, 2015 (*Oral Presentation*).
64. **Khot, L. R.**, J. Zhou*, S. Sankaran, and V. Sathuvalli. 2015. Evaluation of viral infection in potatoes using proximal and remote sensing techniques, Paper No. 2246054, ASABE 2015 Annual International Meeting, New Orleans, LA, July 26-29, 2015 (*Poster Presentation*).
65. Sankaran, S.*, **L. R. Khot**, J. Zhou, J. Trapp, and P. Miklas. 2015. Evaluating plant responses to water stress in dry bean genetic breeding populations using remote sensing technique, Abstract No. 2190729, ASABE 2015 Annual International Meeting, New Orleans, LA, July 26-29, 2015 (*Oral Presentation*).
66. **Khot***, **L. R.**, H. Y. Bahlol, B. Schroeder, and N. Olsen. 2015. Ion mobility spectrometry based volatile sensing for integrated postharvest potato rot management. ASABE 2015 Annual International Meeting, New Orleans, LA, July 26-29, 2015 (*Poster Presentation*).
67. Jacoby*, P. W., R. T. Peters, S. Sankaran, and **L. R. Khot**. 2015. Advancing water use efficiency in vineyards with subsurface micro-irrigation. *Emerging Technologies for Sustainable Irrigation, Joint ASABE/ Irrigation Association Symposium Proceedings*, Long Beach, CA, Nov. 10-12, 2015 (*Oral Presentation*).
68. Jacoby*, P. W., A. McElrone, S. Sankaran, **L. R. Khot**, M. Keller, and R. T. Peters. 2015. Precision sub-surface irrigation to regulate wine grape physiology, Annual Meeting of NW Center for Small Fruit Research, Portland, OR. December 1, 2015 (*Oral Presentation*).

69. Zúñiga* C. E., S., Jarolmasjed, L. A. Kalcsits, S. Sankaran, **L. R. Khot**, A. Dhingra, and K. M. Lewis. 2014. Fourier transform infrared and X-Ray fluorescence spectrometry based analogies of calcium and magnesium in healthy and bitter pit Honeycrisp apples. 110th Annual Meeting of the Washington State Horticultural Association (WSHA), December 1-3, 2014, Kennewick, WA. (Poster presentation)
70. Zhou*, J., **L. R. Khot**, T. Peters, Q. Zhang, and D. Granatstein. 2014. Proof-of-concept: sensing and decision support system to prevent cherry fruit cracking due to rainwater. 110th Annual Meeting of the Washington State Horticultural Association (WSHA), December 1-3, 2014, Kennewick, WA. (Poster)
71. Jarolmasjed*, S., C. E. Zúñiga, L. A. Kalcsits, S. Sankaran, **L. R. Khot**, A. Dhingra, and K. M. Lewis. 2014. X-ray computer tomography imaging and visible-near infrared spectroscopy for non-destructive apple bitter pit detection. 110th Annual Meeting of the Washington State Horticultural Association (WSHA), December 1-3, 2014, Kennewick, WA. (Poster)
72. **Khot, L. R.**, J. A. Tufariello*, E. J. Lynch, P. J. Rauch, D. A. Johnson, N. Olsen, W. F. Siems, and H. Hill Jr. 2014. Feasibility study on the detection of volatile organic compounds (VOCs) from potato tuber soft rot by differential mobility spectrometry (DMS). International Society of Ion Mobile Spectrometry (ISIMS) Annual Conference, 27 July-1 August, 2014.
73. **Khot***, **L. R.**, S. Sankaran, T. F. Cummings, D. A. Johnson, A. H. Carter, S. Serra, and S. Musacchi. 2014. Unmanned aerial system applications in Washington state agriculture. Presentation at 12th International conference on Precision Agriculture (ICPA), Sacramento, CA. ICPA Abstract no. 1637.
74. Sankaran*, S., **L. R. Khot**, A. H. Carter, and K. A. Garland-Campbell. 2014. Unmanned aerial systems based imaging for field-based crop phenotyping: winter wheat emergence evaluation. Presentation at ASABE Annual International Meeting, 13-16 July 2014, Montréal, Canada. Abstract number: 1914284.
75. **Khot, L. R.**, J. A. Tufariello*, E. J. Lynch, P. J. Rauch, D. A. Johnson, N. Olsen, W. F. Siems, and H. Hill Jr. 2014. Feasibility study on the detection of volatile organic compounds (VOCs) from potato tuber soft rot by differential mobility spectrometry (DMS). 62nd American Society of Mass Spectrometry (ASMS) Annual Conference, 15-19 June, 2014. Abstract number: 140602.

PRIOR to WSU: TECHNICAL CONFERENCE PRESENTATIONS/ ABSTRACTS

76. Sankaran*, S, L. R. Khot, and R. Ehsani. 2013. Applications of an unmanned aerial system for field-based crop phenotyping. Poster presentation at Donald Danforth Plant Science Center's Fall Symposium on 'PhenoDays: Imaging and Robotics for 21st Century Science', Saint Louis, MO, September 25-27, 2013.
77. Khot*, L. R., S. E. Jones, P. Trivedi, M. R. Ehsani, N. Wang, and J. I. Reyes-De-Corcuera. 2013. Thermal treatment of huanglongbing infected trees using in-field solar heating system. Presentation at ASABE Annual International Meeting, 21-24 July 2013, Kansas City, MI. Abstract number: 1591334.
78. Sankaran, S., L. R. Khot, J. M. J. Maja*, and R. Ehsani. 2013. Comparison of two multiband cameras for use on small UAVs in agriculture. 5th IEEE Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS), 25-28 June 2013, Gainesville, FL.
79. Khot, L. R., S. E. Jones, P. Trivedi, M. R. Ehsani, N. Wang, and J. I. Reyes-De-Corcuera*. 2013. In-field thermal treatment of huanglongbing (HLB) infected trees. Proceedings of the 3rd International Conference on HLB, Abstract no. 7.21P.
80. Khot*, L. R., R. Ehsani et al. 2013. An enhanced variable rate axial-fan airblast sprayer for citrus. 2013 UFL-CREC Posters and Pastries Research Gallery, Lake Alfred, FL. Poster no. 27.

81. Khot*, L. R., R. Ehsani et al. 2013. In-field thermal treatment of Huanglongbing (HLB) infected trees. 2013 Posters and Pastries Research Gallery, Lake Alfred, FL. Poster no. 28.
82. Khot*, L. R., R. Ehsani, G. Albrigo, W. Swen, J. C. Neto, J. Campoy, and C. Wellington. 2012. Validation of variable rate spray decision rules in intricate micro-metrological conditions. Presentation at 11th International conference on Precision Agriculture (ICPA), Indianapolis, IN. ICPA Abstract no.1314.
83. Khot, L. R., R. Ehsani, S. D. Tumbo, A. Schumann, W. M. Larzelere, and G. Albrigo*. 2011. Testing a variable rate airblast sprayer for use in citrus. AHSH 2011 Annual Conference, 25-28 Sept. 2011, Waikoloa, Hawaii. Posters nos. SCRI-13 & Citrus Crops. 65.
84. Khot*, L. R., J. M. Maja, R. Ehsani, and S. Buchanon. 2011. Citrus canopy volume and yield estimation using photosynthetically active radiation based mobile sensor system. Presentation at ASABE 2011 Annual International Meeting, Louisville, KY, Aug. 7-10, 2011.
85. Khot*, L. R., M. Salyani, and R. Sweeb. 2010. Degradation of oil- and water-soluble fluorescent dyes. Presented at 2010 ASABE Annual International Meeting, Pittsburgh, PA. Paper number: 1008369.
86. Khot*, L. R., S. Panigrahi, Y. Chang, and J. S Glower. 2008. Olfactory sensing with adaptive wavelet transform for food safety application. Presented at 2008 ASABE Annual International Meeting, Providence, RI. Paper number: 085240.
87. Panigrahi*, S., S. Sankaran, and L. R. Khot. 2008. Evaluation of metal oxide-based nano-structured sensing material for detection of compounds associated with meat contamination. Poster presentation at 2008 Biological Engineering annual conference, Chapel Hill, NC.
88. Khot*, L. R., S. Panigrahi, J. S Glower, P. Bhattacharyajee, J. Sherwood, and C. Logue. 2007. Temporal analysis of VOC profile of packaged meat during spoilage. Presented at 2007 ASABE/CSBE North Central Intersectional Meeting, Paper number: RRV-07109.
89. Khot*, L. R., S. Panigrahi, J. S Glower, P. Bhattacharyajee, Y. Chang, J. Sherwood, and C. Logue. 2007. An automated headspace sampling system for meat safety. Presented at 2007 ASABE Annual International Meeting, Minneapolis, MN. Paper number: 073101.
90. Khot*, L. R., and S. Panigrahi. 2006. Wavelet transform: a tool for pattern recognition of olfactory signal. Presented at 2006 ASABE/CSBE North Central Intersectional Meeting, Saskatoon, SK, Canada. Paper number: MBSK 06-213.
91. Khot*, L. R., L. Tang, and K. Hayashi. 2006. Modeling and simulation of a four-wheel-steered agricultural robotic vehicle. Presented at 2006 ASABE Annual International Meeting, Portland, OR. Paper number: 061106.
92. Khot, L. R., L. Tang*, B. L Steward, and S. Han. 2006. Sensor fusion for roll and pitch estimation improvement of an agricultural sprayer vehicle. Presented at 2006 ASABE Annual International Meeting, Portland, OR. Paper number: 061159.
93. Khot*, L. R., V.M. Salokhe, and H. P. W. Jayasuriya. 2005. Experimental validation of distinct element simulation for dynamic wheel-soil interaction. Presented at 2005 ASABE Annual International Meeting, Tampa, FL. Paper No: 053120.
94. Khot, L. R., L. Tang*, S. B. Blackmore, and M. Nørreremark. 2005. Posture estimation for autonomous weeding robot's navigation in nursery tree plantations. Presented at 2005 ASABE Annual International Meeting, Tampa, FL. Paper No: 053092.
95. Khot*, L. R., H. P. W. Jayasuriya, and V. M. Salokhe. 2004. Precision agriculture: problems and strategies to overcome in adoption under Indian conditions. Presentation at 38th Annual Convention and Symposium of Indian Association of Agricultural Engineers (ISAE), January 16-18, 2004, Dapoli, Maharashtra, India.
96. Khot*, L. R., V. M. Salokhe, and H. P. W. Jayasuriya. 2004. Tractor operator's comfort and performance: effect of vibration and noise. Presentation at 38th Annual Convention and Symposium of Indian Association of Agricultural Engineers (ISAE), January 16-18, 2004, Dapoli, Maharashtra, India.

EXTENSION

WORKSHOPS, FIELD DAYS (ORGANIZING)

1. Lead and Organized “**2-day UAS in Agriculture Workshop 2018**”, CPAAS, Prosser, WA; November 15-16, 2018 (Attendees: 16 from WA, ID & OR Agri-business industry, growers, researchers and policy makers (WSDA). Event generated \$5,180 from registrations.
2. Lead and Organized “**WSU Drone Data Analytics Workshop 2018**”, CPAAS, Prosser, WA; May 24, 2018 (Attendees: 32 from WA, ID & OR Agri-business industry, growers and researchers. Event generated \$6,875 from registrations.
3. Lead and Organized “**2-day UAS in Agriculture Workshop 2017**”, CPAAS, Prosser, WA; November 8-9, 2017 (Attendees: 18 from WA, ID & OR Agri-business industry, growers, researchers and media (Good Fruit Grower). Event generated \$6,290 from registrations.
4. Lead and Organized “**CPAAS Agricultural Technology Day 2017**”, CPAAS, Prosser, WA; July 31, 2017 (Attendees: 130 from Agri-business industry, growers, commodity group representatives, OSU-UI-WSU researchers and media (Good Fruit Grower, Capital Press, Local news channels & others). Event offered 3.5 CEUs. CPAAS affiliates had 30 poster presentations and 6 DEMOs. Was able to get food/drink sponsorship (~\$2,000) from Wilson Orchard and Vineyard Supply; Ste. Michelle Wine Estate & and Treetop Inc. WA.
5. (Co-) lead and facilitated organization of “**Precision Farming EXPO 2016**”, *PFE16*, Kennewick, WA; January 7-8, 2016. Participants: ~320.
6. Lead and Organized “**Yamaha RMAX Presentation & Demo for tree fruit growers**”, CPAAS, Prosser, WA; July 22, 2015 (15 invited growers).
7. Lead and Organized “**Yamaha RMAX Presentation & Demo for WSU tree fruit researchers**”, CPAAS, Prosser, WA; (Day 2: 34 [24 WSU researchers, 10 media and agri-business players]).
8. Lead and Organized “**CPAAS Open House & Agricultural Technology Day 2015**”, CPAAS, Prosser, WA; September 17, 2015 (Attendees: 137 from Agri-business industry, growers, commodity group representatives, OSU-UI-WSU researchers and media (Good Fruit Grower, Capital Press, Local news channels & others). Event offered 2.5 CEUs. CPAAS affiliates had 21 poster presentations and 8 DEMOs. Was able to get sponsorship of \$2000 from Wilbur-Ellis Co. for lunch & Juice (\$200) from Treetop Inc., WA.

INVITED TALKS/ SHORT COURSES/WEBINARS/PODCASTS (WITHIN UNITED STATES)

9. (Invited) Research flask talk on “Solid set canopy delivery system”, 2019 Cherry Field Day, Prosser, WA. June 10, 2019. Time: 7 min, Participants: ~50.
10. (Invited/sponsored) Presentation on “Advanced technologies to measure and manage stressors in perennial specialty crops”, College of Mechanical and Electronic Engineering, Northwest A&F University, Shaanxi, China. May 21, 2019. Time: 60 min, Participants: ~100.
11. (Invited) Presentation talk on “Drones, Data and Decisions in Grapevine Production Management”, H2O and S02! Irrigation systems and winemaking chemistry, A two day combon event in partnership by Washington Winegrowers and Idaho Wine Commission, Benton City, WA. May 8-9, 2019. Time: 30 min, Participants: ~50+.
12. Podcast “A Partnership: UAVs and Wheat Breeding with Arron Carter and Lav Khot”. The WSU Wheat Beat Podcast, <http://smallgrains.wsu.edu/wsu-wheat-beat-episode-52/>

13. (Invited) Khot, L. R. 2019. General session talk on “Transitioning to smart agriculture: technology landscape”, *WSU Plant Science Symposium, Pullman, WA*. March 22, 2019. Time: 45 min, Participants: ~150+.
14. (Invited/sponsored) Khot, L. R. 2019. Presentation on “Drones, Data and Decisions in Agriculture”, *22nd Othello Sandhill Crane Festival, Othello, WA; March 22, 2019*. Time: 60 mins, Participants: ~40.
15. (Invited) General session talk on “What data is most useful using drones”, *Northwest Hay Expo, Kennewick, WA*. January 16, 2019. Time: 30 min, Participants: ~55+.
16. (Invited) General session talk on “Remote sensing technology landscape to improve plant health”, *43rd Annual Hermiston Farm Fair, Seminars & Tradeshow, Hermiston, OR*. November 28-29, 2018. Time: 30 min, Participants: ~65+.
17. (Invited/Sponsored) Keynote Talk on “Drone-data-decisions & Washington agriculture”, *Focus on Farming Conference, Evergreen State Fairgrounds, Monroe, WA*. November 8, 2018. Time: 45 mins. Participants: ~150.
18. (Invited) Talk on “UASs for tree fruits crop loss management”, *Unmanned Aerial Application Systems Workshop, Aerial Application Technology Research, ARS College Station, Texas*. November 7-9, 2018. Time: 10 mins. Participants: ~35.
19. (Invited) Talk on “Drone-data-decisions & Washington agriculture”, *AUVSI Cascade Chapter Symposium, Intel RA Campus, Hillsboro, OR*. September 26-27, 2018. Time: 45 mins. Participants: ~110.
20. (Field day) Talk, demonstration and hands-on training on drones. *Next Generation Tree Fruit Network Event: Drones, WSU Sunrise Research Farm, Rock Island, WA*. September 21, 2018. Time: 120 mins. Participants: ~30.
21. (Invited) Talk on “Drones are changing the business world”, *2018 Washington Economic Development Association Summer Conference, Prosser, WA*. August 22-23, 2018. Time: 30 mins. Participants: ~70.
22. (Invited) Panelist “Research & Education”, *Workshop on Exploring Government and Private Sector Applications of UAS/Drones in Washington, Lakewood, WA*. June 28, 2018. Time: 45 mins. Participants: ~150.
23. (Invited/sponsored) Talk on “Emerging sensing technologies for high value crop production and loss management” *U.S. Highbush Blueberry Council’s Blueberry Technical Symposium, Salt Lake City, UT*. Time: 15 mins & panel discussion, Participants: ~130.
24. Short course on “Fun with agricultural drones”. 2018. *WSU CAHNRS “Spark” program, Prosser, WA*. February 21, 2018. Time: 75 min, Participants: ~30 (Participants were students from Grandview, Prosser & Mabton High School with majority of underrepresented population, 1st generation student having low socio-economic status).
25. (Invited) Short course on "Drone, data and agricultural production management decisions". *2018 Columbia Basin Crop Consultants Associations meeting, Moses Lake, WA*. January 17-18, 2018. Time: 30 min, Participants: ~60.
26. (Invited/sponsored) Presentation on “Precision Agriculture of Specialty Crops”, *College of Mechanical and Electronic Engineering, Northwest A&F University, Shaanxi, China*. October 23, 2017. Time: 60 min, Participants: ~70.
27. (Invited/sponsored) Presentation on “Application of Electronics and Computer Technology in Precision Agriculture”, *College of Information Science and Technology, Agricultural University of Hebei, Baoding, China*. October 26, 2017. Time: 60 min, Participants: ~40.
28. (Invited/sponsored) Demo/Presentation on “Advances in Proximal and Remote Sensing Relevant to Precision Agriculture”, *SciTech Northwest 2017, Seattle, WA*. October 11, 2017. Time: 180 min, Participants: ~150.

29. (Invited/sponsored) Presentation on “Precision Agriculture and Future of Solid Set Canopy Delivery Systems”, *Future Farm Expo, Pendleton, OR*. August 15-17, 2017. Time: 60 min, Participants: ~200.
30. (Invited) Panel speaker “Remote Sensing Applications for Premium Wine Grapes”, *Future Farm Expo, Pendleton, OR*. August 15-17, 2017. Time: 60 min, Participants: ~300.
31. (Invited/sponsored) Plenary talk on “State-of-the-Art on Sensing Technologies for Plant Disease Detection”, *American Phytopathology Society Annual Meeting, San Antonio, TX*. August 7, 2017 Time: 30 min, Participants: ~800-1000 (registered 1350).
32. Presentation & Demo of “State-of-art on UAS in Agriculture”, CPAAS Agricultural Technology Day 2017, Prosser, WA; *July 31, 2017*. Time: 35 mins, Participants: 130.
33. Demo/Poster presentation of “Solid set canopy deliver system: An efficient way to deliver agrochemicals in orchards and vineyards”, CPAAS Agricultural Technology Day 2017, Prosser, WA; *July 31, 2017*. Time: 35 mins, Participants: 130.
34. (Invited) Presentation & Demo of “Drone imagery and demonstration”, “*Everything Soil*” WSU Wilke Research and Extension Farm Field Day, Ritzville, WA; *June 28, 2017*. Time: 35 min, Participants: 70.
35. (Invited/sponsored) Sankaran, S.* and L.R. Khot, 2017. Presentation on “Drones, Data and Decisions in Agriculture”, *20th Othello Sandhill Crane Festival, Othello, WA; March 25, 2017*. Time: 60 mins, Participants: 15-20.
36. (Invited) Presentation on “Role of Emerging Technologies in ‘Decision & Precision’ Agriculture”, AgroFresh Crunch Academy 2017, Wenatchee, WA. March 7-8, 2017. Time: 30 min. Participants: ~150.
37. (Invited) Presentation on “Drones, Data Collection & Precision Agriculture”, *Eastern Washington Ag Expo 2017, Pasco, WA, January 4-5, 2017*. Time: 45 min, Participants: ~45.
38. (Invited) Fast Pitches: Vineyards, Forests, Insects- on “Domain of small & mid-sized UAS in WA agriculture”, *Xconomy Intersect: Innovating Where Disciplines Collide, Seattle, WA*. December 8, 2016. Time: 10 min, Participants ~100.
39. (Invited) Presentation on “Past, present, and future of solid set canopy delivery systems”, *112th Annual Meeting & NW Hort Expo, Washington State Tree Fruit Association, Wenatchee Convention Center, WA*. December 6, 2016. Time: 45 min, Participants ~300.
40. (Invited) Workshop presentation on “Utilization of drones in potato production management”, *43rd Annual Hermiston Farm Fair, Seminars & Tradeshow, Hermiston, OR*. November 30, 2016. Time: 30 min, Participants: ~255+.
41. (Invited/sponsored) Panelist “Produce Pilots: Drones in the Field and Orchard”, *Drone World Expo, San Jose, CA*. November 15-16, 2016. Time: 60 min, Participants: ~200.
42. (Invited) Webinar (Khot, L. R. and P. Jacoby) on “Deep sub-surface micro-irrigation (SSMI) and the role of emerging sensing tools in growing wine grapes with less water”, *October 2016 Webinar by Decagon Devices, Inc., Pullman, WA*. October 27, 2016. Time: 60 min, Registrations: ~175. Webinar link: <http://us2.campaign-archive1.com/?u=874b1784bd142518756e8b07a&id=b63780c805&e=26bac1312d>
43. (Invited) Panelist on “small UAS in Agriculture and STEM education”, *2016 UAS Agricultural and Academic Conference, Sunnyside, WA*. September 15, 2016. Time: 60 min, Participants: ~65.
44. Lead & organized “Central Washington Field Tour”, *5th IFAC Conference on Sensing, Control and Automation Technologies for Agriculture- AGRICONTROL 2016, Seattle, WA*; August 17, 2016. Time: 1 day, Participants: 26.
45. (Invited) Presentation & DEMO on “Aerial and ground sensing in agriculture production”, *2016 Washington Viticulture Field day, Kiona Vineyards and Winery, Benton City, WA*; August 12, 2016. Time: 25 min, Participants: 80.

46. (Invited) Tutorial on “Emerging sUAS technology for precision agricultural applications”, *2016 IEEE International Conference on Unmanned Aircraft Systems, Arlington, VA*; June 7, 2016. Time: 45 min, Participants: 14.
47. Demo and Presentation on “In-field sensing and decision support system to prevent cherry fruit cracking due to rainwater” *WSU Cherry Field Day, Prosser, WA*; June 1, 2016. Time: 20 min, Participants: ~66.
48. (Invited/sponsored) Workshop on “UAVs: Understanding and applying drone technology”, *2016 Tree School East, Baker City, OR*; April 23, 2016. Time: 70 min, Participants: 15.
49. (Invited/sponsored) Presentation on “Domain of small and mid-sized UAS in Agriculture”, *19th Othello Sandhill Crane Festival, Othello, WA*; March 19, 2016. Time: 60 mins, Participants: 16.
50. (Invited/ sponsored) Presentation on “Unmanned aerial systems in agriculture”, *Skagit summit, Mount Vernon, WA*; March 3, 2016. Time: 45 min, Participants: 15.
51. (Invited/ sponsored) Presentation on “Precision agriculture and ag Automation”, *Skagit summit, Mount Vernon, WA*; March 3, 2016. Time: 45 min, Participants: 15. (Co-presentation with Dr. Qin Zhang).
52. (Invited/ sponsored) Workshop presentation on “UAS applications in cherries”, *73rd Annual Northwest Cherry Institute, Yakima, WA*; January 15, 2016. Time: 25 min, Participants: 55+.
53. Panel Lead and Presentation on “Proximal and remote sensing technologies”, *Precision Farming EXPO 2016, Kennewick, WA*; January 8, 2016. Time: 60 min, Participants: 96+.
54. (Invited) Seminar on “UAS and precision ag”, *Eastern Washington Ag Expo 2016, Pasco, WA*; January 5-6, 2016. Time: 45 min, Participants: ~40.
55. Sankaran, S.*, and L.R. Khot. 2016. Role of sensor technologies in precision agriculture and high-throughput phenomics. 2nd International Workshop on the Role of Robotics in Precision Agriculture, Lahore, Pakistan, 13 October 2016. [International Invited Webinar], Participants: 60.
56. (Invited) *eXtension webinar* on “Precision Agriculture: Beyond the domain of small UAS”. 2015/16 eXtension Unmanned Aircraft Systems in Agriculture Learning Network Webinar Series. November 18, 2015. Time: 30 min, Participants: 23. Webinar link: <https://connect.extension.iastate.edu/p93j46o37ke/?launcher=false&fcsContent=true&pbMod e=normal>
57. (Invited) Workshop/class on “Drones & imagery”. *Crop Production Services- 5th Annual Ag School, Kennewick, WA*; December 3, 2015. Time: 60 min (x 2 classes), Participants: Class-1: 90; Class-2:50.
58. (Invited/sponsored) Workshop presentation on “Role of small and mid-sized unmanned aerial systems in potato production management”. *42nd Annual Hermiston Farm Fair, Seminars & Tradeshow, Hermiston, OR*. December 2, 2015. Time: 40 mins, Participants: 165+.
59. (Invited) Workshop presentation on “Precision drones”. *Washington Mint Convention & Washington Mint Growers 2015 Winter Conference, Kennewick, WA*. December 1, 2015. Time: 40 min, Participants: 55.
60. (Invited) Workshop presentation on “Applications of UAV in field, row and tree-fruit crop production in WA State”. *UF-CREC Workshop on UAS Applications in Agriculture, Lake Alfred, FL*. March 20, 2015. Time: 20 min, Participants: 60.
61. (Invited/sponsored) Panelist “Data Panel”. *Precision Farming Expo, Salem, OR*. March 17-18, 2015. Time: 45 min, Participants: 100.
62. (Invited) Presentation on “Unmanned aerial systems in agriculture”. *WSU ANR meeting, Spokane, WA*. February 11-12, 2015. Time: 60 min, Participants: ~30.
63. (Invited) Short course on "UAV's and rapid sensing technologies for agriculture". 2015 *Columbia Basin Crop Consultants Associations meeting, Moses Lake, WA*. January 22-23,

2015. Time: 40 min, Participants: 70, (one-on-one interactions with consultants: 4, Time: 30 min)
64. (Invited/sponsored) Presentation on “Scope of UAS technology in WA Agriculture”. *Workshop on The Technological Landscape for Application of Unmanned Aerial Vehicles in Specialty Crops, Georgia Institute of Technology, Atlanta, GA.* November 11, 2014. Time: 15 min, Participants: ~40.
65. (Invited/sponsored) Presentation on “Applied sensor technologies in precision agriculture”. *Oregon Precision Farming Expo (OPFE), McMinnville, OR.* April 2-3, 2014. Time: 60 min, Participants: 150.

OUTREACH

INVITED TALKS/PRESENTATIONS: INTERNATIONAL

66. (Invited/sponsored) **General session** talk on “Transitioning from Precision to Decision Agriculture: Technology Landscape”, *AgroBIT Brazil, Londrina, Brazil.* November 20-21, 2018. Time: 50 mins. Participants: ~1050.
67. (Invited/sponsored) **General session** talk on “Precision agriculture: The role of emerging technologies in high-quality crop production”, *XIV International Congress of Promotion to Fruit and Vegetables Consumption, Tuxtla Gutiérrez, Chiapas, Mexico.* October 9-10, 2018. Time: 30 mins. Participants: ~970.
68. (Invited/sponsored) **General session** talk on “Technological advances: precision and decision agricultural technologies”, *IEEE-Geoscience and Remote Sensing International Society organized International Forum on Remote Sensing in the Era of Machine Learning: Applications and Opportunities, Remote Sensing and GIS Research Center, SQU, Oman.* October 2, 2018. Time: 25 mins. Participants: ~35.
69. (Invited/sponsored) **Talk** on “Drone-Data-Decisions & Precision Agriculture”, *Department of Soils, Water and Agricultural Engineering, College of Agricultural and Marine Sciences, Sultan Qaboos University, Oman.* October 3, 2018. Time: 60 mins. Participants: ~25.
70. (Invited/sponsored) **Keynote** talk “Transitioning from Precision to Decision Horticulture: Technology Landscape”, *2nd International symposium on Mechanization, Precision Horticulture, and Robotics, XXX. International Horticultural Congress, Istanbul, Turkey.* August 12-16, 2018. Time: 45 mins, Participants: ~50.
71. (Invited/sponsored) **General session** talk “Role of UAS in Horticultural Production Management” *Workshop on UAVs in horticulture, 2nd International symposium on Mechanization, Precision Horticulture, and Robotics, XXX. International Horticultural Congress, Istanbul, Turkey.* August 12-16, 2018. Time: 25 mins, Participants: ~40.
72. (Invited/sponsored) **Talk** on “WSU Precision Agriculture Research and Extension Program Overview”, *Inception Workshop, Center for Advanced Agricultural Science and Technology for Climate Smart Agriculture and Water Management, MPKV, Rahuri, India.* July 15, 2018. Time: 15 mins, Participants: ~45.
73. (Invited/sponsored) **Talk** on “Emerging sensing and crop input management technologies for climate smart agriculture,” at International seminar “Advances and Challenges for Technology Use in Climate Smart Agriculture”, *Facultad de Agronomía e Ingeniería Forestal (FAIF), Pontificia Universidad Católica de Chile, Santiago, Chile.* March 15, 2018. Time: 45 mins, Participants: ~120.
74. (Invited/sponsored) **Seminar** on ‘Precision and decision agriculture technologies’, *Doctoral seminar, Facultad de Agronomía e Ingeniería Forestal (FAIF), Pontificia Universidad Católica de Chile Santiago, Chile.* March 14, 2018. Time: 30 mins, Participants: ~10.

75. (Invited/sponsored) **Talk** on “Role of sensing technologies in apple bitter pit management”, *1st International Apple Symposium, Shaanxi, China*. October 10-16, 2016. Time: 25 min, Participants: ~80.
76. (Invited/sponsored) **General session** talk on “Role of low altitude remote sensing tools in growing wine grapes with less water”, *3rd International Grape Symposium, Hermosillo, Sonora, México*. January 26-27, 2017. Time: 60 min, Participants: ~400.
77. (Invited/sponsored) Presentation on “Advanced technologies for ‘decision and precision’ agriculture”, *College of Mechanical and Electronic Engineering, Northwest A&F University, Shaanxi, China*. October 15, 2016. Time: 120 min, Participants: ~35.

OUTREACH PRESENTATIONS (WITHIN WASHINGTON & PNW)

* Presenter

78. Sinha*, R. and Lav R. Khot. 2019. Demonstration of ‘Advances in solid set canopy delivery systems for chemical applications in grapevines’. US EPA Pesticide Inspector Residential Training (PIRT) Field Tour, Prosser, WA. May 16, 2019, Time: 30 min, Participants: ~50+.
79. Sinha*, R. and Lav R. Khot. 2019. (Presentation and demonstration) Precision agriculture technologies and WA state. Yakima Valley College Agriculture Club Members CPAAS visit. May 10, 2019. Time: 40 min. Participants: ~15.
80. McCoy*, M., G. Hoheisel, L. R. Khot and M. M. Moyer. 2019. Optimizing airblast sprayers in vineyard canopies using different nozzles and air assistance. 2019 Washington Winegrowers Association Convention and Trade Show, Kennewick, WA. February 12-14, 2019 (Poster). [Participants: ~30] (*Awarded 2nd place in Poster Presentation*).
81. Sinha*, R. R. Ranjan, L. R. Khot, G.-A. Hoheisel, and M. J. Grieshop. 2019. Solid set canopy delivery system: A novel way to deliver agrochemicals in WA vineyards. 2019 Washington Winegrowers Association Convention and Trade Show, Kennewick, WA. February 12-14, 2019). Time: 20 min. Participants: ~50.
82. Bahlol, H.Y., R. Sinha*, L.R. Khot, G.-A. Hoheisel and R. Ehsani. 2019. Efficacy evaluation of horticultural oil based thermotherapy for pear psylla management. BIOAg Symposium, Center for Sustaining Agriculture and Natural Resources, Washington State University, Pullman, WA. February 7, 2018. [Participants: 40] (*Received ‘Best Graduate Poster Award’*).
83. Khot*, L. R., G.A. Hoheisel and H. Thistle. 2019. Continuing Report on: Data to model apple airblast spraying drift exposure levels. Washington Tree Fruit Research Commission Apple Crop Protection Research Review, Wenatchee, WA. January 24, 2019. Time: 14 min (7 min x2), Participants: ~50.
84. Bahlol*, H.Y., R. Sinha, L. R. Khot, G.-A. Hoheisel and R. Ehsani. 2018. Horticultural oil based thermotherapy for Pear psylla management. Research News Flash, *114th Annual Meeting & NW Hort Expo, Yakima, WA*. December 3, 4 & 5, 2018. Time: 5 min. Participants: ~50.
85. Sinha*, R., L.R. Khot, G. Hoheisel and M.J. Grieshop. 2018. A scaled-up solid set canopy delivery system for spray application in a high-density apple orchard. Research News Flash, *114th Annual Meeting & NW Hort Expo, Yakima, WA*. December 3, 4 & 5, 2018. Time: 5 min. Participants: ~50.
86. McCoy*, M., G. Hoheisel, L. Khot, and M. Moyer. 2018. Optimizing airblast sprayers in vineyard canopies using different nozzles and air assistance. Washington State Grape Society Annual Meeting. Grandview, WA, USA. November 15, 2018 (Poster). [Participants: 20-30]
87. Khot, L. R. 2018. Drones in Agricultural Crop Assurance and Insurance Programs. *National Crop Insurance Group, Prosser, WA*. September 13, 2018. Time: 30 min. Participants: 15.
88. Khot, L. R. 2018. Show-n-tell of Precision Agriculture Technologies for WA Agriculture. Horticulture. *Crop and Soil 2018 State-wide Tour (Hort503/CropS512/SoilS502), Prosser, WA*. May 10, 2018. Time: 45 min. Participants: 44.

89. Khot, L. R. 2018. Precision Agriculture Technologies for WA Agriculture. Spring 2018 *University and Industry Consortium Tour, Prosser, WA*. April 24, 2018. Time: 15 min. Participants: ~55.
90. Sinha*, R. and L. R. Khot. 2018. Unmanned Aerial Systems in Precision Agriculture. *2nd Annual Prosser Science Expo*, a community outreach program, Prosser, WA. April 21, 2018. Time: 30 mins. Participants: ~42.
91. Sinha*, R., and L.R. Khot. 2018. Drones in Agriculture. *Teach, Tour and Taste: community outreach program, Yakima Valley College, Grandview, WA*. March 2, 2018. Time: 120 min. Participants: 60.
92. Sinha*, R., and L.R. Khot. 2018. Solid set canopy delivery system: An efficient way to deliver agrochemicals in WA vineyards. *Teach, Tour and Taste: community outreach program, Yakima Valley College, Grandview, WA*. March 2, 2018. Time: 120 min. Participants: 60.
93. Sinha*, R., H.Y. Bahlol* and L.R. Khot. 2018. Demonstration and show-n-tell on role of unmanned aerial system in agriculture. Ag Day at the REACH Museum 2018, Kennewick, WA. February 24, 2018. Time: 180 min, Participants: 180.
94. Khot*, L. R., G.A. Hoheisel and H. Thistle. 2018. Data to model apple airblast spraying drift exposure levels. Washington Tree Fruit Research Commission Apple Crop Protection Research Review, Pasco, WA. January 25, 2018. Time: 15 min, Participants: 50.
95. Sinha*, R., L.R. Khot, G.A. Hoheisel, and M.J. Grieshop. 2018. Solid set canopy delivery system: An efficient way to deliver agrochemicals in WA vineyards. 2018 Washington Winegrowers Association Convention and Trade Show, Kennewick, WA. February 6-8, 2018 (Poster). Participants: 20-30.
96. Gao*, Z. L. R. Khot, N. A. Rayapati and Q. Zhang. 2018. Early detection of grapevine Leafroll disease by hyperspectral imaging. 2018 Washington Winegrowers Association Convention and Trade Show, Kennewick, WA. February 6-8, 2018 (Poster). Participants: 20-30.
97. Bahlol, H.Y., M. McCoy, G.-A. Hoheisel and L.R. Khot. Comparison of different spray sample collectors for the evaluation of pesticide spray assessment in grapevine. 2018 Washington Winegrowers Association Convention and Trade Show, Kennewick, WA. February 6-8, 2018 (Poster). [Participants: 20-30]
98. Zúñiga*, C.E., P. Jacoby, L.R. Khot and S. Sankaran. 2018. Proximal and remote sensing methods to evaluate vine water status in subsurface and deficit irrigated Cabernet Sauvignon grapevines. 2018 Washington Winegrowers Association Convention and Trade Show, Kennewick, WA. February 6-8, 2018 (Poster). [Participants: 20-30] (*Awarded 3rd place in Poster Presentation*).
99. McCoy*, M., G. Hoheisel, L. R. Khot and M. M. Moyer. 2018. Assessing sprayer technology in Washington vineyards. 2018 Washington Winegrowers Association Convention and Trade Show, Kennewick, WA. February 6-8, 2018 (Poster). [Participants: 20-30] (*Awarded 1st place in Poster Presentation*).
100. Sinha, R., L.R. Khot and G.-A. Hoheisel*. 2017. Updates on Solid Set Canopy Delivery Systems (SSCDS) for apple orchards. Presented at Washington State Tree Fruit Association 2017 “Research News Flash”, Kennewick, WA. December 5, 2017. Time: 5 min, Participants: 60.
101. Peters, R. T. and L. R. Khot. 2017. Large scale evaluation of a LEPA/LESA system compared to mesa on spearmint and peppermint. Washington Mint Commission Research Review, Prosser, WA. November 4, 2017. Time: 15 min, Participants: 20.
102. Bahlol*, H.Y., G.-A. Hoheisel and L.R. Khot. 2017. Development and evaluation of an automated vertical spray patternator for calibration of vineyard air-assist sprayers, CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.

103. Bahlol*, H.Y., G.-A. Hoheisel and L.R. Khot. 2017. Thermoherapy with HMO for pear psylla management. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
104. Khan*, M. A., L. R. Khot*, R. T. Peters, C. O. Stöckle, M. Chakraborty and R. Sinha. 2017. Low altitude multispectral sensing to evaluate retrofitted center pivot irrigation systems and water stress gradients in irrigated crops. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
105. Chakraborty*, M. and L. R. Khot. 2017. 3D LIDAR based rapid methods of grapevine canopy characterization. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
106. Zuniga*, C. L. R. Khot, P. Jacoby and S. Sankaran. 2017. Remote sensing-based water-use efficiency evaluation in sub-surface irrigated grape vines. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
107. Osroosh, Y. L. R. Khot and R. T. Peters. 2017. Smart thermal imagery-based crop monitoring system for water and crop loss management. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
108. Gao*, Z., N. A. Rayapati, Q. Zhang and L. R. Khot*. 2017. Early detection of grapevine Leafroll disease by hyperspectral imaging. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
109. Zhao*, Y., Z. Gao, G.-A. Hoheisel, L. W. DeVetter, Q. Zhang, Y. He and L. R. Khot. 2017. Assessing blueberry buds damage during cold hardiness using hyperspectral imaging. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130
110. Sinha*, R., L.R. Khot, and G.-A. Hoheisel. 2017. Solid set canopy delivery system: An efficient way to deliver agrochemicals in orchards and vineyards. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
111. Sinha*, R., L.R. Khot and B. K. Schroeder. 2017. FAIMS based volatile fingerprinting for real-time postharvest infections detection in stored potatoes and onions. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
112. Sinha*, R., Z. Gao, A.P. Rathnayake, L.R. Khot and R.A. Naidu. 2017. Visible–near infrared spectroscopy-based Grapevine Leafroll–associated virus–3 detection from undetached leaves under field condition. CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
113. Khot, L.R. 2017. Presentation on “Research needs in the domain of precision agriculture” Matchmaking for Interdisciplinary Research Session I, WSU Office of Research, Pullman, WA. October 10, 2017.
114. (Invited) Khot L. R. 2017. Presentation on “Advanced technologies for precision to decisions in agriculture”. WSU Horticulture (Hort509/510), Feb 16, 2017. Time: 60 min, Participants: ~30.
115. McCoy*, M., G. Hoheisel, **L. R. Khot** and M. M. Moyer. 2017. Assessing sprayer technology in Washington vineyards. Washington State Grape Society Annual Meeting, Grandview, WA, USA. February 7, 2017 (*Awarded 1st place in Poster Presentation*).
116. Sankaran, S.*, Jarolmasjed, S., Zuniga, C.E., and Khot, L.R. 2017. Sensing in specialty crops. 2017 CPAAS Agricultural Technology Day, July 31, 2017 (Poster Presentation), Participants: 130.
117. (Invited) Khot L. R. 2016. Presentation on “Advanced technologies for precision to decisions in agriculture”. WSU Mount Vernon Northwestern Washington Research and Extension Center, May 26, 2016. Time: 60 min, Participants: ~50.
118. Khot*, L. R. 2016. Presentation and demonstrations of “Precision agriculture technologies” to Crop & Soil Science and Horticulture 2016 Statewide Graduate Tour CPAAS, Prosser, WA. May 20, 2016. Time: 60 min, Participants: 29.

119. Khot*, L. R. 2016. Presentation and demonstrations of “Precision agriculture technologies” to University of Faisalabad faculty group visiting WSU as part of a USAID funded Center for Advanced Studies program, CPAAS, Prosser, WA. May 18, 2016. Time: 60 min, Participants: 9.
120. Khot*, L. R., Q. Zhang, G. Hoogenboom, M. Salazar-Gutiérrez, L. Kalcsits and J. Zhou. 2016. Novel wireless sensor networks for real-time decisions in orchard management. Washington Tree Fruit Research Commission Technology Research Review, Ellensburg, WA. February 4, 2016. Time: 15 min, Participants: 25.
121. Kafle*, G. K., L. R. Khot, J. Zhou, and H.Y. Bahlol. 2016. Towards precision spray applications to prevent rain-induced sweet cherry cracking: understanding calcium washout due to rain and fruit cracking susceptibility. 2016 Precision Farming Expo, Kennewick WA. January 7-8, 2016. (Poster Presentation).
122. Zhou*, J., L. Khot, T. Peters, M. D. Whiting, Q. Zhang, and D. Granatstein. 2016. Assessment on efficacy of an orchard sprayer and an unmanned helicopter in rainwater removal from cherry canopies based on an in-field sensing system. 2016 Precision Farming Expo, Kennewick, WA. January 7- 8, 2016. (Poster Presentation).
123. Zhou*, J., L. Khot, M. J. Pavek, and S. Sankaran. 2016. Remote sensing based crop loss assessment: an application in the evaluation of potato crop damage due to hailstorms. 2016 Precision Farming Expo, Kennewick, WA. January 7- 8, 2016. (Poster Presentation).
124. Zhou*, J., L. Khot, S. Sankaran, and R. Boydston. 2016. Estimation of yield and water use efficiency in dry beans using airborne multispectral and thermal imagery. 2016 Precision Farming Expo, Kennewick, WA. January 7- 8, 2016. (Poster Presentation).
125. Khot*, L. R., G.-A. Hoheisel, and D. B. Walsh. 2015. Horticultural mineral oil based spray efficacy towards SWD control in blueberry. 2015 Washington Blueberry Research Review, Mount Vernon, WA. November 3, 2015. Time: 10 min, Participants: 20.
126. Jacoby, P.*, T. Peters, S. Sankaran, L. Khot, J. Thompson, and Z. York. 2015. Deep subsurface irrigation to advance precision vineyard management. CPAAS Agricultural Technology Day 2015 (Participants: 137) September 17, 2015.
127. York, Z.*, P. Jacoby, T. Peters, S. Sankaran, L. Khot, and J. Thompson. 2015. Deep subsurface irrigation in Concord vineyards. CPAAS Agricultural Technology Day 2015 (Participants: 137) September 17, 2015.
128. Espinoza*, C. Z., S. Jarolmasjed, P. Jacoby, L. R. Khot, and S. Sankaran. 2015. Evaluating water-use efficiency using advanced sensing techniques. CPAAS Agricultural Technology Day 2015 (Participants: 137) September 17, 2015.
129. Sankaran* S., and L. R. Khot. 2015. High-throughput sensing technologies for evaluating phenotypes in crop improvement programs. CPAAS Agricultural Technology Day 2015 (Participants: 137) September 17, 2015.
130. Khot*, L. R., J. Zhou, and S. Sankaran. 2015. Unmanned aerial systems in agricultural production management. CPAAS Agricultural Technology Day 2015 (Participants: 137) September 17, 2015.
131. Zhou*, J., L. Khot, H. Bahlol, Gopi Kafle, M. Whiting, T. Peters, Q. Zhang, D. Granatstein. 2015. In-field sensing and decision support system to prevent cherry fruit cracking due to rainwater. CPAAS Agricultural Technology Day 2015 (Participants: 137) September 17, 2015.
132. Hoheisel*, G.-A., and L. R. Khot. 2015. Application technology & WA agriculture. CPAAS Agricultural Technology Day 2015 (Participants: 137) September 17, 2015.
133. Karkee*, M., L. Khot*, and Q. Zhang, 2015. Precision, automation and robotics in Agriculture. Nippon Telegraph and Telephone West Corporation Delegation Meeting (Participants: 4 + 2) April 30, 2015. Time: 60 min

134. Khot, L. 2015. Domain of precision agriculture applications, Tour of 'Element 8 Angles', BySE WSU, Pullman, WA; May 18, 2015. Time: 45 min, Participants: ~10.
 135. Karkee*, M., L. R. Khot*, and S. Sankaran. 2014. The state of drones for agriculture. *Washington State Grape Society (Annual Meeting and Trade show)*, Grandview, WA. November 13, 2014. Time: 30 min, Participants: ~30.
 136. Sankaran*, S., L. R. Khot, M. Pavek, and R. Knowles. 2014. Developing emerging technologies towards improving agronomic practices in field conditions. Northwest Potato Research Consortium Meeting, Moscow, ID. October 31, 2014. Time: 15 min, Participants: 30.
 137. Khot, L. R., S. Sankaran*, D. Johnson, M. Pavek, R. Knowles, and S. Sathuvalli. 2014. Decision support system for detection and monitoring of potato diseases onset and progression. Northwest Potato Research Consortium Meeting, Moscow, ID. October 31, 2014. Time: 15 min, Participants: 30.
 138. (Invited) Sankaran*, S. and L. R. Khot*. 2014. Unmanned aerial vehicle research program highlight. Agribusiness Council, Greater Spokane Cooperated, WSU Tour, Pullman, WA. October 28, 2014. Time: 30 min, Participants: 25-30.
 139. Sankaran*, S., L. R. Khot, and A. H. Carter, 2014. Evaluating plant responses using aerial sensing techniques in wheat. Washington Grain Commission Research Review Meeting, Pullman, WA. October 22, 2014. Time: 15 min, Participants: 20.
 140. (Invited) Sankaran*, S., and L. R. Khot*. 2014. WSU unmanned aerial vehicle research in agriculture. WSU Congressional & Legislative Staff Fact Finding Tour, August 14, 2014. Participants: 30-50.
 141. Sankaran*, S., and L. R. Khot*. 2014. Unmanned aerial system: rapid sensing technologies in potato production and management participation, WSU Potato Field Day, Othello, WA. June 26, 2014. Participants: 50-70.
 142. (Invited) Khot, L.R.*, and S. Sankaran*. 2014. Unmanned aerial system in agriculture. Inland Empire Wilbur Ellis Field Day, Colfax, WA. June 24, 2014. Time: 30 min, Participants: 35-40.
 143. (Invited) Khot, L. R.*, and S. Sankaran*. 2014. Unmanned aerial system in agriculture. WSU *Weed Science Field Day*, R.J. Cook Agronomy Farm, Pullman, WA. June 18, 2014. Participants: 20-30.
 144. Sankaran*, S., and L. R. Khot*. 2014. Unmanned aerial systems (UAS) for field-based crop phenotyping in wheat. WSU *98th Annual Lind Field Day*, Lind, WA. June 12, 2014. Participants: 20-30.
 145. Mazzola, M*., S. Musacchi, L. R. Khot, and S. Sankaran. 2014. Investigation on a canker disease in pears. PNW Pear Research Committee Research Review Meeting, Yakima, WA. February 18, 2014. Participants: ~35.
 146. Sankaran, S.*., L. R. Khot, and W. Chen. 2014. Early detection of ascochyta blight in chickpeas using optical sensing technologies. USA Dry Peas and Lentil Council, Research Review Meeting, Moscow, ID. February 6-7, 2014. Participants: ~30.
 147. Khot, L.R.*, and S. Sankaran. 2014. Optical sensors for non-symptomatic 'bitter pit' detection in apples. 2014 Apple/Apple Crop Protection Research Review, Yakima, WA. January 29-31, 2014. Participants: 30.
 148. (Invited) Khot*, L. R. 2014. Applied sensor technologies in agriculture production systems and food safety. *Center for Sustainable Agriculture and Natural Resources [CSANR] winter advisory meeting*, Ellensburg, WA. January 13-14, 2014. Time: 40 min, Participants: ~50.
- Khot, L. R. 2013. Outreach seminar at WSU Tree Fruit Research and Extension Center, Wenatchee, WA.

149. Demonstrated variable rate sprayer developed as part of USDA-SCRI project for citrus during ‘International Symposium on Mechanical Harvesting & Handling Systems of Fruits and Nuts’ field day held on 4 April, 2012 at Lykes Bros., Ft. Basinger, FL.
150. Poster presentation on ‘Intelligent artificial nose for food safety’ as a part of 61st Annual Agricultural Technology Expo, held at North Dakota State University, Fargo, ND. February 14, 2009.

MEDIA RELEASES/ FEATURES

1. **“Spray researchers aim to catch their drift”**, by Kate Prengaman (photos by TJ Mullinax), Good Fruit Grower, February 15, 2019. <https://www.goodfruit.com/spray-researchers-aim-to-catch-their-drift/>
2. **“Researcher finds alternatives to pesticides”** by Kaye Gill, The Daily Evergreen. February 4, 2019. <https://dailyevergreen.com/47570/news/researcher-finds-alternatives-to-pesticides/>
3. **“Grower, science partnership fuels future of hay”**, Drovers, January 31, 2019. <https://www.drovers.com/article/grower-science-partnership-fuels-future-hay>
4. **“Cutting pesticide spray residue on crops aim of grant, research”** https://news.wsu.edu/2018/12/17/cutting-pesticide-spray-residue-crops-aim-grant-research/?utm_source=WSUNews-eneewsletter&utm_campaign=wsunewsnewsletter&utm_medium=email
5. **“AGROBIT BRASIL: Evento aborda as possibilidades do uso da tecnologia no agronegócio”** <http://paranacooperativo.coop.br/ppc/index.php/sistema-ocepar/comunicacao/2011-12-07-11-06-29/ultimas-noticias/120212-agrobit-brasil-evento-aborda-as-possibilidades-do-uso-da-tecnologia-no-agronegocio>
6. **“Focus on Farming and Focus on Forestry Conference”**, https://www.yakimaherald.com/calendar/focus-on-farming-and-focus-on-forestry-conference/event_231871d6-d18e-11e8-9800-5cb9017bdf0e.html
7. **“Red Delicious robots: It's drone warfare against orchard pests”**, http://www.ifiberone.com/columbia_basin/red-delicious-robots-it-s-drone-warfare-against-orchard-pests/article_7bba7d96-c2a4-11e8-9be5-7b9aab50d330.html
8. **“Are you ready for liftoff?”**, T.J. Mullinax, Good Fruit Grower, (<http://www.goodfruit.com/mullinax-are-you-ready-for-liftoff/>), February 26, 2018.
9. **“Drones in Agriculture Pt 1”** Audio Interview by Bob Larson, AgInfo.net November 30, 2017. Link: <http://www.aginfo.net/index.cfm/event/report/id/Washington-State-Farm-Bureau-Report-38674>
10. **“Drones in Agriculture Pt 2”** Audio Interview by Bob Larson, AgInfo.net December 04, 2017. Link: <http://www.aginfo.net/index.cfm/event/report/id/Washington-State-Farm-Bureau-Report-38693>
11. **“Precision agriculture: growing the future”** <https://cleantech.wsu.edu/>
12. **“Drones, robots highlight WSU tech day”** by Dan Wheat, August 1, 2017. Link: <http://www.capitalpress.com/Washington/20170731/drones-robots-highlight-wsu-tech-day>
13. **“Automated agriculture: Can robots, drones, and AI save us from starvation”** by Will Nicol. Digital Trends Online April 18, 2017. Link: <https://www.digitaltrends.com/cool-tech/automated-agriculture-can-robots-drones-ai-save-us-from-starvation/>
14. **“Drone use in agriculture expected to grow quickly”** by Logan Hawkes. Southwest Farm Press. Mar 31, 2017. Link: <http://www.southwestfarmpress.com/technology/drone-use-agriculture-expected-grow-quickly>
15. **“Washington State Professor Finds Sky-high Opportunities for Drones in Agriculture”** by Erin Anthony. American Farm Bureau News Online, February 2017. Link:

<http://www.fb.org/news/washington-state-professor-finds-sky-high-opportunities-for-drones-in-agric>

16. **“Plant biologists welcome their robot overlords”** by Heidi Ledford. Nature News, January 25, 2017. Link: <http://www.nature.com/news/plant-biologists-welcome-their-robot-overlords-1.21352>
17. Cover story- **“AGTECH: Higher yields, lower costs, better environmental protection”** by Richard S. Davis. Washington Business Magazine, Fall 2016. Link: <https://www.joomag.com/magazine/washington-business-fall-2016-washington-business/0861048001477954666?page=4>
18. **“Ag drone future’s up in the air”** by Ross Courtney. Good Fruit Grower, (<http://www.goodfruit.com/ag-drone-futures-up-in-the-air-video/>) November 9, 2016.
19. **“Drones and wine only mix in research”** by Cody Cottier. In The Summer Evergreen Vol 122, No. 152, July 13, 2016.
20. Featured interview on KOMO NEWS Radio (1000 AM/97.7 FM) by Brian Calvert, July 13, 2016.
21. **“Seattle Week in Review”** by Benjamin Romano. In Xconomy, (<http://www.xconomy.com/seattle/2016/07/08/seattle-week-in-review-tragic-summer-continues/>) July 8, 2016.
22. Featured interview on **‘Cherry Creek Radio’** (KONA AM FM Radio) by Kevin Rounce, July 7, 2016.
23. **“Unmanned aerial system captures Washington vineyard irrigation data”** By: David Eddy, Growing Produce (<http://www.growingproduce.com/fruits/grapes/unmanned-aerial-system-captures-washington-vineyard-irrigation-data/>), July 6, 2016.
24. **“Washington vineyards use drone to capture irrigation data”** by Kendra Hinger and V. Quintero, NBC Right Now, KNDU 25, KNDO23 (www.nbcrighnow.com/story/32377363/washington-vineyards-use-drone-to-capture-irrigation-data), July 6, 2016.
25. **“Drone captures vineyard irrigation data”**, by Scott A. Weybright, (<https://news.wsu.edu/2016/07/05/drone-captures-vineyard-irrigation-data/>), July 5, 2016.
26. **“Going deep when watering grapes”** by Shannon Dininny, Good Fruit Grower, (<http://www.goodfruit.com/going-deep-when-watering-grapes/>), April 12, 2016.
27. **“WSU Office of Economic Development Collaboration Spotlight: Lav Khot”**, by Alyssa Patrick (<https://economicdevelopment.wsu.edu/2016/01/25/collaboration-spotlight-lav-khot/#more-2212>), January 25, 2016.
28. **“WSU and Digital Harvest Corp. test drone helicopter for rainwater removal”** by Jeffrey Dennison, Tri-Cities Area Journal of Business (<http://www.tricitiesbusinessnews.com/2015/09/wsu-and-digital-harvest-corp-test-drone-helicopter-for-rainwater-removal/>), September 14, 2015.
29. **“WSU tests UAV agricultural apps”** by the Shephard News Team, Shephard News-UV online (<https://www.shephardmedia.com/news/uv-online/wsu-tests-new-agricultural-uav/>), August 14, 2015.
30. **“Yamaha UAV finding role in Washington state cherry orchards”** by Luke Geiver, UAS Magazine (<http://uasmagazine.com/articles/1204/yamaha-uav-finding-role-in-washington-state-cherry-orchards>), August 13, 2015.
31. **“Yamaha UAV to be tested for rainwater removal in cherry orchards”** by Unmanned-Aerial team, Unmanned Aerial, (http://unmanned-aerial.com/e107_plugins/content/content.php?content.1414#.Vc0Y403JBZQ), August 12, 2015.
32. **“WSU tests unmanned helicopter to dry cherries”** by Dan Wheat, Capital Press (<http://www.capitalpress.com/20150812/wsu-tests-unmanned-helicopter-to-dry-cherries>), August 12, 2015.

33. “**WSU researches unmanned helicopter to remove rainwater from fruit crops**” by Jeffrey Dennison, WSU News (<https://cahnrs.wsu.edu/news-release/2015/08/11/ws-u-researches-unmanned-helicopter-to-remove-rainwater-from-fruit-crops/>), August 11, 2015.
34. “**Sensor data improves cherry production**” by Steven Garrity, Blog post-Environmental Biophysics Measuring and Modeling the Environment (<http://www.environmentalbiophysics.org/sensor-data-improves-cherry-production/>), June 15, 2015.
35. “**Things that fly in the sky**” by Nic Deshais, Washington State Magazine, Fall 2014, pp.38-43.

EXTRAMURAL FUNDS

(*Lead Principal Investigator)

FEDERAL GRANTS

1. *NSF/USDA-NIFA Cyber Physical Systems* (2019-2022)
CPS: Small: Localized, geospatial sensing of canopy and fruit microclimate for real-time management of sunburn in apple
Team: **L. R. Khot***, R. T. Peters, M. Salazar-Gutierrez
2. *Foundation for Food and Agriculture Research* (2018-2021)
New Innovator in Food and Agriculture Research: Towards production of residue-free healthy fruit crops
Team: **L. R. Khot*** (Mentoring collaborators: G.-A. Hoheisel, M. Moyer, B. Bears, M. Grieshop)
3. *USDA-NIFA/ AFRI competitive Grant Program* (2018-2023)
PMU: Technology for trade: Improving water use and allocation efficiency in agriculture and beyond
Team: J. Yoder, M. P. Brady, C. E. Kruger, J. C. Adam, **L. R. Khot**, M. Liu, C. O. Stockle, R. T. Peters, J. C. Padowski, N. B. Pickering, K. Rajagopalan, G. G. Yorgey
4. *USDA-NIFA Specialty Crop Research Initiative* (2016-2019)
Solid Set Canopy Delivery Systems: an efficient, sustainable and safer spray technology for tree fruit.
Team: M. Grieshop [MSU Lead], **L. R. Khot*** [WSU lead PI], G.-A. Hoheisel et al.
5. *USDA-NIFA Specialty Crop Research Initiative* (2015-2019)
Steam-generated supplementary heat thermotherapy as an immediate treatment for prolonging productivity of HLB-infected citrus trees
Team: R. Ehsani [UF Lead], **L. R. Khot*** [WSU lead PI] et al.
6. *USDA-ARS Research Agreement* (2018-2020)
Investigation of laser-guided variable-rate spray technology in Washington state apple orchards
Team: **L. R. Khot***, G.-A. Hoheisel, Q. Zhang

STATE GRANTS

7. *Washington State Department of Agriculture – Specialty Crop Block Grant* (2018-2021)
Alternative pest management technologies for tree fruit and wine grapes
Team: **L. R. Khot***, G.-A. Hoheisel, M. Moyer

8. *Washington State Department of Agriculture – Specialty Crop Block Grant (2017-2020)*
Novel sensing for potato postharvest quality and loss management in bulk storages
Team: S. Sankaran, **L. R. Khot**, B. Schroeder
9. *Washington State Department of Agriculture – Specialty Crop Block Grant (2015-2018)*
Deep sub-surface micro-irrigation to increase water use efficiency in Washington vineyards
Team: P. Jacoby, **L. R. Khot**, H. Sadeghi, S. Sankaran
10. *Washington State Department of Agriculture – Specialty Crop Block Grant (2014-2017)*
Rapid detection technologies for in-field and post-harvest apple bitter pit management
Team: **L. R. Khot***, S. Sankaran

REGIONAL COMMODITY COMMISSIONS

11. *Washington Tree Fruit Research Commission-Apple (2018-2020)*
Data to model apple airblast spraying drift exposure levels
Team: **L. R. Khot***, G.-A. Hoheisel, H. Thistle
12. *Washington Tree Fruit Research Commission-Apple (2018-2019)*
Database of airblast sprayer metrics for use in mechanistic drift model
Team: **L. R. Khot***, G.-A. Hoheisel, H. Thistle
13. *Washington Blueberry Commission (2017-2019)*
Modeling blueberry cold hardiness in Washington
Team: G.-A. Hoheisel, L. W. DeVetter, **L. R. Khot**, T. Coffey
14. *Washington Tree Fruit Research Commission-Apple (2015-2017)*
Effectiveness of foliar calcium applications in bitter pit management
Team: L. Kalcsits, S. Sankaran, **L. R. Khot**
15. *Oregon Blueberry Commission (2015-2017)*
Assessment of application technologies specific to the Western Pacific Northwest blueberries
Team: V. Walton, G.-A. Hoheisel, **L. R. Khot**
16. *Washington State Grape and Wine Research Program (2014-2018)*
Assessment of application technologies in wine grapes
Team: G.-A. Hoheisel, M. Moyer, **L. R. Khot**
17. *Washington Wheat Foundation (2014-2015)*
Equipment grant to purchase a 2D light detection and ranging (LiDAR) system for rapid field phenotyping of spring and winter wheat varieties
Team: S. Sankaran, **L. R. Khot**, A. Carter, M. Pumphrey
18. *USDA-ARS Northwest Centre for Small Fruit Research (2014-2015)*
Precision sub-surface irrigation to regulate wine grape physiology
Team: P. Jacoby, S. Sankaran, M. Keller, T. Peters, **L. R. Khot**

INTERNAL COMPETITIVE GRANTS

19. *WSU Agricultural Research Center –Emerging Research Issues (2017-2019)*

Adapting satellite-based methods for estimating water use and crop-water stress to high resolution images from small UAS

Team: R. T. Peters, **L. R. Khot**, C. Stockle

20. *WSU Center for Sustainable Ag and Natural Resources BIOAg Program* (2016-2017)

Rapid sensing of dairy manure nutrients for precision applications in agricultural production

Team: P. Ndegwa, **L. R. Khot**, G. Kafle

21. *State of Washington Water Research Center 104B program* (2016-2017)

Low energy precision (/spray) applications: unmanned aerial system based rapid evaluation for crop and site specific system adaptation in the Pacific Northwest

Team: **L. R. Khot***, T. R. Peters, H. Neibling

22. *WSU Agricultural Research Center –Emerging Research Issues* (2014-2016)

In-field sensing and decision support system to prevent cherry fruit cracking due to rainwater

Team: **L. R. Khot***, T. Peters, Q. Zhang, M. Whiting, D. Granatstein

EXTENSION WORKSHOPS/ PRIVATE/INDUSTRY SUPPORT/GIFTS

23. *Continuum Dynamics Inc., New Jersey, U.S.A* (2019)

Data to model mid-sized UAS spraying drift exposure levels

Team: **L. R. Khot***

24. *WSU 2-Day UAS in Agriculture Workshop* (2018)

November 15-16, 2018

25. *WSU Drone Data Analytics Workshop* (2018)

May 24, 2018

26. *WSU 2-Day UAS in Agriculture Workshop* (2017)

November 8-9, 2017

27. *Desert Air Solutions, Mattawa, WA* (Sun Hwang & Steve Kim) (2016)

In-kind UAS equipment donation

28. *Campbell Scientific Inc. IMAGINE Educational grant* (2017)

Measurement instrumentation for education

Team: S. Sankaran, **L. R. Khot**.

29. *Borton Fruits, Yakima, WA* (2015)

In-kind cash to support WSDA-SCBG project ‘Rapid detection technologies for in-field and post-harvest apple bitter pit management’

30. *Yamaha Precision Agriculture Inc. and Digital Harvest Inc.* (2015)

Sponsored demo & presentations of unmanned helicopter technology to WA Stakeholders and WSU Researchers

31. *Wilbur-Ellis Co. (Pacific Northwest Division)* (2015)

Lunch Sponsorship for CPAAS Open house and Ag Tech Day 2015.

32. *Digital Harvest Inc.* (2015)

In-kind equipment support to WSU-ERI project 'In-field sensing and decision support system to prevent cherry fruit cracking due to rainwater'

INTERNATIONAL COLLABORATIONS (* Funds not counted in total addition at header)

33. *India - National Agricultural Higher Education Project (funded by World Bank) (2018-2021)*
Climate smart precision agriculture and water management.
MPKV India Team: S. D. Gorantiwar, M. G. Shinde et al.; WSU Team: **L. R. Khot***, C. Stockle, R. T. Peters, Q. Zhang, D. Brown
34. *Chile- Comisión Nacional de Investigación Científica y Tecnológica (2018-2019)*
The digital agriculture network to strengthen agricultural resilience under climate change.
PUC Chile PI: Dr. F. Meza et al.; WSU Team: C. Stockle, **L. R. Khot**, R. T. Peters

UNIVERSITY INSTRUCTION / MENTORING

GRADUATE STUDENTS/ POSTDOCS/SCHOLARS

MAJOR ADVISOR/CO-ADVISOR

Graduate Students (In-Progress)

Rakesh Ranjan (PhD, WSU Aug/2017- Present)
Abhilash Kumar Chandel^{YY} (PhD, WSU Aug/2017- Present)
Zongmei Gao^{**} (PhD co-advisor, WSU Aug/2016- Present)
Alexa McDaniel (PhD co-advisor, WSU Jan/2019- Present)
Jake Schreder (MS, WSU May/2019-Present)

Graduate Students (Graduated)

Rajeev R. Sinha^{*, Y, †} (PhD, WSU Aug/2015- Spring, 2019; Currently working as Postdoc in my lab)
Haitham Bahlol^Y (PhD, WSU Aug/2014- Spring, 2019; Returned to home country on promotion at Technical Trainer Instructor Institute/ Baghdad–Iraq)
Momtanu Chakraborty^{***} (MS, WSU Aug/2016- Dec/2017; Currently working as 'Technical Support Engineer, North America', Pix4D Inc. San Francisco, CA)
Parish Nalavade (MS, WSU Aug/2015- May/2017; Currently Working in as Assistant Professor, Academic Institute, India)

** Recipient of "Alfred and Genevieve Gallucci Scholarship 2018" and "Arnie and Marta Kegel Endowed Fellowship 2017" as Biological Systems Engineering Outstanding Graduate Student Awards, Washington State University;*

^YRecipient of Best Graduate Poster Award, 2019 BIOAg Symposium.

[†] Recipient of 2019 Turner Designs Student Travel Stipend Program.

^{YY}Recipient of WSI graduate student scholarship 2019.

*** 2018 Travel scholarship- WSU Plant Science Symposium, Diversity in Agriculture: Faces of Plant Science*

****#2nd Place BSysE 512 – Poster Competition, 2017.*

Joint MS/PhD Training

Ms. Yanru Zhao (CSC Joint-PhD training Sept/2016-Oct/2017; Currently working as Instructor at Northwest Agriculture & Forestry University, China)

Mr. Juan José Quirós (Joint-MS training Jan/16-Mar/2016; Currently working as Research Associate, Washington State University)
Mr. Ming Li (CSC Joint-PhD training Sept/2014-Aug/2015; Currently working as Instructor at South Central University for Nationalities, China)
Mr. Abid Sarwar (PhD, WSU Aug/2016- Dec/2016; Currently pursuing PhD, Washington State University)

GRADUATE COMMITTEE MEMBER

PhD (In-progress)

Margaret McCoy (PhD, WSU-Hort., Spring/2015- Present)
Samuel Revolinski (PhD, WSU-CSC, Fall/2017- Present)
Afef Marzougui (PhD, WSU-BSysE, Fall/2018- Present)
Chongyuan Zhang (PhD, WSU-BSysE, Fall/2017- Present)
Behnaz Molaei (PhD, WSU-BSysE, Spring/2019- Present)

PhD (Graduated)

Carlos Zuniga Espinoza (PhD, WSU-BSysE, Fall/2014- Spring/2018)
Seyedehsanaz Jarolmasjed (PhD, WSU-BSysE, Fall/2014- Spring/2018)
Andres Pena Quinones (PhD, WSU-BSysE 2014- Fall/2017)

MS (In-progress)

Katherine Chattin Taylor (MS, Horticulture, Fall/2017-Fall/2019)

MS (Graduated)

Afef Marzougui (MS, WSU-BSysE, Fall/2016- Spring/2018)
Chongyuan Zhang (MS, WSU-BSysE, Fall/2017- Spring/2018)
Kapil Khanal (MS, WSU-BSysE, Fall/2016- Spring/2018)

POSTDOCTORAL RESEARCHER/SCHOLARS

In-Progress

Dr. Anura Rathnayake-Mudiyanselage (Postdoc, Oct/2018-Present)
Mr. Bin Wang (CSC Scholar, Jan/2019- Present)

Former Members

Dr. Jianfeng Zhou (Postdoc, WSU Sept/2014-Sept/2016; Currently an Assistant Professor, University of Missouri)
Dr. Gopi Kafle (Postdoc, WSU Jan/2015-Jan/2016; April/2016-June/2017; Currently a Project Engineer, Clean Methane Systems LLC, OR)
Dr. Yasin Osroosh (Postdoc, WSU Nov/2016-Oct/2017; Currently a Research Engineer, METERS Group Inc., WA)
Dr. Azeem Khan (Postdoc, WSU Feb/2017-Aug/2017; Ecoinformaticist, University of Agriculture Faisalabad, Pakistan)
Mr. Juan José Quirós (Research Associate, Feb/2018-Feb/2019; Research Associate, Washington State University)
Dr. Guobin Shi (CSC Scholar, Sept/2017-Sept/2018; Currently an Associate Professor, Heilongjiang Bayi Agricultural University, China)
Dr. Yanlei Xu (CSC Scholar, Oct/2017-Oct/2018; Currently an Associate Professor, JiLin Agricultural University, China)
Dr. Qiufang Dai (CSC Scholar, Feb/2017-Jan/2018; Currently Lecturer at College of Electronic Engineering, South China Agricultural University, China)
Dr. Anura Rathnayake-Mudiyanselage (Fulbright Adjacent Faculty, Mar/2016-Sept/2016; Current: Working as Postdoc at WSU)

INSTRUCTOR / CO-INSTRUCTOR

- BSysE 552** Spring 2019. BYSE Special Topics: Unmanned Aerial Systems in Agriculture (*1 credit*; Course instructor; Enrolment: 6)
- BSysE 552** Spring 2018. BYSE Special Topics: Unmanned Aerial Systems in Agriculture (*1 credit*; Course instructor; Enrolment: 10; audits: 2)
- BSysE 541** Spring 2018. Instrumentation and Measurement (*3 credit*; Co-Instructor, 2 lecture: 50 min each; 9 lab sessions @ Prosser site, 3 h each)
- BSysE 552** Spring 2017. BYSE Special Topics: Unmanned Aerial Systems in Agriculture (*1 credit*; Course instructor; Enrolment: 15; audits: 2)
- BSysE 598** Fall 2016. BYSE Graduate Seminar (*1 credit*; Course instructor; Enrolment: 37)
- BSysE 541** Fall 2016. Instrumentation and Measurement (*3 credit*; Co-Instructor, 2 lecture: 50 min each; 9 lab sessions @ Prosser site, 3 h each)
- BSysE 541** Spring 2015. Instrumentation and Measurement (*3 credit*; Co-Instructor, 2 lecture: 50 min each; 9 lab sessions @ Prosser site, 3 h each)

GUEST LECTURES

- Crop Sci 435** [CAPS] Interdisciplinary Solutions to the Plant Sciences (Spring 2018; *Guest lecture: 90 min* [February 25]; Enrolment: 50)
- Hort 310** Pomology (Fall 2018; *Guest lecture: 50 min* [November 13]; Enrolment: 41)
- Hort 509/510** Seminar Series (Spring 2017; *Guest lecture: 50 min*; Enrolment: 25+)
- Hort 409** Seminars in Viticulture and Enology (Fall 2017; *Guest lecture: 50 min*; Enrolment: 20)
- AgTM 405** Advanced Agricultural Precision Systems (Fall 2017; *Guest lecture: 50 min*; Enrolment: ~22)
- AFS 101** Introduction to Agricultural and Food Systems (Fall 2017; *Guest lecture: 50 min*; Enrolment: ~65)
- CptS 580** Pervasive Computing (Spring 2016; *Guest lecture: 50 min*; Enrolment: ~18)
- AgTM 405** Advanced agricultural Precision Systems (Spring 2015; *Guest lecture: 50 min*; Enrolment: ~15)
- Hort 413/513** Advanced Viticulture (Spring 2015; *Guest lecture: 50 min*; Enrolment: ~20)
- BYSE 541** Instrumentation and measurement (Spring 2014; *Guest lecture: 180 min*)
- AgTM 405** Advanced Agricultural Precision Systems (Spring 2014; *Guest lecture: 50 min*)

PRIOR EFFORTS

- North Dakota State University
 - CFS 471-Food processing laboratory (Teaching Assistant, Fall-2008)
 - “Expanding the Horizon” program volunteer (2007)
- Asian Institute Technology-Thailand: Graduate course curriculum and teaching material preparation for following courses in ‘*Agricultural Systems Engineering*’ program
 - ED70.04 : Ergonomics
 - ED70.13 : Agricultural soil mechanics
 - ED70.16 : Controlled environment agriculture

PROFESSIONAL SERVICE

INTERNATIONAL/ NATIONAL

2019-Present Associate Editor, MS Technical community of ASABE, Transactions of ASABE.

- 2018-2022 Chair, 'Mechanization, Digitization, Sensing and Robotics Working Group', ISHS.
- 2019-2021 Chair, ITSC-348 Electromagnetics & Spectroscopy Committee, ASABE
- 2019 Reviewer: Proceedings of 12th ECPA (European Conference on Precision Agriculture), Montpellier, France. (Manuscripts reviewed 3, January, 2019).
- 2018 External Thesis Examiner, University of Southern Queensland, Australia; (Evaluated 1 PhD thesis) August, 2018.
- 2018 Moderator: Session 148 Crop and Soil Sensing for Precision Agriculture Part 1 (Sponsored by MS-54 Precision Agriculture), at ASABE 2018 Annual International Meeting, Detroit, MI; (Moderated 7 presentations).
- 2018 Moderator: Session 211 Spectroscopic Sensing and Imaging Part 3 (Sponsored by ITSC-348 Electromagnetics & Spectroscopy) at ASABE 2018 Annual International Meeting, Detroit, MI; (Moderated 6 presentations).
- 2018 Moderator: Session 248 Crop and Soil Sensing for Precision Agriculture Part 2 (Sponsored by MS-54 Precision Agriculture), at ASABE 2018 Annual International Meeting, Detroit, MI; (Moderated 7 presentations).
- 2018 Judge, Session 313 Machinery systems poster session at ASABE 2018 Annual International Meeting, Detroit, MI; (Judged 10 posters).
- 2018 Reviewer/Judge: Graduate Research Paper Awards 2018 by Association of Agricultural, Biological, and Food Engineers of Indian Origin (AABFEIO).
- 2018 Served on 'Scientific Committee of 2nd International symposium on Mechanization, Precision Horticulture, and Robotics, XXX. International Horticultural Congress, Istanbul – Turkey, August 12 - 16 2018.
- 2017-2018 Chair, 'Precision Horticulture Engineering Working Group', ISHS
- 2017-2019 Vice-chair, ITSC-348 Electromagnetics & Spectroscopy Committees, ASABE
- 2017 Moderator: Session 311 Crop and Soil Sensing for Precision Agriculture (Sponsored by MS-54 Precision Agriculture), at ASABE 2017 Annual International Meeting, Spokane, WA; (Moderated 8 presentations).
- 2017 Moderator: Session 232 Spectroscopic Imaging (Sponsored by ITSC-348 Electromagnetics & Spectroscopy), at ASABE 2017 Annual International Meeting, Spokane, WA (Moderated 7 presentations).
- 2017 Reviewer/Judge: Graduate Research Paper Awards 2017 by Association of Agricultural, Biological, and Food Engineers of Indian Origin (AABFEIO).
- 2017 Guest Editor: Agronomy journal, Special Issue: Sensing and Automated Systems for Improved Crop Management, 2017.
- 2016 Served on 'National Organizing Committee' 5th IFAC Conference on Sensing, Control and Automation Technologies for Agriculture- AGRICONTROL 2016, Seattle, WA; August 15-17, 2016.
- 2016 Moderator: Session 1.1 Unmanned Aerial Systems I, at 5th IFAC Conference on Sensing, Control and Automation Technologies for Agriculture- AGRICONTROL 2016, Seattle, WA; August 15, 2016 (Moderated 5 presentations).
- 2016 ASABE "ITSC-348 Electromagnetics & Spectroscopy" committee vice chair, (2017-2019).
- 2016 Moderator: Session 311 Crop and Soil Sensing for Precision Agriculture (Sponsored by MS-54 Precision Agriculture), at ASABE 2016 Annual International Meeting, Orlando, FL; July 17-20, 2016 (Moderated 9 presentations).
- 2016 Moderator: Session 232 Spectroscopic Imaging (Sponsored by ITSC-348 Electromagnetics & Spectroscopy), at ASABE 2016 Annual International Meeting, Orlando, FL; July 17-20, 2016 (Moderated 10 presentations).
- 2016-Present Member, MS60: Unmanned Aircraft Systems in Agriculture Committee, ASABE
- 2016-Present Member, IET312: Machine vision Committee, ASABE

2015 Ad-hoc reviewer: USDA-AFRI Exploratory Program.
 2014-2017 Associate Editor - Power and Machinery Division, Transactions of the ASABE.
 2013-Present Member, PM54: Precision Agriculture Committee, ASABE

Ad-Hoc Reviewer: Journal of Field Robotics, Precision Agriculture, Transactions of ASABE, Applied Engineering in Agriculture, Biosystems Engineering, Computers and Electronics in Agriculture, Agricultural Engineering International: CIGR Journal, Frontiers Plant Science, Sensors, Sensing and Instrumentation for Food Quality and Safety, Applied Nanoscience, Journal of Terramechanics.

GRANT REVIEW PANELS

2019 Peer-Review Panel: USDA-AFRI Small Business Innovation Research (SBIR-2) 8.13 Plant Production and Protection – Engineering.
 2018 Ad-hoc reviewer: BARD (Binational Agricultural Research and Development Fund US-Israel).
 2018 Peer-Review Panel: USDA-AFRI Small Business Innovation Research (SBIR-2) 8.13 Plant Production and Protection – Engineering.
 2017-18 Peer-Review Panel: USDA-AFRI Small Business Innovation Research (SBIR-1) 8.13 Plant Production and Protection – Engineering.
 2017 Ad-hoc reviewer: BARD (Binational Agricultural Research and Development Fund US-Israel).
 2017 Peer-Review Panel: USDA-AFRI Small Business Innovation Research (SBIR-2) 8.13 Plant Production and Protection – Engineering.
 2017 Ad-hoc reviewer: Belgian Science Policy Office Program "STEREO III - Support to the Exploitation and Research of Earth Observation data".
 2017 Peer-Review Panel: USDA-AFRI Small Business Innovation Research (SBIR-1) 8.13 Plant Production and Protection – Engineering.
 2016 Ad-hoc reviewer: BARD (Binational Agricultural Research and Development Fund US-Israel).
 2016 Ad-hoc reviewer: Belgian Science Policy Office Program "STEREO III - Support to the Exploitation and Research of Earth Observation data".
 2016 Peer-Review Panel: USDA-AFRI capacity building grants for non-land grant colleges of agriculture (NLGCA) program.
 2015 Peer-Review Panel: USDA-AFRI capacity building grants for non-land grant colleges of agriculture (NLGCA) program.
 2015 Peer-Review Panel: USDA-AFRI Foundation program.

UNIVERSITY

2019 Judge: 'Showcase for Undergraduate Research and Creative Activities', WSU, March 25, 2019 (Judged 4 posters).
 2019 Ad-hoc reviewer: WSU CSANR BIOAg Program (Proposals Reviewed: 1).
 2018 *Member*, WSU CPAAS Executive Committee.
 2018 *Chair*, WSU IAREC IT Committee.
 2018 Judge: 'Showcase for Undergraduate Research and Creative Activities', WSU, April 2, 2018 (Judged 3 posters).
 2018-to date BSE faculty representative, CAHNRS Business Center User Group.
 2017 Delegation member to visit Northwest University of Agriculture and Forest (NWUAF), China for research exchange and future collaboration explorations. November 19-27, 2017.

- 2017 WSU representative, “WSDOT UAS Integration Pilot Program” a public-private consortium.
- 2017 Judge: ‘Showcase for Undergraduate Research and Creative Activities’, WSU, March 27, 2017 (Judged 3 posters).
- 2016-2017 Served on Search Committee “Fiscal Specialist 1 (position #124530)”, WSU IAREC, Prosser, WA.
- 2016 Judge: ‘Showcase for Undergraduate Research and Creative Activities’, WSU, March 28, 2016 (Judged 3 posters).
- 2015 Judge ‘Showcase for Undergraduate Research and Creative Activities’, WSU, March 30, 2015 (Judged 3 posters).
- 2014-2015 Committee Member WSU-CAHNRS Three Minute Thesis research communication competition.

PROFESSIONAL ORGANIZATION MEMBERSHIP

- 2005-Present Member of American Society of Agricultural and Biological Engineers
- 2017-Present Member International Society for Horticultural Science Since
- 2016-Present Member of International Society for Optics and Photonics
- 2012-Present Member of International Society of Precision Agriculture
- 2004-Present Life Member of Indian Society of Agricultural Engineers
- 2008-Present Invited Member of Alpha Epsilon Honour Society
- 2012 Toastmasters International: Competent Communicator

Multi-state Projects

- S-1069: Research & extension for UAS applications in U.S. agriculture and natural resources (Secretary 2019) *
- NCERA 180: Precision agriculture technologies for food, fibre, and energy production

PROFESSIONAL DEVELOPMENT/ EXTRA-CURRICULAR

- 2017 Federal Aviation Administration: Airman Certificate: Small Unmanned Aircraft System.
- 2013-2015 Federal Aviation Administration: Private Pilot ground school certification.
- 2008 Participant of a semester long advanced leadership program “**Masters of Success**” in Spring 2008 at North Dakota State University, Fargo, ND. Have participated in life changing ‘Unleash Power Within’ program by Tony Robbins in Orlando, FL in October 2008 as a part of leadership program.
- 2002 Participant of International course on ‘New Technologies of Agricultural Engineering’ (in year 2002), held at Beijing, China, organized by Chinese Academy of Agricultural Mechanization Science (CAAMS).
- 2000 Training on ‘Design, Fabrication and Quality control of Agricultural Implements’ (2000) conducted by Popular Steel Works Pvt. Ltd., Maharashtra, India.
- 1999 Training on ‘Tractors, Agricultural Machinery Operation and Testing’ (1999) held at Tractor Training and Testing Center, Madhya Pradesh, India.
- 2008 A promotional talk on “NDSU graduate program and opportunities in USA” at Dr. DY Patil College of Agricultural Engineering and Technology, Talsande, Kolhapur (December, 2008) as NDSU student ambassador.
- 2007 Volunteer/ Participated in an International Conference on, “Biological Sensorics: Critical Technologies for Future Biosystems”, June 15-17, 2007 organized by ASABE in Minneapolis, MN.
- 2003-2004 President of Indian Student Association at Asian Institute of Technology, Thailand.