

EXPANDED CURRICULUM VITAE

Personal Information:

Lakesh K. Sharma

Lakesh K. Sharma Ph.D. | Assistant Professor | Soil Fertility and Sustainable Nutrient Management | Soil and Water Sciences Dept. | University of Florida | IFAS | Gainesville, FL 32611-0290 | 2181 McCarty Hall A | 352-363-7040 | lakesh.sharma@ufl.edu

Academic Background:

- 2014** **Ph.D., Department of Soil Science**, North Dakota State University, Fargo, ND.
Dissertation Title: Evaluation of active optical sensor for yield prediction in corn (*Zea mays*, L).
- 2007** **MS Horticulture**, Punjab Agricultural University, Ludhiana, India.
Major-Horticulture, Minor-Botany
Thesis Title: Evaluate the direct sown and transplanted rough lemon (*Citrus jambhiri* Lush.) seedlings under modified environmental conditions.
- 2005** **BS in Agriculture (Hons.)**, Guru Nanak Dev University, Amritsar, India.

Employment Experience:

Year	Position	Employer
2019-present	Assistant Professor, Soil Fertility and Sustainable Agriculture	University of Florida, Gainesville, FL
2015-2019	Assistant Extension Professor of Sustainable Agriculture	University of Maine Cooperative Extension (Orono), and the University of Maine At Presque Isle
2014-2015	Post-Doctoral Fellow	North Dakota State University, Fargo, N.D.
2012-2013	Teaching Assistant	North Dakota State University, Fargo, N.D.
2011-2014	Graduate Research Assistant	North Dakota State University, Fargo, N.D.
2010-2011	Graduate Research Assistant	Texas A & M, College Station, Texas
2008-2010	Research Fellow	Punjab Agricultural University, Ludhiana, India
2005-2007	Graduate Research Assistant	Punjab Agricultural University, Ludhiana, India

Professional Organization Memberships:

- American Society of Agronomy, *2011-Present*
- Crop Science Society of America, *2011-Present*
- International Nutrient Use Efficiency Group, *2011-Present*
- Soil Science Society of America, *2011-Present*
- Phi Kappa Phi Science Honor Society, *2012-Present*
- Gamma Sigma Delta – “The Honor Society of Agriculture” (Permanent Membership, *2014*)
- Potato Association of America, *2015-Present*
- International Society of Precision Agriculture, *2016-Present*
- American society of agronomy precision agriculture community member, *2015-Present*

- American society of agronomy Extension community member, *2015-Present*
- National Association of County Agents member, *2018-Present*
- Member of International Society of Precision Agriculture 2016 to present.
- Member of Potato Association of America 2015 to present.
- Member of Canadian Soil Science Society, 2013 to 2014.
- Member of Phi Kappa Phi, 2012 to Present.
- Member of Soil Science Club, NDSU 2012 to 2015.
- Member of Graduate student association, NDSU, 2011 to 2014.
- Member of International student association, NDSU, 2011 to 2014.
- Member of association of students from India, NDSU, 2011 to 2014.
- Member Lions Club Sunam, INDIA (July 2002- June 2010).
- Nettar Bank Samiti (Eye Donation Organization, INDIA) 2008-2009.
- Bharat Vikas Parishad (Indian Development Organization) 2004-2010.
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Grants:

1. Development of advanced phosphorous recommendations for Maine Potato Growers. USDA, Specialty Crop Block Grant. \$91,892 (Awarded). Role: PI.

Project collaborators: Department of Environmental Protection, Bruce Hoskins (UMaine Soil Lab), and Sukhwinder Bali (UMCE).

Project Participants: Aroostook Research Farm, Moir farm, Landeen farm, Paradis farm, Gureete Farm, Edgicum Farm, Porter Farm, Theriault Farm, Crop Production Services, Maine Potato Board, Department of Environmental Protection, McCain Foods, NRCS, Funding Agency: Maine Department of Agriculture program of USDA, Specialty Crop Block Grant

Funding: \$91,892

Project Objectives:

- Develop guidelines for grid and zone soil sampling to sample efficiently to prepare nutrient recommendations.
- Develop soil- and climate-based phosphorus (P) recommendations with an understanding of P uptake by plants, P mineralization, and P yield curve under conventional (processing, seed, and table stock) and organic farming systems.
 - Evaluate commercially available strain of arbuscular mycorrhizae for P availability to potatoes under changing soil type and climate conditions.
- Recalibrate the common commercial soil P tests, modified Morgan and Mehlich III, using several soil types; evaluate P response.
- Develop grower specific online mobile and computer application for P recommendations.

2. Improve nitrogen and potassium use efficiency. \$7,000 (Awarded). Role: PI.

Project Collaborators: Dow Chemicals and Sukhwinder Bali (UMCE).

Project Participants: Aroostook Research Farm

Funding Agency: Dow Chemicals

Funding: \$7,000

Project objective: Evaluate the performance of Agrocote specialty fertilizers (N and K) in processed potatoes as compared to normal/standard fertilizer; study effects on crop development and yield, mainly when the number of fertilizer applications is limited.

3. Demonstrating effects of fly ash on agriculture production and soil amendments at a reduced cost. USDA, Conservation Innovation Grant. \$63,636 (Awarded). Role: CO-PI.

Project Collaborators: Sukhwinder Bali (UMCE), Casella Organics (Presque Isle and Bangor Office).

Project Participants: Ryan Guerette (Farmer) and Aroostook Research Farm

Funding Agency: NRCS, USDA, Conservation Innovation Grant.

Funding: \$63,636

Project Goal: Measure the overall effects of fly ash on agricultural production, as a less expensive input.

Project Objectives:

- Study the effects of fly ash on potato fields/crops including nutrient uptake, toxic elements, and crop quality and yield.
- Study yield and fertilizer use efficiency by using fly-ash with chemical fertilizer.
- Examine associated reductions in financial costs and carbon emissions from the use of fly ash.

4. Evaluate varied N fertilizers to improve nitrogen use efficiency, potato yield, and quality in rainfed and irrigated fields. UMCE Integrated Research and Extension Grant. \$4,395 (Awarded). Role: PI.

Project Collaborators: Sukhwinder Bali (UMCE)

Project Participants: Greg Cousins (Consultant and Farmers) and MSAD1 School Farm

Funding Agency: UMCE Integrated Research and Extension Grant.

Funding: \$4,395

Project Objectives: Evaluate different N sources for their impact on productivity, quality, and chemical composition of potatoes when applied with and without a nitrification inhibitor.

- Test N response to dry and irrigated conditions.
- Test sensors for the ability to predict yield
- Evaluate drone imagery to test N response with varied fertilizers using Maine Precision Unmanned Aerial Service.

5. UMPI Greenhouse Facility for Research and Educational Activities. Maine Economic Improvement Fund, \$145,000 (Awarded). Role: PI.

Project Collaborators: Dr. L. Feinstein, Dr. J. Johnston, Mr. J. Moir, Dr. J. Roe.

Project Participants: UM Cooperative Extension, Aroostook Research Farm, Maine Organic Farmers and Gardeners Association (MOFGA), and local organic farming community.

Funding Agency: Maine Economic Improvement Fund

Funding: \$145,000

Greenhouse Facility Project Objectives:

- Research to support the development of fertilizer application recommendations;
- Investigate slow release nutrients using typical Maine soil types with soil electrical conductivity, temperature, and moisture maintained to imitate the natural field conditions; 3. Soil compaction effects on soil properties and nutrient loss investigations using PVC pipes, electrical conductivity sensors, and acetic acid solutions intended for ammonia by-products through volatilization;
- Determine mineralization potential of soil organic matter for common Maine soil textures;
- Evaluate new fertilizers for potential benefits in greenhouse applications;
- Control degree days to test likely alternatives for rotational crops suited to Maine conditions;
- Pilot environmental sensors including active optical sensors to incorporate sensors into local potato farming practices.

6. Agriculture activities in Aroostook County. Farm Credit East Funds, \$5,000 (Awarded). Role: PI.

Collaborators: Larry Feinstein and Jason Johnston

Project Participants: UMCE

Funding Agency: Farm Credit East Presque Isle Office.

Funding: \$5,000

Project Objective: Build and maintain a greenhouse at UMPI to support the development of fertilizer application recommendations.

7. Funds for Sustainable Agriculture. Maine Potato Board, \$5,000 (Awarded). Role: PI.

Project Collaborators: A. Plant and J. Dwyer

Project Participants: Aroostook Research Farm and MSAD1 School Farm

Funding Agency: Maine Potato Board.

Funding: \$5,000

Since higher nitrogen levels hurt potato quality, we seek to evaluate the effect of soft rot and specific gravity under Maine conditions. Studies have shown that calcium (Ca) and boron (B) strengthen the cell wall and improve defense systems in potatoes; therefore, available Ca and B might reduce the incidence of soft rot. Most Maine potato farmers are not currently blending Ca and B with pre-planting fertilizer; rather they use ammonium sulfate and ammonium nitrate as the nitrogen source.

Project Objectives:

- Evaluate varied pre-plant and in-season N management practices on *Russet Burbank* tuber yield and quality.
- Evaluate the impact of nutrient balance and soil moisture variability on soft rot incidence in potatoes.
- Compare tissue sampling and active optical sensor employed at tuber initiation and tuber bulking stage of evaluating for yield and quality prediction.

8. GreenSeeker Sensor Branch Research Funds, Trimble. \$3,000 (Awarded). Role: PI.

Project Collaborators: Jim Dwyer

Project Participants: Aroostook Research Farm

Funding Agency: Trimble sensor section.

Funding: \$3,000

Project Objective: Develop seasonal/split application recommendations for potatoes using active optical sensors.

9. Barenburgs USA Research Funds. Nurse crops for potatoes to control soil erosion. \$10,000 Role: PI.

Project Collaborators: A. Plant and John Jemison

Project Participants: Aroostook Research Farm, MSAD1 School Farm, Moir Farm, and Guerette Farm.

Funding Agency: Barenburgs USA.

Funding: \$5,000

Project Objective: Explore the use of nurse crops in potato fields to reduce soil erosion. Maine experiences significant soil erosion when heavy rain falls in a short period on fields without ground cover. Nurse crops grown in potato fields until hilling occurs may remediate erosion.

10. Extension Activities Funds for Aroostook County. Farm Credit East, \$500 (Awarded). Role: PI.

Project Collaborators: Jason Johnston and Larry Feinstein

Project Participants: UMPL.

Funding Agency: Farm Credit East.

Funding: \$500

Project Objective: Develop agriculture activities in Aroostook County to support the local agriculture industry.

11. Cover Cropping Challenge or Opportunity. USDA Northeast SARE 2016 Cover Crops Initiative. \$9,866 (Awarded) Role: Co-PI.

Project Collaborators: A. Plant and John Jemison

Project Participants: Aroostook Research Farm, MSAD1 School Farm, Moir Farm, and Guerette Farm.

Funding Agency: USDA Northeast SARE 2016 Cover Crops Initiative.

Funding: \$9,866

Project Goals: 1. Assess the capacity of nurse crops to hold N and protect soil from eroding before hilling. 2. Assess the effects of alternative methods to cover cropping and primary tillage timing on small grain yields and production efficiency.

Project Objectives:

- Determine optimum nurse crop species and planting rate to obtain optimum efficiency;
- Assess the optimum method and timing of nurse crop destruction;
- Determine the most effective and efficient methods for fall cover and primary tillage preceding a potato crop using underseeding or cover cropping;
- Assess the economic feasibility of cover crop and tillage methods.

12. Developing sulfur recommendations for Maine potato growers. USDA, Specialty Crop Block Grant. \$96,943 (Awarded). Role: PI

Project collaborators: Department of Environmental Protection, Bruce Hoskins (UMaine Soil Lab), and Sukhwinder Bali (UMCE).

Project Participants: Aroostook Research Farm, Moir farm, Landeen farm, Paradis farm, Gureete Farm, Edgicum Farm, Porter Farm, Theriault Farm, Crop Production Services, Maine Potato Board, Department of Environmental Protection, McCain Foods, NRCS,

Funding Agency: Maine Department of Agriculture program of USDA, Specialty Crop Block Grant

Funding: \$96,943

These are the specific brief objectives of this project:

1. Develop recommendations for S in potatoes.
2. Demonstrate S deficiency and its implication on potato yield and quality.
3. Evaluate ammonium sulfate, elemental sulfur, and calcium sulfate source regarding their S response.
4. Develop active optical sensor based inseason S applications.
5. Development of mobile base S calculator for growers.

Demonstrates Educational Program Leadership

- **Lead Organizer and coordinator of January 17-18, 2018 and 23-24 January 2019 Maine Potato Conference.**
 - Research Abstracts compiled and edited.
 - Prepared a conference booklet independently along with collaboration from UMPI
- **Started a new educational program as Maine Soil and Agronomy Workshop on February 8, 2016. Organized again on February 22, 2017, and now participating key personnel in the event since 2018.**
 - Research Abstracts compiled and edited.
 - Participants' number increased significantly in 2018 to 130 people from an average of 80 from previous years due to program impact.
- **Organizer and coordinator of UMaine Aroostook Research Farm Field Day, August 23, 2016, July 25, 2017, and August 10, 2018.**
 - Faculty with potato and grain cultivation expertise participated.
 - Showcased Extension research and other efforts for growers, industry and faculty/staff.
 - Growers learned about potential rotation crops, potato fertility management, precision agriculture, new potato varieties, and received an update on Dickeya.
 - Media coverage from WAGM
- **Poster and graduate student oral presentation judge, ASA-CSSA-SSSA meetings, Nov. 2015, 2016, 2017, and 2018.**
- **Managing UMaine Precision Agriculture website (See Appendix I).**
 - Added links from other university precision agriculture educational programs to UMaine website.
- **Served as Chair of National Precision Agriculture community from 2017-2018**
 - Organized and coordinated symposium on “enhancing productivity and profitability in a changing climate with precision agriculture” at ASA-CSSA Baltimore meeting. (<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/session/17960>).
 - Organized and coordinated graduate student competition sessions on “Development of tools for precision agriculture oral I, oral II, and poster. (<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/session/17961>, <https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/session/18691>, and <https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/session/17963>).
 - Lead the precision agriculture community business and planning meeting (<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/session/17632>).
- **Leading National Research and Extension Soil Fertility Group**

- Served as project leader for SCRI grant 2018.
- I am working with the group to manage weeds and water issues in potatoes.
- I am serving associate editor for Agronomy Journal and Agrosystems, Geosciences, & Environment journal.
- **Advisor for Graduate Students**
 - Supervising and advising 2 Ph.D. students
 - Have supervised more than 15 undergraduate students.

Invited Presentations:

- Improving yield estimates by using precision agriculture tools: ASA-CSSA-SSSA International meeting, Phoenix, Arizona (2016).
- Maine precision agriculture potential and agronomic implications: UMPI, Presque Isle, (2015).
- Economical nitrogen recommendations for grain cultivation: UMaine Annual Extension Meeting, Presque Isle, (2016).
- Science seminar series “Changes in soil nutrient levels under intensive agricultural systems”: UMPI, Presque Isle, (2017).
- Declined invitation to Canada farmer meets three times since 2015 due to UMaine International Program Office recommendation (avoid any travel outside the country).

Educational Mentoring Relationships 2016 - 2017:

Staff	Undergraduates	Graduate Students
1	12	Ph.D. - 2

SCHOLARSHIP AND PROFESSIONAL ACTIVITY (from last 4 years)

In pipeline

1. Impact of nitrogen rates on two potato cultivar’s yield and quality. Ahmed Zaeen, Ahmed Jasim, Lakesh K. Sharma, and Sukhwinder K. Bali. (Planning to submit to Agronomy Journal).
2. Sensor ability to predict phosphorus response. Ahmed Jasim, Ahmed Zaeen, Lakesh K. Sharma, and Sukhwinder K. Bali. (Planning to submit to Potato Journal).

Peer Reviewed:

1. Breker, J. S., T. DeSutter, M.K. Rakkar, A. Chatterjee, L. Sharma, and D.W. Franzen. 2019. Potassium Requirements for Corn in North Dakota: Influence of Clay Mineralogy. Soil Sci. Soc. Am. J. 83:429-436. doi:10.2136/sssaj2018.10.0376
2. Franzen, D.W., E.C. Schultz, T.M. DeSutter, **L.K. Sharma**, R. Ashley, and H. Bu. 2019. Sunflower Type Influences Yield Prediction using Active Optical Sensors. Agron. J. 0. doi:10.2134/agronj2018.07.0440.
3. **Sharma, L.K.**, S.K. Bali, A.A. Zaeen, P. Baldwin, and D.W. Franzen. 2018. Use of Rainfall Data to Improve Ground-Based Active Optical Sensors Yield Estimates. Agron. J. 110:1561-1571. doi:10.2134/agronj2017.12.0696.

4. Schultz, E., T. DeSutter, **L. Sharma**, G. Endres, R. Ashley, H. Bu, S. Markell, A. Kraklau, and D. Franzen. 2018. Response of Sunflower to Nitrogen and Phosphorus in North Dakota. *Agron. J.* 110:685-695. doi:10.2134/agronj2017.04.0222.
5. Bu H, **Sharma LK**, Denton A, Franzen DW. 2017. Comparison of satellite imagery and ground-based active optical sensors as yield predictors in sugar beet, spring wheat, corn, and sunflower. *Agronomy Journal.* 109:1-10. Available at: <https://dl.sciencesocieties.org/publications/aj/abstracts/109/1/299>
6. **Sharma LK**, Bali SK, Dwyer J, Plant AB, Bhowmik A. 2017. A case study of improving yield prediction and sulfur deficiency detection using optical sensors under variable climatic conditions in dryland potato cultivation in Maine. *Sensors.* 17(5), 1095; doi:[10.3390/s17051095](https://doi.org/10.3390/s17051095). Available at: <http://www.mdpi.com/1424-8220/17/5/1095/htm>
7. **Sharma L**, and Bali, S. 2017. A review of methods to improve nitrogen use efficiency in agriculture. *Sustainability.* 10(1), 51. Available at <http://www.mdpi.com/2071-1050/10/1/51>.
8. **Sharma L**, Bali S, and Zaaen, A. 2017. A case study of potential reasons of increased soil phosphorus levels in the Northeast United States. *Agronomy.* 7(4): 85. Available at <http://www.mdpi.com/2073-4395/7/4/85>.
9. **Sharma LK**, Bu H, Denton A, Franzen DW. 2016. Evidence for the Ability of Active-Optical Sensors to Detect Sulfur Deficiency in Corn. *Agronomy Journal.* 108:1–5. doi:10.2134/agronj2016.05.0287. available at: <https://dl.sciencesocieties.org/publications/aj/abstracts/108/5/2158>
10. **Sharma LK**, Bu H, Franzen DW, Denton A. 2016. Use of corn height measured with an acoustic sensor improves yield estimation with ground-based active optical sensors. *Computers and Electronics in Agriculture.* 124, (June 2016); 254–262. Available at: <https://www.sciencedirect.com/science/article/pii/S0168169916301399>
11. Bu H, **Sharma LK**, Denton A, Franzen DW. 2016. Sugar Beet Yield and Quality Prediction at Multiple Harvest Dates Using Active-Optical Sensors. *Agronomy Journal*; 108:273–284. Available at: <https://dl.sciencesocieties.org/publications/aj/abstracts/108/1/273>
12. **Sharma LK**, Bu H, Denton A, Franzen DW. 2015. Active-optical sensors using red NDVI compared to red edge NDVI for prediction of corn grain yield in North Dakota, U.S.A. *Sensor Journal.* 15(11):27832-53. Available at: <http://www.mdpi.com/1424-8220/15/11/27832>
13. **Sharma LK**, Bu H, Franzen DW. 2015. Comparison of two ground-based active-optical sensors, GreenSeeker® and Holland crop circle® acs-470, for in-season estimation of the yield of corn (*Zea mays*, L). *Journal of Plant Nutrition.* 39:7, 957-966. Available at: <https://www.tandfonline.com/doi/abs/10.1080/01904167.2015.1109109>
14. Shultz, EC, **Sharma LK**, Enders G, Ashley R, Bu H, Markell S, Kraklau A, Franzen, DW. 2017. The response of sunflower to nitrogen and phosphorus fertilization in North Dakota. Accepted by *Agronomy Journal.* Available at: <https://dl.sciencesocieties.org/publications/aj/abstracts/110/2/685>.
15. **L.K. Sharma**, D.W. Franzen, and Honggang Bu 2014. Comparison of two ground-based active-optical sensors, greenseeker® and holland crop circle® acs-470, for in-season estimation of yield of corn (*Zea mays*, L). *Journal of Plant Nutrition.* 2015 39:7, 957-966.
16. **L.K. Sharma** and D.W. Franzen 2013. Use of corn height to improve the relationship between active optical sensor readings and yield estimates. *Precision Ag Journal* DOI 10.1007/s11119-013-9330-9.

17. Manveen Kaur, J. S. Bal, **L.K. Sharma**, and S. K. Bali 2013. An evaluation of mango germplasm for future breeding programme. African Journal of Agriculture research. Vol. 9 pp 1530-38.
18. **L.K. Sharma**, Manisha Kaushal, Sukhwinder Kaur Bali, and O P Choudhary 2013. Evaluation of rough lemon, (*Citrus jambhiri* Lush.), as rootstock for salinity tolerance at seedling stage under in-vitro conditions. African journal of biotechnology, Vol. 12(44), pp. 6267-6275.
19. H.S. Dhaliwal, Ajay Banke, **L. K. Sharma**, S.K. Bali. 2013. Impact of pruning practices on shoot growth and bud production in kinnow (*Citrus reticulata* Blanco) plants. Journal of Experimental Biology and Agricultural Sciences, January - 2014; Volume – 1 (7 - Special Issue on soil and water management in agriculture)
20. **L.K. Sharma** and H. S. Dhaliwal 2013. Germination and growth of rough lemon (*Citrus jambhiri* Lush.) seedlings under protected environment. *J. Hortl. Sci.* Vol. 8(1):91-94, 2013.
21. H.S. Dhaliwal, **L.K. Sharma**, A.K. Banke, J.S. Brar and S.K. Bali. 2013. Investigations on Growth Behaviour of ‘Kinnow’ (*Citrus Reticulata*) Mother Plants Pruned at Different Intensities. Middle-East Journal of Scientific Research 16 (1): 135-140. DOI: 10.5829/idosi.mejsr.2013.16.01.11633
22. **L.K. Sharma**, Manisha Kaushal, M.I.S. Gill and S.K. Bali. 2013. Germination and survival of citrus jambhiri seeds and epicotyls after treating with different mutagens under in vitro conditions. Middle-East Journal of Scientific Research 16 (2): 250-255. DOI: 10.5829/idosi.mejsr.2013.16.02.11634.
23. **L.K. Sharma** and Dhaliwal H S 2009. Effect of raising rough lemon (*Citrus jambhiri* Lush.) on budding success under modified environmental conditions. J Res-Punjab Agric. Univ. 2009, 46(1-2), 50-1.

Peer Reviewed Book Chapter:

1. Chapter 2 Improving Nitrogen and Phosphorus Efficiency for Optimal Plant Growth and Yield. **Lakesh K. Sharma**, Ahmed A. Zaeen, and James D. Dwyer. Published 2018. (<https://www.semanticscholar.org/paper/Chapter-2-Improving-Nitrogen-and-Phosphorus-for-and-Sharma-Zaeen/b04c5bc3bc5aa2a9600ee9352ead7b2591c4b9c6>)
1. An overview of QTL identification and marker-assisted selection for grain protein content in wheat. A Kumar, S Jain, EM Elias, M Ibrahim, **LK Sharma**. Eco-friendly Agrobiological Techniques for Enhancing Crop Productivity, 245-274. (https://link.springer.com/chapter/10.1007/978-981-10-6934-5_11).

Proceedings

1. **Sharma L.K.**, D.W. Franzen, and H. Bu. 2013. Evaluation of wavelength from ground-based active optical sensors for corn yield prediction in North Dakota. Proceedings at North central Soil Fertility Meeting at Des Moines, Iowa.
2. Bu, H., D.W. Franzen, and **L.K. Sharma**. 2013. Crop yield relationship to remote sensing data using intensified weighted nonlinear regression models. Proceedings at North central Soil Fertility Meeting at Des Moines, Iowa.

3. Franzen, D.W. and **L.K. Sharma** 2012. Use of corn height to improve the relationship between active optical sensor readings and yield estimates. Proceedings paper/presentation at the North Central Extension-Industry Soil Fertility Conference, November, 2012, Des Moines, IA.
4. **Sharma L.K.**, D.W. Franzen, and H. Bu. 2013. Evaluation of wavelength from ground-based active optical sensors for corn yield prediction in North Dakota. Proceedings paper/presentation at the North Central Extension Conference, November, 2013, Des Moines, IA.
5. Kaushal, M., **L.K. Sharma**, M.I.S. Gill, O.P. Choudhary, and S.K. Bali. 2013. Effect of salinity on survival and growth performance of in vitro grown rough lemon (*Citrus jambhiri* Lush.) seeds. Indian Journal of Biotechnology Vol 12, April 2013, pp 284-286.
6. Dhaliwal, H.S. and **L.K. Sharma**. 2012. Effect of direct sown and transplanted rough lemon (*Citrus jambhiri* Lush.) seedlings on chlorophyll and dry matter content under modified environmental conditions. Crop improvement 39 p 609-610.
7. **Sharma L.K.** and H. S. Dhaliwal. 2012. Growth performance of direct sown and transplanted rough lemon (*Citrus jambhiri* Lush.) seedlings under modified environmental conditions. Crop improvement 39 p 641-642.

Peer Reviewed Poster and Oral Presentations:

1. Ahmed Jasim, Lakesh Sharma, and Sukhwinder Bali. 2018. Detection of Phosphorus Stress in Maine Potato Using Active and Passive Sensors. Oral.
(<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/Paper/111306>).
2. Ahmed A Zaeen, Lakesh Sharma, and Sukhwinder Bali. 2018 Developing an Application for Smartphones and Computers to Detect and Control Insect on Potatoes. Oral.
(<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/Paper/111295>).
3. Ahmed A Zaeen, Lakesh Sharma, and Sukhwinder Bali. 2018. Using the Active Optical Sensors to Develop a Nitrogen Recommendation for Potatoes in Dryland Agriculture. Poster
(<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/Paper/111305>).
4. Ahmed Jasim, Lakesh Sharma, and Sukhwinder Bali. 2018. The Response of Maine Potato to Phosphorus Rate Applications. Poster
(<https://scisoc.confex.com/scisoc/2018am/meetingapp.cgi/Paper/111309>).
5. **L.K. Sharma**, S.K. Bali, and J. Dwyer. Study of Improving Yield Prediction and Sulfur Deficiency Detection Using Optical Sensors. ASA-CSSA-SSSA, Madison, WI.
6. (Oral presentation) 2017. Available at:
<https://scisoc.confex.com/crops/2017am/webprogram/Paper104901.html>
7. **L.K. Sharma**, S.K. Bali, A.A. Zaeen and J. Dwyer. Potential Reasons for Increased New England States Phosphorus Pollution: A Review. ASA-CSSA-SSSA, Madison, WI (Poster) 2017. Available at: <https://scisoc.confex.com/crops/2017am/webprogram/Paper104902.html>
8. **L.K. Sharma**, S.K. Bali, A.A. Zaeen and J. Dwyer. 2017. Evaluate Different N Fertilizers to Improve Nitrogen Use Efficiency, Yield, and Quality of Potato Cultivation Under Rainfed and Irrigated Fields. ASA-CSSA-SSSA, Madison, WI (Oral presentation). 2017. Available at: <https://scisoc.confex.com/crops/2017am/webprogram/Paper104903.html>
9. S.K. Bali, **L.K. Sharma**, and J. Dwyer. Effect of fly ash on agriculture production as soil amendments. ASA-CSSA-SSSA, Madison, WI (Poster) 2017. Available at: <https://scisoc.confex.com/crops/2017am/webprogram/Paper105123.html>

10. J. Breker, T. DeSutter, A. Chatterjee, M Rakkar, **L.K. Sharma**, E. Schultz, and D.W. Franzen. Potassium recommendations for corn in North Dakota: influence of clay chemistry. ASA-CSSA-SSSA, Madison, WI (Poster) 2017. Available at: <https://scisoc.confex.com/crops/2017am/webprogram/Paper105845.html>
11. L.K. Sharma, J. Dwyer, A. Plant, and S.K. Bali. Inseason Nitrogen Recommendation Methods: A Review. ASA-CSSA-SSSA, Madison, WI (Oral presentation). 2016. Presenter: Lakesh Sharma. Available at: <https://scisoc.confex.com/crops/2016am/webprogram/Paper100654.html>
12. L.K. Sharma, J. Dwyer, and A. Plant. Evaluate the Nitrogen, Calcium, and Boron Application Rates for Their Impact on Soft Rot, Yield, and Quality of “Russet Burbank.” ASA-CSSA-SSSA, Madison, WI (Oral presentation). 2016. Presenter: Lakesh Sharma. Available at: <https://scisoc.confex.com/crops/2016am/webprogram/Paper101389.html>
13. L.K. Sharma and J. Jemison Jr. Developing Nurse Crop Practice in Potato Cultivation System. ASA-CSSA-SSSA, Madison, WI (Poster). 2016. Presenter: Lakesh Sharma. Available at: <https://scisoc.confex.com/crops/2016am/webprogram/Paper101391.html>
14. L.K. Sharma, D.W. Franzen, E. C. Shultz, and H. Bu. In-Season N Management Tools in Commercial Cultivation System. ASA-CSSA-SSSA, Madison, WI (Oral presentation). 2016. Invited Presenter: Lakesh Sharma. Available at: <https://scisoc.confex.com/crops/2016am/webprogram/Paper100167.html>
15. Eric Shultz, Dave Franzen, Christopher Graham, and Lakesh Sharma. Nitrogen and Phosphorus Recalibration for Modern Varieties of Sunflowers for the Northern Great Plains. ASA-CSSA-SSSA meeting, Minneapolis, MN. November 2015. (Oral presentation). Presenter: Lakesh Sharma. Available at: <https://scisoc.confex.com/crops/2015am/webprogram/Paper95128.html>
16. Franzen, D.W., E. Schultz, and **L.K. Sharma**. 2015. Nitrogen and Phosphorus Recalibration for Sunflowers in the Dakotas. National sunflower association meeting.
17. Franzen, D.W., and **L.K. Sharma**. 2015. Using ground-based active Sensors to direct in-season N application for corn in North Dakota. Precision Ag Summit.
18. **Sharma L.K.** 2014. Algorithms for use in directing in-season N rates for corn. Soil and soil water workshop.
19. Franzen, D.W., **L.K. Sharma**, and H. Bu. 2013. Split application of N on sugarbeet and update on the use of active-optical sensors for sugarbeet yield and quality prediction. 44th Annual Sugarbeet Research Reporting Session, National Sunflower Association Research Forum 2013 at Fargo, ND (Poster).
20. **Sharma L.K.**, D.W. Franzen, and Honggang Bu 2013. Evaluation of wavelength from ground-based active optical sensors for corn yield prediction in North Dakota. North central Soil Fertility Meeting at Des Moines, Iowa (Poster).
21. Franzen, D.W., **L.K. Sharma**, and H. Bu. 2013. Nitrogen rate revision for corn in North Dakota - A preview of coming N fertilization strategies. North central Soil Fertility Meeting at Des Moines, Iowa (Poster).
22. Bu, H., D.W. Franzen, and **L.K. Sharma**. 2013. Crop yield relationship to remote sensing data using intensified weighted nonlinear regression models. North central Soil Fertility Meeting at Des Moines, Iowa (Poster).

23. Franzen, D.W., H. Bu, and **L.K. Sharma**. 2013. Relationship of active-optical sensor readings with sugarbeet yield and quality, sunflower yield and spring wheat grain protein. International annual meeting, November 3-6, Tampa, Florida. ASA-CSSA-SSSA, Madison, WI (Poster).
24. Franzen, D.W. and **L.K. Sharma**. 2013. Active-Optical Sensor Algorithms for Corn Yield Prediction and In-Season N Application in North Dakota. Paper and presentation- International Conference on Precision Agriculture, Indianapolis, IN (Oral).
25. Bu, H., D.W. Franzen, and **L.K. Sharma**. 2013. Crop yield relationship to remote sensing data using intensified weighted nonlinear regression models. International annual meeting, November 3-6, 2013, Tampa, Florida. ASA-CSSA-SSSA, Madison, WI (Poster).
26. **Sharma L.K.** and D.W. Franzen. 2013. Performance of two commercially available ground based active optical sensors, Greenseeker® (TM) and Holland Scientific Crop Circle Sensor® ACS 470, for their ability to estimate corn (*Zea mays*, L.) yield over two years. Research and Arts Forum, NDSU, April 11, 2013 (Poster).
27. **Sharma L.K.** and D.W. Franzen. 2013. Evaluation of red and red-edge NDVI from ground-based active optical sensors for corn yield prediction over two years under different soil type texture and tillage categories. Oral presentation, International annual meeting, November 3-6, 2013, Tampa, Florida. ASA-CSSA-SSSA, Madison, WI (Oral).
28. **Sharma L.K.** and D.W. Franzen. 2013. Relationship of corn height, active optical sensor readings and corn yield under different soil surface textures in North Dakota. Canadian Society of soil Science annual meeting, July 22-25, 2013, Winnipeg, Canada (Poster).
29. **Sharma L.K.**, M. Kaushal, S.K. Bali, M.I.S. Gill, O.P. Choudhary, and J. Saini. 2013. Survival of Rough Lemon (*Citrus jambhiri* Lush.) Seeds Under in Vitro Saline Conditions. Poster presentation, International annual meeting, November 3-6, Tampa, Florida. ASA-CSSA-SSSA, Madison, WI (Poster).
30. **Sharma L.K.** and D.W. Franzen. 2012. Comparison of two commercial active optical sensors regarding their relationship between early-season sensor readings and final corn (*Zea mays*, L.) yield. Poster in International annual meeting, October 21-24, 2012, Cincinnati, Ohio. ASA-CSSA-SSSA, Madison, WI (Poster).
31. Franzen, D.W. and **L.K. Sharma**. 2012. Improvement of Corn Yield and Sensor Reading Relationship with Consideration of Crop Height. Poster in International annual meeting, October 21-24, 2012, Cincinnati, Ohio. ASA-CSSA-SSSA, Madison, WI (Poster).
32. Franzen, D.W. and **L.K. Sharma**. 2012. Use of corn height to improve the relationship between active optical sensor readings and yield estimates. Paper and presentation- International Conference on Precision Agriculture, Indianapolis, IN (Oral).
33. Franzen, D.W. and **L.K. Sharma**. 2012. Use of active optical sensors in North Dakota. Nitrogen Use efficiency Conference, Fargo, 2012 (Oral).

Peer Reviewed Extension Publications (see Appendix K)

1. **L. K. Sharma** and S.K. Bali. #1882 High Phosphorus Levels Build Up in Soils of Aroostook County, Maine: Importance for Potato Growers. (<https://extension.umaine.edu/publications/1082e/>).

2. **L. K. Sharma** and S.K. Bali. #1083 Potato Farmers in Aroostook County, Maine, Should Test for Soil Micronutrients and Correct as Needed. (<https://extension.umaine.edu/publications/1083e/>)
3. **L. K. Sharma** and S.K. Bali. #1084 Change in Levels of Soil Potassium and Magnesium Over Time in Aroostook County, Maine: What Potato Farmers Need to Know. (<https://extension.umaine.edu/publications/1084e/>)
4. **L. K. Sharma** and S.K. Bali. #1085 Potato Farmers in Aroostook County Maine Should Test for Soil pH. (<https://extension.umaine.edu/publications/1085e/>)
5. **L. K. Sharma** and S.K. Bali. Potato Farmers in Aroostook County, Maine, Should Test for Soil Sulfur and Correct as Needed. Bulletin #1081 (<https://extension.umaine.edu/publications/1081e/>).
6. S.K. Bali and L. K. Sharma. Minimize Nitrogen Losses and Increase Nitrogen Use Efficiency. Bulletin #1086 (<https://extension.umaine.edu/publications/1086e/>).
7. **L.K. Sharma**, A. Plant, J Dwyer, and D.W. Franzen. An Introduction to Using Site-Specific Farming to Manage Field Variability. UMaine Extension Bulletin #1080. 2016. (<http://extensionpubs.umext.maine.edu/ePOS?form=item.html&store=413&cat=97&item=1080>)
8. **L.K Sharma**. Maine Potato Conference booklet. UMaine Extension publication #1. 2018.
9. **L.K Sharma**. Maine soil and agronomy workshop booklet. UMaine Extension publication #1. 2017.

Unpublished Professional Presentations

1. **L.K. Sharma**. Phosphorus response in potatoes in Maine. January 23, 2019, Maine Potato Conference, Caribou, ME.
2. **L.K. Sharma**. Sulfur response in potatoes in Maine. January 23, 2019 Maine Potato Conference, Caribou, ME.
3. **Ahmed Zaeen and Lakesh Sharma**. Nitrogen response in potatoes and possible yield prediction models. January 23, 2019, Maine Potato Conference, Caribou, ME.
4. **Ahmed Jasim and Lakesh Sharma**. Mycorrhizae Inoculation in Potatoes and their impact over yield and quality. January 23, 2019, Maine Potato Conference, Caribou, ME.
5. **L.K. Sharma**. Evaluate Different N Fertilizers to Improve Nitrogen Use Efficiency, Yield, and Quality of Potato Cultivation Under Rainfed and Irrigated Fields. December 6, 2018. UM Presque Isle, ME
6. **L.K. Sharma**. Changes in soil nutrient levels under intensive agricultural systems. Science Seminar Series. November, 2017. UM Presque Isle, ME.
7. **L.K. Sharma**. Annual Rye Grass Research. McCain Foods Farmer's Meeting, March UMPI Campus Center, 2017.
8. **L.K. Sharma**. Fertilization and Liming in Soil. Soil and Agronomy Workshop, February 8, 2017. UMPI.
9. **L.K. Sharma**. Improving Farm Income: Rotation Crops and Potato Irrigation. Soil and Agronomy Workshop, February 8, 2017. UM Presque Isle, ME.
10. **L.K. Sharma**. Improving nitrogen use efficiency. Maine Potato Conference. January 2017. Caribou, ME.
11. **L.K. Sharma**. What is site-specific agriculture? Maine potato conference in January 2017. Caribou, ME.

12. **L.K. Sharma.** Predicting potato yield and quality using optical sensors. Certified Crop Advisors training workshop. February 2, 2017. Portsmouth, New Hampshire.
13. **L.K. Sharma.** Tillage Management in Potato and Grain Crops. Potato Conference January 22-23, 2016. Caribou, ME.
14. **L.K. Sharma.** Sensors to assess vegetable fertility. Certified Crop Advisors training workshop. February 2, 2016. Portsmouth, New Hampshire.
15. **L.K. Sharma.** Nurse crop benefits and implications. Aroostook Extension Staff meeting, January 2016. Presque Isle, ME.
16. **L.K. Sharma.** Potato fertility and its impact on yield and quality. Aroostook Extension Staff meeting, April 2016. Presque Isle, ME.
17. **L.K. Sharma.** “Role of Precision Ag in Agronomy.” Science Seminar Series, October 2016. Presque Isle, ME.
18. **L.K. Sharma.** The role of Precision Ag: about Soils and Agronomic Crops. Soil and Agronomy Workshop. February 8, 2016. Presque Isle, ME.
19. **L. K. Sharma.** Role of precision ag and nurse crops in potato cultivation. Roger’s Farm Field Day, July 2016. Stillwater, ME.
20. **L.K. Sharma.** Evaluating different fertilizers for their role in maintaining potato yield, health, and quality. Aroostook Research Farm Field Day, August 2016. Presque Isle, ME.
21. **L.K. Sharma.** What is site-specific farming? Pest Management Conference. December 2, 2015. Presque Isle, ME.

Other Scholarly Activity

Reviewed Research Articles, Proposals, and Publications (Appendix F)

Manuscripts Reviewed for *Agronomy Journal*, *Journal of Crop Improvement*, *Sensor Journal*, *Journal of Remote Sensing*, *Sustainability Journal*, and *Journal of Plant and Soil Science*:

- More than 100 articles reviewed since September 2015.

Type of Award

- National Association of County Agricultural Agents: Achievement Award, 2018.
- Letter of Appreciation from “Journal of Applied Remote Sensing”, 2017 (Appendix F).
- Letter of Appreciation from American Society of Agronomy for serving Associate Editor for Precision Agriculture 2019.
- Reviewing research manuscripts for American Journal of Agronomy and Journal of Crop Research.
- Awarded with permanent membership by Gamma Sigma Delta “The Honor Society of Agriculture” 2014.
- Received an Outstanding Graduate Student Award at North-Central Soil Fertility Conference 2013.
- Received travel help from NDSU Graduate School to attend the ASA-CSSA-SSSA Conference, Tampa, FL 2013.
- Awarded with Frank Bain Graduate Student Scholarship NDSU, School of Natural Resource Science, for the year 2013-14.
- Received NDSU Soil Science Roy A. Erickson Scholarship Award for the year 2012-2013.

- Received 1st prize in graduate student poster competition conducted by Sensor Community at International ASA-CSSA-SSSA conference.
- Awarded with first prize at Graduate student poster competition in Research and Art Forum, NDSU, 2013.
- Research and Teaching Assistant for North Dakota State University, Fargo.
- Advertising officer in Phi Kappa Phi Honor Society, NDSU.
- Received travel grant from NDSU Graduate School to attend the Canadian Soil Science Annual Meeting Conference, Winnipeg, Manitoba, July 2013.
- Received travel help from NDSU Graduate School to attend the ASA-CSSA-SSSA Conference, Cincinnati, OH 2012.
- Received membership invitation from honor society Phi Kappa Phi.
- Received an appreciation letter from Director Research, Punjab Agriculture University for contributions to their research program.
- Nominated for IPNI Scholar student award for the year 2012-13 and 2013-14 by Dr. D.W. Franzen (Ph.D. Advisor).