# Curriculum Vitae

**SANTOSH K. PITLA**
Department of Biological Systems Engineering
University of Nebraska-Lincoln

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## 1. Education and Employment History

### 1.1. Education History

University of Kentucky, USA
Ph.D. Biosystems and Agricultural Engineering — Aug 2007 – Jan 2012

University of Kentucky, USA
M.S. Biosystems and Agricultural Engineering — Aug 2004 – June 2007
M.S. Mechanical Engineering

Osmania University, India
B.E. Mechanical Engineering — June 2000 – June 2004

### 1.2. Employment History

**Professor** (58% **Teaching**, 40% **Research** and 2% **Service**) — July 2024 - Present
Department of Biological Systems Engineering
University of Nebraska - Lincoln

**Courtesy Professor** — Oct 2022 - Present
School of Computing
University of Nebraska-Lincoln

**Associate Professor** (58% **Teaching**, 40% **Research** and 2% **Service**)
Department of Biological Systems Engineering
University of Nebraska - Lincoln — July 2019 – July 2024

**Assistant Professor** (58% Teaching, 40% Research and 2% Service)
Department of Biological Systems Engineering
University of Nebraska - Lincoln — July 2014 – July 2019

**Post-Doctoral Scholar**
Food Agricultural and Biological Engineering
Ohio State University, Columbus, OH May 2012 – Sept 2013

**Engineer Associate**
Biosystems and Agricultural Engineering Aug 2007 – May 2012
University of Kentucky, Lexington, KY

**Graduate Research Assistant**
Biosystems and Agricultural Engineering
University of Kentucky, Lexington, KY Aug 2004 – June 2007

## 1.3. Awards and Recognitions

1.3.1. 2025 CIGR Next Leader, International Commission of Agricultural and Biosystems Engineering Nov 2025

1.3.2. Best Paper award for Robotic Security Test-Bed Midwest United States Association for Information Systems (MWAIS) May 2022

1.3.2. Advisor: 2022 ASABE Robotics Competition Winner July 2022

1.3.3. Faculty Fellow for Student Success, UNL SAVC Aug 2021

1.3.4. ASABE Major Award: Farrall Young Educator Award July 2021

1.3.5. John Deere Teaching Award, NACTA June 2020

1.3.6. UNL Parent's Association & Teaching Award Mar 2020

1.3.7. Raikes School Design Studio Platinum Award April 2018

1.3.8. Holling Junior Faculty Teaching Excellence Award March 2018

1.3.9. ASABE Major Award: Sunkist Young Designer July 2016

1.3.10. ASABE Superior Paper Award July 2016

# 2. Research Accomplishments

## 2.1. Publication and Presentations Record

| Year | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|
| No. of peer-reviewed Journal Articles | 3 | 1 | 3 | 3 | 3 |

*The following subscripts are used to indicate graduate student co-authors*
*1: Masters student under my supervision*

*2: Ph.D. student under my supervision*

### 2.1.1. Peer Reviewed Journal Publications

1. Muvva VVRMKR, Joseph KT, Chawla Y, Pitla S and Wolf M (2025) Custom UAV with model predictive control for autonomous static and dynamic trajectory tracking in agricultural fields. *Front. Robot. AI 12:1694952.* https://doi.org/10.3389/frobt.2025.1694952 (Contribution 25%)

2. Fazayeli, H., Daigh, A. L. M., Palmer, C., Pitla, S., Jones, D., & Ge, Y. (2025). Space Agriculture: A Comprehensive Systems-Level Review of Challenges and Opportunities. *Agriculture*, *15*(24), 1. https://doi.org/10.3390/agriculture15242541? (Contribution 10%)

3. Islam, M. D., Liu, W., Izere, P., Singh, P., Yu, C., Riggan, B., ... & Shi, Y. (2025). Towards real-time weed detection and segmentation with lightweight CNN models on edge devices. *Computers and Electronics in Agriculture*, *237*, 110600. https://doi.org/10.1016/j.compag.2025.110600 (Contribution 5%)

4. Singh M, Kumar V, Knezevic SZ, Irmak S, Lindquist JL, Irmak S, **Pitla S**, Jhala AJ (2024). Pollen‐mediated gene flow from herbicide‐resistant yellow corn to non‐genetically engineered food‐grade white corn. *Crop Science. 64(3): 471–481*. https://doi.org/10.1002/csc2.21230 (Contribution 10%)

5. Balabantaray A, Behera S, Liew CT, Chamara N, Mandeep S, Jhala AJ , Irmak S, **Pitla S** (2024). Targeted weed management of Palmer amaranth using robotics and deep learning (YOLOv7). *Frontiers in Robotics and AI. 11(2024)* https://doi.org/10.3389/frobt.2024.1441371 (Contribution 20%)

6. Singh M, Irmak S, Kukal M.S, Kumar V, Knezevic SZ, Lindquist JL, **Pitla S**, Jhala AJ (2024). Effect of center-pivot and subsurface drip irrigation systems on growth and evapotranspiration of volunteer corn in corn, soybean, and sorghum. *Weed Science. 72(5): 567–577*. https://doi.org/10.1017/wsc.2024.50 (Contribution 10%)

7. Singh M, Kumar V, Knezevic SZ, Irmak S, Lindquist JL, **Pitla S**, Jhala AJ (2023) Interaction of quizalofop-pethyl with 2,4-D choline and/or glufosinate for control of volunteer corn in corn resistant to aryloxyphenoxypropionates. ***Weed Technol. 37: 471–481***. doi: 10.1017/wet.2023.79 (Contribution 10%)

8. C.T. Liew[1], A Donesky[2], M Freyhof[1], I Tempelmeyer[1], **S.K. Pitla**. 2023. Estimating Battery Size Requirements for Tractor Electrification of Row-Crop Planting Operations. *Journal of the ASABE 66(6): 1481-1496* (Contribution 40%)

9. Irumva, T[1]., H. Mwunguzi[1], **S.K. Pitla**, B. Lowndes, A. Yoder, J. Siu. 2023. Agricultural Machinery Operator Monitoring System (Ag-OMS): A Machine Learning Approach for Real-Time Operator Safety Assessment. *Journal of Agricultural Safety and Health 29 (2), 85-97* (Contribution 30%)

10. C. Folkerts, J.D. Luck, **S.K. Pitla**, Y.Ge. 2022. Optical Sensor Fusion Technique For Direct Nozzle Injection Chemical Flow Rate Monitoring. *Journal of the ASABE 65 (1), 87-95* (Contribution 10%)

11. Atefi, A[2]., Y. Ge, **S.K. Pitla**, J. Schnable. 2021. Robotic Technologies for High-Throughput Plant Phenotyping: Contemporary Reviews and Future Perspectives. Frontiers in Plant Science (12):1082 (Contribution 20%) (doi.org/10.3389/fpls.2021.611940)

12. Stoll, G.P[1]., J.D. Luck, **S.K. Pitla**, R.A. Rohrer. 2021. Integration of Auxiliary Sensor Data to ISOBUS for Agricultural Machinery Data Collection. *Applied. Eng. Agric* 37(*1): 157-162*) (Contribution 25%) (doi: 10.13031/aea.14152)

13. Yao, L., **S.K. Pitla.** C. Zhao, C.T.Liew[1], D. Hu, Z. Yang. 2020. An Improved Fuzzy Logic Control Method for Path Tracking of an Autonomous Vehicle. *Trans. ASABE. 63(6): 1895-1904* (Contribution 25%) (doi: 10.13031/trans.13737)

14. Condotta, I.C.F.S., T.M. Brown-Brandl, **S.K. Pitla**, J. P. Stinn, K.O.Silva-Miranda . 2020. Evaluation of low-cost depth cameras for agricultural applications. Computers Electronics Agric. 173 (2020): 105295 (Contribution 20%) https://doi.org/10.1016/j.compag.2020.105394

15. Evans, J. T[2]., S.K**. Pitla**, J. D. Luck, M.F. Kocher. 2020. Row crop grain harvester path optimization in headland patterns. Computers Electronics Agric. 171 (2020): 105295 (Contribution 20%) https://doi.org/10.1016/j.compag.2020.105295

16. Atefi, A[2], Y. Ge**, S.K. Pitla**, J. Schnable. 2020. Robotic Detection and Grasp of Maize and Sorghum: Stem Measurement with Contact. Robotics. 9 (58): 104854 (Contribution 20%) doi:10.3390/robotics9030058

17. Atefi, A[2], Y. Ge**, S.K. Pitla**, J. Schnable. 2019. In vivo human-like robotic phenotyping of leaf traits in maize and sorghum in greenhouse. Computers Electronics Agric. 163 (19): 104854 (Contribution 20%) https://doi.org/10.1016/j.compag.2019.104854

18. Rohrer, R.A, **S.K.Pitla**, J.D. Luck. 2019. Tractor CAN bus interface tools and application development for real-timed data analysis. Computers Electronics Agric. 163(19):104847 (Contribution 35%) https://doi.org/10.1016/j.compag.2019.06.002

19. Rohrer, R.A, J.D. Luck, **S.K. Pitla**, R.M. Hoy. 2018. Evaluation of the Accuracy of Machine Reported CAN Data for Engine Torque and Speed. *Trans. ASABE. 61(5): 1547- 1557* (Contribution 25%)

20. Lindhorst, C.M[1], R.M. Hoy, **S.K. Pitla**, M.F. Kocher. 2018. Dynamic ROPs test for Tractors over 6000 kg. *Trans. ASABE. 61(1):53-62 (*Contribution 25%) https://doi.org/10.13031/trans.12499

21. C.J. Thompson, L. Luck, J. Keshwani, **S.K. Pitla**. L.K. Karr. 2018. Location on the Body of a Wearable Accelerometer Affects Accuracy of Data for Identifying Equine Gaits. *Journal of Equine Veterinary Sci. 63(2018):1-7 (*Contribution 15 %) https://doi.org/10.1016/j.jevs.2017.12.002

22. Roeber, J. BW[1], **S.K. Pitla**, R. M. Hoy, J. D. Luck, M. F. Kocher. 2017. Tractor power take-off torque measurement and data acquisition system. *Applied. Eng. Agric. 33(5): 679-686* (Contribution 40%) https://doi.org/10.13031/aea.11994

23. Roeber, J.BW[1], **S.K. Pitla**, R.M. Hoy, J.D. Luck, M.F. Kocher. 2017. Development and validation of a tractor drawbar force measurement and data acquisition system (DAQ). *Applied. Eng. Agric. 33(6): 781-789* (Contribution 40%) https://doi.org/10.13031/aea.12489

24. Forney, S. H., J.D. Luck, M. F. Kocher, and **S.K. Pitla**. 2017. Laboratory and full boom-based investigation of nozzle setup and restriction effects on flow, pressure, and spray pattern distribution. *Applied. Eng. Agric. 33(5): 641-653* (Contribution 15%) https://doi.org/10.13031/aea.12043

25. Kocher, M.F., B.J. Smith, R.M. Hoy, J.C. Woldstad, and **S.K. Pitla.** 2017. Fuel consumption models for tractor test reports. *Trans. ASABE 60(3): 693-701.* (Contribution 25%) https://doi.org/10.13031/trans.12121

26. S.L. Young, **S.K. Pitla**, F.K. Van Evert, F.J. Pierce, J.K. Schueller. 2017. Moving

integrated weed management from low level to a truly integrated and highly specific weed management system using advanced technologies. *Weed Research 57(1): 1-5* (Contribution 25%) DOI: 10.1111/wre.12234

27. **Pitla, S.K.**, J.D. Luck, J. Werner[1], N. Lin[1] and S.A Shearer. 2016. In-field fuel use and load states of agricultural field machinery. *Computers Electronics Agric.* 121(2016): 290 - 300. (Contribution 70%) http://dx.doi.org/10.1016/j.compag.2015.12.023

28. Roeber, J. BW[1], **S.K. Pitla,** J.D. Luck, M.F. Kocher, R.M. Hoy. 2016. Tractor Hydraulic Power Data Acquisition System. *Computers Electronics Agric. 127(2016):1-14* (Contribution 40%) http://dx.doi.org/10.1016/j.compag.2016.05.012

29. Marx, S.E., Joe D. Luck, **S.K. Pitla**, Roger M. Hoy. 2016. Comparing various hardware/software solutions and conversion methods for Controller Area Network (CAN) bus data collection. *Computers Electronics Agric. 128(2016):141-148* (Contribution 20%) http://dx.doi.org/10.1016/j.compag.2016.09.001

30. Marx, S.E., J.D. Luck, R.M. Hoy, **S.K. Pitla**, M.J. Darr, and E. Blankenship. 2015. Validation of machine CAN Bus J1939 fuel rate accuracy using Nebraska Tractor Test Laboratory fuel rate data. *Computers Electronics Agric.* 118: 179-185. (Contribution 20%) http://dx.doi.org/10.1016/j.compag.2015.08.032

31. Luck, J.D., S.A. Shearer, M.P. Sama, and **S.K. Pitla**. 2015. Control system development and response analysis of an electronically actuated variable-orifice nozzle for agricultural pesticide applications. *Trans. ASABE.* 58(4): 997-1008. (Contribution 20%) DOI 10.13031/trans.58.10945

32. Luck, J.D., **S.K. Pitla**, M.P. Sama, and S.A. Shearer. 2015. Flow, spray pattern and droplet spectra characteristics of an electronically actuated variable-orifice nozzle. *Trans. ASABE*. 58(2) 261-269. (Contribution 25%) DOI 10.13031/trans.58.10798

33. **Pitla, S.K.,** N. Lin[1], S.A. Shearer and J.D. Luck**.** 2014**.** Use of Controller Area Network (CAN) Data To Determine Field Efficiencies of Agricultural Machinery. *Applied Eng. Agric.* 30(6): 829-839 (Contribution 70%) DOI 10.13031/aea.30.10618

34. Ramarao, V**.,** P.R. Thomison, C.K. Gabriel, M.A. Bennett, E.M. Grassbaugh, M.D. Kleinhenz, S.A. Shearer and **S.K. Pitla**. 2014. Seed Tape Effects On Corn Emergence Under Greenhouse Conditions. *Crop Mgmt.* 13(1). (Contribution 10%) doi:10.2134/CM-2014-0051-BR

35. Luck, J.D., A. Sharda, **S.K. Pitla,** J.P. Fulton, and S.A. Shearer.2011. A Case Study Concerning the Effects of Controller Response and Turning Movements on Application Rate Uniformity with a Self-Propelled Sprayer. *Trans. ASABE*. 54(2):423-431. (Contribution 20%) doi: 10.13031/2013.36445

36. Luck, J.D., **S.K. Pitla,** R.S. Zandonadi, M.P. Sama, and S.A. Shearer. 2010. Estimating Off-Rate Pesticide Application Errors Resulting from Agricultural Sprayer Turning Movements.*PrecisionAgri.12(4):534-545*.(Contribution 30%) https://doi.org/10.1007/s11119-010-9199

37. **Pitla, S.K.,** L.G. Wells and S.A. Shearer**.** 2009**.** Integration of an Extended Octagonal Ring Transducer and Soil Coulterometer for Identifying Soil Compaction. *Applied Eng. Agric*. *25(5): 647-652*. (Contribution 80%)

38. Luck, J.D., **S.K. Pitla,** T.G. Mueller, C.R. Dillon, S.F. Higgins, J.P. Fulton, and S.A. Shearer. 2009. Potential for Pesticide and Nutrient Savings via Map-Based Automatic Boom Section Control of Spray Nozzles. *Computers Electronics Agric. 70(1): 19-26.* (Contribution 30%) https://doi.org/10.1016/j.compag.2009.08.003

### 2.1.2. Peer Reviewed Journal Publications Submitted/In-review*

1. Grispos, G., **S.K.Pitla**, M. Freyhof[1], I. Tempelmeyer[1]. 2025. Investigating The Implications of Cyberattacks Against Precision Agricultural Operations: A Nitrogen Application Use Case, to Precision Agriculture. *Precision Ag* (*Under Review).*

### 2.1.3. Peer Reviewed IEEE/CS Conference Proceedings*

1. Muvva, VVRMKR., Joseph, K. T., Wolf[1], M., & Pitla, S. (2025, August). Reliable AI for UAVs Through Control/Perception Co-design. In *Dynamic Data Driven Applications Systems: 5th International Conference, DDDAS/Infosymbiotics for Reliable AI 2024, New Brunswick, NJ, USA, November 6–8, 2024, Proceedings* (p. 296). Springer Nature.

2. Freyhof, M., Grispos, G., Pitla, S. K., & Mahoney, W. (2025, March). Investigating The Implications of Cyberattacks Against Precision Agricultural Equipment. In *20th International Conference on Cyber Warfare and Security (ICCWS 2025)*.

3. Rao, V. V. R. M. K., Chawla, Y., Joseph, K. T., Pitla, S., & Wolf, M. (2025). Cooperative Localization of UAVs in Multi-Robot Systems Using Deep Learning-Based Detection. In *AIAA Science and Technology Forum and Exposition, AIAA SciTech Forum 2025*. American Institute of Aeronautics and Astronautics Inc, AIAA.

4. Nie, S., M.M., Lunar, G. Bai, Y. Ge, **S.K. Pitla**, C.E. Koksal, M.C. Vuran. 2022. mmWave on a Farm: Channel Modeling for Wireless Agricultural Networks at Broadband Millimeter-Wave Frequency. *2022 19th Annual IEEE International Conference on Sensing, Communication, and Networking (SECON). PP: 388-396.*

5. Vuran,M.C., M.M., Lunar, S. Nie, Y. Ge, G. Bai, **S.K. Pitla**, C.E. Koksal. 2022. Millimeter-Wave Agricultural Channel Measurements in Corn and Soybean Fields at Different Growth Stages. *2022 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (AP-S/URSI). PP: 1686-1687*

6. Freyhof, M., G. Grispos, **S.K. Pitla,** C. Stolle. 2022. Towards a Cybersecurity Testbed for. In the Proceedings of the 17th Midwest Association for Information Systems Conference (MWAISC), Omaha, Nebraska. https://doi.org/10.48550/arXiv.2205.05866

7. Nadig, D., S.El. Alaoui, B. Ramamurthy, **S.K. Pitla**. 2021. ERGO: A Scalable Edge Computing Architecture for Infrastructure less Agricultural Internet of Things. 2021 IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN)

8. Guru, H.S., A.D.Weng, **S.K.Pitla**, D.A.Dev. 2021. SensiTray: An Integrated Measuring Device for Monitoring Children's Mealtime Dietary Intake. 2021 IEEE International Instrumentation and Measuring Technology. PP: 1- 6

### 2.1.4. Book Chapters and Other Peer Reviewed Articles

1. **Pitla, S.K.** and C.T.Liew. 2021. Row-Crop Field Machinery CAN Bus Data Collection. ASABE EOPD-Special Projects, Case Studies and Modules for Data Science Instruction.

2. **Pitla, S.K.,** S. Bajwa, S.Bhusal, T. Brumm, T. Brown-Brandl, D.R. Buckmaster, I. Condotta, J. P. Fulton, T. Janzen, M. Karkee, M. Lopez, R. Moorhead, M.P. Sama, L. Shumacher, S.A. Shearer, A. Thomasson. 2020. Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges. CAST Issue Paper, IP70, Ames, IA

3. Weigman, C., **S.K. Pitla**, S.A. Shearer. 2019, "Advances in communication systems in agricultural robots", in Robotics and Automation for Improving Agriculture. Editor: John Billingsley, bd publishing. ISBN-13: 9781786762726

4. **S.K. Pitla**. "Agricultural Robotics", in Advances in Agricultural Machinery and

Technologies. 2018. Editor: Guangnan Chen, CRC Press. ISBN-13: 978-1498754125 ISBN-10: 1498754120

5. Shearer, S.A. and **S.K. Pitla**, "Precision Planting and Crop Thinning", in Automation: The Future of Weed Control in Cropping Systems. Young, S.L and F.J. Pierce, Springer, 2014, pp. 99-124. ISBN: 978-94-007-7511-4 (Print) 978-94-007-7512-1 (Online)
6. Shearer, S.A. and **S.K. Pitla**, "Field Production Automation," in Agricultural Automation: Fundamentals and Practices, Zhang, Q and F.J. Pierce, CRC Press, 2013, pp. 97-124.

### 2.1.5. Conference Proceedings (Peer Reviewed)

1. Dotto, J., Y. Xiong, **S.K. Pitla**, R.S. Gates. A web-based interface for automatic pollutant emission estimations in poultry facilities. Proceedings of 2023 Annual International American Society of Agricultural & Biological Engineers (ASABE) Meeting, July 9-12, Omaha, NE
2. K[1].Mowat, **S.K. Pitla**, L. Perry. 2023. Case Study of Preparedness in Engineering for Agricultural Start-ups (PEAS). Proceedings of 2023 American Society of Engineering Education (ASEE) Conference & Exposition, June 25-28, Baltimore, MD.
3. Troyer, T. A[1], **S.K. Pitla,** E. Nutter. 2016. Inter-row Robot Navigation using 1D Ranging Sensors Inter-row Robot Navigation using 1D Ranging Sensors. *IFAC-PapersOnLine 49(16):463-468*

   https://doi.org/10.1016/j.ifacol.2016.10.084

4. **Pitla, S.K.,** J.D. Luck and S.A. Shearer. 2014. Multi-Robot System Control Architecture (MRSCA) For Agricultural Mobile Robots. In Proceedings of the Second International Conference on Robotics and Associated High-technologies and Equipment for Agriculture and Forestry (RHEA – 2014), May 21-23, 2014. Madrid, Spain.
5. **Pitla, S.**K., J.D., Luck, S.A. Shearer, N. Lin 1, B.A. Schroeder, A.A. Klopfenstein. 2013. Work and Load Performance Profiles for Agricultural Field Machinery. In Proceedings of the 71st Land, Technik AgEng 2013 Conference, Hannover, November 2013, VDI-BERICHTE, 2193:29-36

### 2.1.6. Conference Proceedings (Non-peer Reviewed)

1. Palli, P[1]., C. Liew, A.Drozda, H. Mwunguzi, **S.K.Pitla**, H. Walia, Y.Ge. 2019. Robotic Gantry for Automated Imaging, Sensing, Crop Input Application, and High-Throughput Analysis. Paper Number: 1901519 in Proc. Of the 2019 Annual International Meeting, July 20-Aug 1, Boston, Massachusetts, July 7–10, 2019
2. Stoll, G.P[1]., R.A. Rohrer, **S.K. Pitla**, J.D.Luck. 2018. Prediction of Agricultural Implement Hydraulic Power Requirements Using Controller Area Network Bus Data.

Paper Number: 1801552 in Proc. Of the 2018 Annual International Meeting, July 20-Aug 1, Detroit, Michigan.

3. Roeber, JBW[1], **S.K. Pitla**, R.M. Hoy, and J.D. Luck. Development of a row-crop tractor data acquisition system. Paper No. 152187827 in Proc. Of the 2015 ASABE International Meeting, July 26-29, New Orleans, LA. (13 pages)

4. **Pitla, S.K.,** J.D. Luck and S.A. Shearer. 2010. Multi-Robot System Control Architecture (MRSCA) for Agricultural Production. Paper No. 1008703 in Proc. Of the 2010 ASABE International Meeting, June 20-23, Pittsburg, PA. (11 pages)

5. **Pitla, S.K.,** J.D. Luck and S.A. Shearer. 2010. Low-Cost Obstacle Detection Sensor Array for Unmanned Agricultural Vehicles. Paper No. 1008702 in Proc. Of the 2010 ASABE International Meeting, June 20-23, Pittsburg, PA. (11 pages)

6. **Pitla, S.K.,** J.D. Luck and S.A. Shearer. 2009. Cut Crop Edge Detection Using a Laser Sensor. Paper No. 096717 in Proc. Of the 2009 ASABE International Meeting, June 21-24, Reno, NV. (12 pages)

### 2.1.7. Invited Talks, Webinars, and Demonstrations

1. **Pitla, S.K. 2023**. Robotics and AI as Technology Tools for Climate-Smart Agriculture. C-DAC Kolkata, India, December, 2023.
2. **Pitla, S.K. 2023**. Robotics and AI for Climate-Smart Production Agriculture. SIMAP conference, Mato Grosso, Brazil. August 18th, 2023.
3. **Pitla, S.K. 2023**. Robotics and Computer Vision in Agriculture. Nebraska Innovation Studio. Inaugural Heartland Robotics Speaker, Lincoln, Nebraska.
4. **Pitla, S.K. 2023**.AI-Enabled Robotics in Row-Crop Operations. Acharya NG Ranga Agricultural University, Andhra Pradesh, India.
5. **Pitla, S.K. 2023**.Transitioning to Robotics and AI in production Agriculture, Columbia, Missouri.
6. **Pitla, S.K. 2023.** Cybersecurity of Robotic Agricultural Machinery. French American Innovation Day (FAID), Consulate General of France, Chicago, Illinois.
7. **Pitla, S.K. 2023.** AI Enabled Robotics in Row-Crop Systems. International Conference on Systems and Technologies for Smart Agriculture, Kolkata, India.
8. **Pitla, S.K. 2022.** Smart Farms of the Future – Trends in Robotics & Automation. School of Computing Colloquium, University of Nebraska-Lincoln. Nov 17, 2022.
9. **Pitla, S.K. 2022.** Robotics Tools for Conservation Agriculture, Agricultural Rural Connectivity (ARC) Workshop, ENREEC, Aug 15-16, 2022**.**
10. **Pitla, S.K. 2022.** Flex-Ro Robot and Swarm Robotics Demo. Nitrogen Use Efficiency Workshop. August 1-3, 2022. Nebraska Innovation Campus (NIC), Lincoln, NE.

11. **Pitla, S.K.,** and I. Tempelmeyer. 2022. Flex-Ro Robot Demo at the Farm Progress Show's Farm Next Booth, Aug 30 to September 1st, Boone, Iowa
12. **Pitla, S.K.**, A. Velez, J. McMechan.2021. Invited Presentation on "Agricultural Robotics in Broad Acre Row-Crop Production". Session: Using Technology to Adapt, Advance, and Transform Insect Resistance Management. **Entomology Conference 2021**, Oct 31 - Nov 3, Denver, Colorado.
13. **Pitla, S.K.** 2021. Invited Presentation on "Transitioning to Robotics in Row-Crop Production" in the Autonomy/Robotics session. **InfoAg 2021**, Aug 3 - Aug 5, 2021, St. Louis, Missouri.
14. **Pitla, S.K.** 2021. Webinar on "Trends in Machine Automation and Robotics in Broad Acre Row-Crops". **VDI Seminars**, Germany, July 29, 2021. Attendees' demographic [Global: 90 Professionals]
15. **Pitla, S.K.** 2020. Webinar on "Ground and Aerial Robots for Agricultural Production: Opportunities and Challenges". ww.cast-science.org, Nov 17, 2020. Attendees' demographic [Global: 750 registered 450 attended]
16. **Pitla, S.K.** Autonomous Machinery for Automated Data Collection in Agronomic Studies. Students of Agronomy, Soils, and Environmental Sciences Conference (SASES), April 12th, University of Nebraska-Lincoln. 2018
17. **Pitla, S.K.** "From Horses to Hands-Free Cab-Less Tractors"- Trends in Agricultural Machinery Automation". BSE Colloquium, April 4th, University of Nebraska-Lincoln. 2018
18. **Pitla, S.K.** Agricultural Machinery Trends and Multi-Robot Systems. Smart Ag International Symposium, Dec 3rd -6th, 2017, East Lansing, MI
19. **Pitla, S. K.** and J. Werner. AgRA - TC Lightning Round, "Agricultural Robotics Research at UNL," IEEE - Robotics and Automation Society, Webinar, January 2017.
20. **Pitla, S.K.** Machine Automation and Agricultural Robotics. Ag Builders of Nebraska (ABN), Lincoln, Nebraska, January 13th, 2016.
21. **Pitla, S.K.** Farming of the Future and Agricultural Robotics. Edgerton Explorit Center's Night at the museum event, Aurora, Nebraska, May 12th, 2016.
22. **Pitla, S.K**. Current and Future Trends in Agricultural Machinery Automation, NEATA, February 5, 2014, Grand Island, Nebraska
23. **Pitla, S.K**. 2014. Agricultural Robotics and Machine Automation in the US. April 15th 2014. C-DAC, Kolkata, West Bengal, India.

### 2.1.8. Presentations and Webinars

1. Atefi, A., Y. Ge, **S.K. Pitla,** ASABE AIM. Modeling the UAV-UGV Collaboration Architecture for Material Refilling in Support of Robotic-Autonomous Planting ASABE,Omaha, NE (July 9-12, 2023).
2. Murman, J., S.K. Pitla. ASABE AIM. "Implementation, Analysis and Control using

the ifm O3M151 3D Sensor on J1939 CANbus Network", ASABE, Boston, Massachusetts (July 9, 2019).

3. Humphrey, R., C.T. Liew, S.K. Pitla, T. Troyer. ASABE AIM. "Non-GPS Based Unmanned Ground Autonomous Robotic Navigation Strategies for Under-Canopy Sensing", ASABE, Boston, Massachusetts (July 9, 2019).
4. Atefi, A., Y. Ge, **S.K. Pitla,** ASABE AIM. "An Automated Robotic System to Measure Stem Diameter of Maize and Sorghum Plants in Greenhouse", ASABE, Boston, Massachusetts (July 9, 2019).
5. Liew, C.T., S.K. Pitla., R.Rohrer, J.D. Luck, R.Hoy, ASABE AIM. "Tractor Instrumentation System for Characterizing Mixed Mode Tractor Power States", ASABE, Boston, Massachusetts (July 9, 2019).
6. Stoll, G.P., J.D. Luck, **S.K. Pitla.** ASABE AIM. "Prediction of Implement Hydraulic Power Requirements for Small Grain Planting Field Operation", ASABE, Boston, Massachusetts (July 9, 2019).
7. Stoll, G.P., R. Rohrer, **S.K. Pitla,** J.D. Luck. ASABE AIM. "Prediction of Agricultural Implement Hydraulic Power Requirements Using the Controller Area Network Bus Data", ASABE, Detroit, Michigan (July 30, 2018).
8. C. Lindhorst, R. Hoy, **S.K. Pitla**, M.F. Kocher. ASABE AIM. "Dynamic ROPS Test for Tractors over 6,000 kg", ASABE, Detroit, Michigan (July 30, 2018).
9. Roeber, J., **S.K. Pitla**. ASABE AIM. "Humulus lupulus: A Drying Review for Small-Scale Production", ASABE, Detroit, Michigan (July 30, 2018).
10. Evans, J.T., **S.K. Pitla**, J.D. Luck. ASABE AIM. "In-Field Harvest Logistics Modeling for Single Combine/Grain Cart Operations", ASABE, Detroit, Michigan (July 30, 2018).
11. Atefi, A., Y.Ge, **S.K. Pitla.** ASABE AIM. "Integration of a Plant Phenotyping Robotic Manipulator with LemnaTec High-Throughput Plant Phenotyping System", ASABE, Detroit, Michigan (July 30, 2018).
12. **Pitla, S.K.,** D. Mabie, E. Curtis. ASABE AIM. "Teaching Coding to Technology Students for Automation Applications", ASABE, Detroit, Michigan (July 30, 2018).
13. **Pitla, S. K.** Smart Ag International Symposium, "Agricultural Machinery Trends and Multi-Robot Systems," IEEE and ASABE, East Lansing, Michigan. (December 4, 2017).
14. Atefi, A., Ge, Y., **Pitla, S.K.,** ASABE AIM, "Development of a robotic system to grasp leaves for plant phenotyping," ASABE, Spokane, Washington. (July 18, 2017).
15. Troyer, T. A., **Pitla, S.K**., ASABE AIM, "Development of an Autonomous Field Robotics Platform: Systems and Control Perspective," ASABE, Spokane, Washington. (July 18, 2017).
16. Evans, J., **Pitla, S.K.,** ASABE AIM, "Hands-on Approach to Teaching J1939 Controller Area Network (CAN) bus Communication and Embedded Controls," ASABE, Spokane, Washington. (July 17, 2017).
17. Evans, J. Pitla, **S.K. Pitla**, Luck, J., ASABE AIM, "In-Field Harvest Logistics Modeling for Single Combine/Grain Cart Operations," ASABE, Spokane, Washington. (July 17,

2017).

18. **Pitla, S.K.**, ASABE AIM, "Using Arduino as a Tool to Teach Basic Instrumentation and Control to Technology Students," ASABE, Spokane, Washington. (July 17, 2017).
19. **Pitla, S.K**, J.D. Luck, J.W. Werner and S.A. Shearer. Tractor Load State Determination Using Controller Area Network (CAN) Data. Oral Presentation, ASABE Annual International Meeting. Orlando, Fl, July 19th, 2016.
20. Troyer, T. A1, **S.K. Pitla** and E. Nutter. Inter-Row Robot Navigation Using 1D Ranging Sensors. AGRICONTROL 2016: The 5th IFAC Conference on Sensing, Control and Automation for Agriculture; 14-17 August, 2016; Seattle, Washington, USA
21. Troyer, T. A1, **S.K. Pitla**, and E. Nutter. Design of a Fuzzy Controller for Autonomous Corn Row Navigation. Oral Presentation, ASABE Annual International Meeting. Orlando, Fl, July 19th, 2016.
22. Evans, J. T1, J.D. Luck and **S.K. Pitla**, and E. Nutter. Evaluating Potential Fuel Savings from Optimized Grain Cart Path Planning. Oral Presentation, ASABE Annual International Meeting. Orlando, Fl, July 19th, 2016.
23. Stevens, R. S, J.D. Luck, R. Ferguson and **S.K. Pitla**. Application of a Multi Hybrid Planter and Geospatial Data Layer Analysis Method for Optimal Placement of Corn Hybrids and Soybean Seed Treatments. Oral Presentation, ASABE Annual International Meeting. Orlando, Fl, July 20th, 2016.
24. **Pitla, S.K,** E. Curtis and D.Dam. Teaching Programming to Mechanized Management System Students. Oral Presentation, ASABE Annual International Meeting. New Orleans, LA, July 28th, 2015.
25. J. Werner and **S.K. Pitla**. Midwestern Row Crop Autonomous Agricultural Machinery Design Considerations. Oral Presentation, ASABE Annual International Meeting. New Orleans, LA, July 28th, 2015.
26. Roeber, J., **S.K. Pitla**, R.M. Hoy, and J.D. Luck. Development of a row-crop tractor data acquisition system. Oral Presentation, ASABE Annual International Meeting. New Orleans, LA, July 28th, 2015.
27. Marx, S.E., J.D. Luck, and **S.K. Pitla**. Comparison of machine CAN bus J1939 fuel rate to Nebraska Tractor Test Laboratory fuel rate data. Oral Presentation, ASABE Annual International Meeting. New Orleans, LA, July 28th, 2015.
28. Marx, S.E., J.D. Luck, and **S.K. Pitla**. Comparing various hardware/software solutions for CAN bus data collection. Poster Presentation, ASABE Annual International Meeting. New Orleans, LA, July 28th, 2015.
29. Marx, S.E., J.D. Luck, **S.K. Pitla**, and R.M. Hoy. Comparison of controller area network (CAN) bus J1939 fuel rate to Nebraska Tractor Test Laboratory fuel rate data. ASABE Agricultural Equipment Technology Conference. Louisville, KY. February 9th, 2015.
30. Marx, S.E.1, J.D. Luck, **S.K. Pitla**, and R.M. Hoy. Controller area network (CAN) data logging and comparison methods: a study of different CAN collection methods.

Nebraska Agricultural Technologies Association Annual Conference. Grand Island, NE. February 5th, 2015.

31. **Pitla, S.K**, J.D. Luck and S.A. Shearer. 2014. Multi-Robot System Control Architecture (MRSCA) For Agricultural Mobile Robots. In Proceedings of the Second International Conference on Robotics and Associated High-technologies and Equipment for Agriculture and Forestry (RHEA – 2014), May 21-23, 2014. Madrid, Spain.
32. **Pitla, S.K**, J.D., Luck, S.A. Shearer, N. Lin, B.A. Schroeder, A.A. Klopfenstein. 2013. Work and Load Performance Profiles for Agricultural Field Machinery. In Proceedings of the 71st Land, Technik AgEng 2013 Conference, Hannover, November 2013, VDI-BERICHTE, 2193:29-36
33. **Pitla, S.K,** J.D.Luck and S.A. Shearer. 2012. Development of a CAN based Autonomous Vehicle Platform for Validating Control Architectures. Paper No. 121338115 in Proceedings of the 2012 American Society of Agricultural and Biological Engineers Annual International Meeting, July 29– August 1, Dallas, Texas.
34. Luck, J.D., M.P.Sama, **S.K. Pitla** and S.A. Shearer. 2012. Droplet Spectra Characteristics from a Variable-Orifice Nozzle at Constant Pressures. Paper No. 121337472 in Proceedings of the 2012 American Society of Agricultural and Biological Engineers Annual International Meeting, July 29– August 1, Dallas, Texas.
35. Billman, R., **S.K. Pitla**, A. Klopfenstein, I.Kuenzli and S.A. Shearer. 2012. Historic Perspective on the Growth in Tractor Power, Vehicle Weight, Tire Size and Fuel Efficiency. Paper No. 121338156 in Proceedings of the 2012 American Society of Agricultural and Biological Engineers Annual International Meeting, July 29– August 1, Dallas, Texas.
36. **Pitla, S.K,** J.D.Luck, S.A. Shearer and R.S. Zandonadi. 2011. Analyzing Robot Behaviors in a Multi-Robot Agricultural Production System. Paper No. 1111602 in Proceedings of the 2011 American Society of Agricultural and Biological Engineers Annual International Meeting, August 7– 10, Louisville, Kentucky.
37. **Pitla, S.K,** J.D.Luck and S.A. Shearer. 2011. Obstacle Detection, Mapping and Avoidance using an Infra-Red Sensor Array. Paper No. 1111600 in Proceedings of the 2010 American Society of Agricultural and Biological Engineers Annual International Meeting, August 7 – 10, Louisville, Kentucky.
38. Luck, J.D., **S.K.Pitla** and S.A.Shearer. 2011. Discharge Rate and Spray Pattern Characterization from an Actively Controlled Variable-Orifice Nozzle. Paper No. 1111759 in Proceedings of the 2011 American Society of Agricultural and Biological Engineers Annual International Meeting, August 7– 10, Louisville, Kentucky.
39. Zandonadi, R.S., T.S. Stombaugh, M.P.Sama**, S.K.Pitla** and R.Baldo. 2011. Evaluation of a Reduced Equipment Set for Multiple Vehicle Guidance Using distance Sensor to Determine Relative Position between Vehicles. Paper No. 1111772 in Proceedings of the 2011 American Society of Agricultural and Biological Engineers Annual International Meeting, August 7– 10, Louisville, Kentucky.

40. Luck, J.D., R.S.Zandonadi, **S.K.Pitla** and S.A.Shearer. 2011. Characterization of Pesticide Application Errors and Quantification of Crop Production Impacts for Manual versus Automatic Boom Section Control on Agricultural Sprayers. Paper No. 1111757 in Proceedings of the 2011 American Society of Agricultural and Biological Engineers Annual International Meeting, August 7– 10, Louisville, Kentucky.
41. **Pitla, S.K,** J.D.Luck, S.A. Shearer. 2010. Multi-Robot System Control Architecture (MRSCA) for Agricultural Production. Paper No. 1008703 in Proceedings of the 2010 American Society of Agricultural and Biological Engineers Annual International Meeting, June 20 – 23, Pittsburg, Pennsylvania.
42. **Pitla, S.K,** J.D.Luck, S.A. Shearer. 2010. Low-Cost Obstacle Detection Sensor Array for Unmanned Autonomous Agricultural Vehicles. Paper No. 1008702 in Proceedings of the 2010. American Society of Agricultural and Biological Engineers Annual International Meeting, June 20 – 23, Pittsburg, Pennsylvania.

## 2.1. Grantsmanship Record

| Role | Internal | | External | | Total | |
|---|---|---|---|---|---|---|
| | Since 2019 | Since 2014 | Since 2019 | Since 2014 | Since 2019 | Since 2014 |
| **PI** | $379,000 | $619,694 | $681,146 | $1,446,340 | $1,060,146 | $2,066,034 |
| **Co-PI** | $150,000 | $244,376 | $14,899,798 | $16,099,713 | $15,049,798 | $16,344,089 |
| **Both** | $529,000 | $864,070 | $15,580,944 | $17,546,053 | $16,109,944 | $18,410,123 |

### 2.2.1. Internally Funded Research and Teaching Grants

1. UNL Grand Challenges 2022 Planning Grant. SPACE 2 (Space Policy Agriculture Climate Extreme Environments). Two PIs: Y. Ge and **S.K.Pitla**. **$150,000**

2. UNL Grand Challenges 2022 Planning Grant. NeCA (Nebraska Circular Agriculture). Awada et al., **S.K.Pitla**. **$150,000**

3. **S.K. Pitla,** G. Grispos, C. Stolle. 2020. Security and Hackability Considerations of Driverless Tractors and Agricultural Robots. System Science Collaborative Initiative – NU System Wide Seed Funding. **$150,000**

4. H. Walia, **S.K.Pitla**, Y.Ge.2019. Next-generation greenhouse robotic gantry system for automated imaging, sensing, crop input application, and high throughput analysis. UNL-ARD. **$43,490.**

5. **Pitla, S.K.** 2019. Differential Tuition Funding for 5 MSYM/AGEN/BSEN courses. Department of Biological Systems Engineering**. $6,500**

6. **Pitla, S.K.** 2017. Differential Tuition Funding for PLC control modules used for MSYM and AGEN class Improvements. Department of Biological Systems Engineering**. $8,500**

7. **Pitla, S.K.,** Y. Ge, J.D. Luck, R. Ferguson. 2016. Flexible Structured Robotic Vehicle (Flex-Ro), a Field Phenotyping Robotic Vehicle Platform Development. ARD Phenotyping Seed Grant, University of Nebraska-Lincoln. **$60,000.** WBS Number: 2162211068

8. **Pitla, S.K.** 2016. Differential Tuition Funding for MSYM and AGEN class Improvements. Department of Biological Systems Engineering**. $20,000**

9. **Pitla, S.K.** 2016. College of Engineering Equipment Research Grant. University of Nebraska-Lincoln**. $15,000**

10. **Pitla, S.K**. 2016. Startup funds for Biological Systems Engineering – Programming, Instrumentation and Electronics (BSE-PIE) group. Department of Biological Systems Engineering. **$5000**

11. **Pitla, S. K**. 2015. Autonomous Agricultural Machine for Row Crop Production. ARD Strategic Funding, University of Nebraska-Lincoln. **$70,000.** WBS Number: 21-6221-1059.

12. Y. Ge, H. Walia, **S.K. Pitla**. 2015. Robotic Technologies for Automated Plant Phenotyping Using Wheat as a Model Plant. ARD Wheat Phenotyping Grant, University of Nebraska-Lincoln**. $94,346**

13. **Pitla, S. K**. 2015. Differential Tuition Funds for MSYM and AGEN Course Improvement. Department of Biological Systems Engineering. **$15,000**

14. **Pitla, S.K,** 2014. Integrating Interactive Learning and Technology in Classroom. UNL-CASNR, **$10,194**

### 2.2.2. Externally Funded Research and Teaching Grants

1. Jhala, A and **S.K. Pitla** et al. **$299,452**. 2025. Exploring New Technologies for Integrated Management of Herbicide-Resistant Weeds in Soybean in North Central Region: Research & Extension. North Central Soybean Research Program (NCSRP).

2. **Pitla, S.K. 2024**. $175,000. SBIR/STTR USDA-NIFA. Plains Technologies LLC, ROBOTIC COVER-CROP DRILL

3. **Pitla, S.K.2023**. $20,000 Gift from ENEL (https://www.enel.com/) to explore robotic mowing in Agrivoltaic Farms.

4. Vuran, M.C., C. Argyropoulos, Y. Ge, S. Nie, Q. Liu, **S.K. Pitla.** 2022. CNS Core: Medium: Field-Nets: Field-to-Edge Connectivity for Joint Communication and Sensing in Next-Generation Intelligent Agricultural Networks. NSF. **$1,000,000**

5. Riley, M., B. Duncan, C. Nelson, **S.K.Pitla**, W. Qiao. 2022. Heartland Robotic Cluster (HRC) – Robotics Research & Teaching. EDA. **$25,000,000**. UNL Share: **$9,360,538**

6. J. Luck et al**., S.K. Pitla**. 2022. Nitrogen Research for Agriculture Transformation and Enhancement (NRATE). 2022. USDA-ARS. **$3,985,200**

7. D. Santra et al., **S.K. Pitla.** 2022. (OUAT) India-NAHEP Undergraduate Students and Faculty Training. **$47,000**

8. Vuran, M.C., T. Brown-Brandl, **S.K. Pitla**, E.Ekici, J. Camp. 2021. NSF-ERC Planning Grant: Engineering Research Center for Agricultural and Rural Connectivity (ARC). **$100,000**

9. **Pitla, S.K.,** R.A. Rohrer, Y. Shi, J.D. Luck. 2021. USDA-NIFA-AFRI, Ground Robot – UAV Collaboration for Material Refilling in Row Crops. **$498,824**

10. **Pitla, S.K.,** B. Lowndes, A.Yoder, K.S.Siu. 2020**.** Ag-Operator Monitory Systems (Ag-OMS) for Safety and Health Risk Detection and Assessment. CS-CASH Pilot/Feasibility Projects Program. **$20,000**

11. Vuran et al., **S.K.Pitla.** T. Brown-Brandl, S. Irmak. 2020. Nebraska Experimental Test Bed of Things (NEXTT). NSF. **$300,000**.

12. D. Piatkowski, **S.K. Pitla,** and J.D. Luck. 2019. Preparing for a Driverless Future. Nebraska Department of Transportation. **$107,060.**

13. **Pitla, S.K**, J.D. Luck, and M.F. Kocher. 2018. Grain Harvest Digital Logistics Tool Development for Producers and CLAAS Customers. CLAAS-Omaha, NE, **$54,782**

14. **Pitla, S.K,** R.Hoy, J.D.Luck, R.Rohrer. 2018. In-Field Tractor Operational Load Profile Generation in Support of Advanced Tractor Testing in Mixed-Mode Power States. USDA-NIFA AFRI, **$472,887.**

15. **Pitla, S.K.** 2017. Electric Motors and Starters Acquisition from AGCO/GSI for teaching Electrical and Control Principles. **$8000**

16. Luck, J.D, G. Kruger, **S.K.Pitla.** 2017. Next-Generation Spray Drift Mitigation via Field-Deployable, Real-Time Weather Monitoring and Novel Spray Nozzle Control Technologies. USDA-NIFA AFRI, **$499,916**

17. Dev, D. A., N. Williams, C. Gustafson**, S.K. Pitla,** A. Guru, M. A. Knott, L. Boeckner. 2016. Food systems, health and well-being: understanding complex relationships and dynamics of change. Multi-state Hatch funding through USDA, **$374,999**

18. Ge, Y., J. Schnable, **S.K. Pitla.** 2016. PAPM EAGER: Transitioning to the Next Generation Plant Phenotyping Robots, NSF/NIFA, **$ 285,000**

19. **Pitla, S.K.** 2016. Embedded Controller Demonstrators Development for Training AGEN and MSYM Students. Danfoss Power Solutions, Iowa, **$59,768**

20. M.F Kocher and **S.K. Pitla.** 2016. Research and Development of a Scalable Drier for Small Hops Growing Operations. Nebraska Department of Economic Development, **$40,000**

21. **Pitla, S.K.** 2016**.** Research Equipment and Sensor Donations from Danfoss Power Solutions, Kvaser, IFM Efector, **$ 12,000**

22. **Pitla, S.K.** 2016**.** Two week STEM workshop at Edgerton Explorit Center, Aurora, Nebraska. **$ 1,200**

23. **Pitla, S.K**, J.D. Luck, D.R. Keshwani and M.F. Kocher. 2015. Integration of CLAAS Telematics Data into Grain and Forage Machine Harvesting Logistics. CLAAS-Omaha, NE, $**111,557.** WBS Number: 2662210287001

24. **Pitla, S.K**, and J.Werner. 2015. CAN enabled IC engines for Autonomous Agricultural Platform Development**,** Kubota engines, Lincolnshire, IL**, $8,800**

25. **Pitla, S.K**, and J.Werner. 2015. Row crop tractor tires (Good Year 7.2 – 16 R1). **Titan** International, Des Moines, IA, **$1,560**

26. **Pitla, S.K.** 2015. Instrumented Electric Robotic Platforms with GPS, Wireless Modules, and 1 Trailer. University of Kentucky Robot Platforms, **$15,000**

27. **Pitla, S.K.** 2015. CAN data acquisition modules and software for advanced CAN Applications. Vector, Novi, Michigan, **$15,000**

28. **Pitla, S.K**, and J.Werner.2015. Hydraulic components for Autonomous Agricultural Platform Development. Danfoss Power Solutions, Iowa, **$40,000**

29. **Pitla, S. K**, 2015. Electrical Control Panels of the Center-Pivot Systems, Lindsay Manufacturing, Lindsay, NE, **$5000**

30. Farm Management Software and Field Hardware Training for Kentucky Corn, Soybean, and Small Grains Producers. Luck, J.D., J.P. Fulton, M.J. Darr, **S.K. Pitla**, T.G. Mueller, and S.A. Shearer. Precision Agriculture. Kentucky Corn Growers Association, 2012-2013, **$12,500**.

31. Farm Management Software and Field Hardware Training for Kentucky Corn, Soybean, and Small Grains Producers. Luck, J.D., J.P. Fulton, M.J. Darr, **S.K. Pitla**, T.G. Mueller, and S.A. Shearer. Precision Agriculture Kentucky Small Grains Growers Association, 2012-2013, **$5,000**.

32. Robotic Architecture for Deployment of Multiple Autonomous Agricultural Vehicles. USDA/CSREES Special Grant. **Pitla**, **S.K.,** R.S. Zandonadi, S.A. Shearer. Sept. 30, 2010 through Sept. 30, 2013. **$49,179**.

33. Sprayer Controller Evaluation for Improving Spatial Application of Pesticides. USDA/CSREES Special Grant. Luck, J.D. **Pitla**, **S.K.**, S.A. Shearer. Sept. 30, 2010 through Sept. 30, 2013. **$49,976**.

34. Development of a Novel Pneumatic Control System for Variable-Rate Pesticide Application. USDA/CSREES Special Grant. J.D.Luck, **S.K. Pitla**, S.A. Shearer. Sept. 30, 2009 through Sept. 30, 2012. **$40,320.**

35. Autonomous Cotton Module Mover for Improving the Efficiency of Cotton Harvesting – Phase I**.** CNHGlobal LLC. **Pitla**, **S.K.,** S.A. Shearer, J.D.Luck. Sept. 9,

2008 through Sept. 22, 2009. CNH Autonomous Cotton Module Mover - Phase II. **Pitla, S.K.,** J.D. Luck, R.S. Zandonadi, M.P. Sama and S.A. Shearer. Nov. 9, 2010 through Dec 31, 2011. **$52,334**.

36. Crop Cut-Width Sensing for Increased Accuracy of Yield Monitor Data. USDA/CSREES Special Grant. **Pitla**, **S.K.,** J.D.Luck, S.A. Shearer. Sept. 30, 2009 through Sept. 30, 2012. **$49,882**.

37. Development of a Harvested Crop Sensing Suite-Subproject 1. Luck, J.D., **S.K. Pitla,** and S.A.Shearer. John Deere, Inc., **$25,250**, 2009-2010.

38. Crop Edge Sensing for Control of Agricultural Field Machinery. CNH Global LLC. S. Shearer and **S.K.Pitla.** Sept. 1, 2006 through August 31, 2008. **$62,000**

### 2.2.3 Research Grants Submitted (Pending)

1. **Pitla et al.** 2023. Decentralized Farms for Decarbonization, Climate-Smart Farming, and Resilient Rural Communities (DeFa4DeCa), USDA-NIFA AFRI SAS. $9,997,987: Pitla (PI)

2. **Pitla.** 2023. Collaborative Research: CPS: Frontier: In-Situ Perception and Energy-aware, Coordinated Weed Treatment with Uncrewed Swarms (InSPECTS). NSF, $999,982: Pitla (PI)

3. **Pitla, S.**K., J.D. Luck, J. McMechan, L. Puntel. 2023**.** Integrated Robotic Cover Crop Seeding and High Resolution Soil Health Monitoring (Robo-Crop Soil). USDA-NIFA. $650,000
4. Brown-Brandl et al. 2023. STAGE: Small Technology-Based Animal-Focused Green Initiative For Engagement: Socially, Environmentally, And Economically Sustainable Dairy. USDA-NIFA AFRI SAS. $9,997,987: Pitla (Key Personnel)

5. **Pitla, S.K.** 2022. Collaborative Research: RI: Medium: Context-Aware Federated Learning for Ag-InspiRed Aerial and Ground Swarms (FLAIR). NSF. **$400,000**

6. **Pitla, S.K.,** T. Brown-Brandl, J.D. Luck, H. Yu**.** 2022. CSFAS-CIN: MetaFarm: A Digital twin in support of field autonomy for ground and aerial robots. USDA-NIFA AFRI. **$1,000,000**

7**.** Riley, M., B. Duncan, **S.K. Pitla**. 2022. Heartland Automation and Robotic Regional Engine (HARRE). NSF. **$146,000**

8. J. Luck et al., **S.K. Pitla**. 2022. Growing Climate Smart Practices across the Midwest: Nebraska Future Agricultural Research and Management Systems (NFARMS). USDA-NIFA. $4,000,000

### 2.2.4 External Research Grants Submitted, but not Funded

1. **Pitla, S.K,** Y. Ge, J. Luck. 2018. Inter-Row Autonomous Sensing Platform (iRASP) for High Resolution Micro-Climate Sensing Under the Crop Canopy. NE Corn Board. **$98,490**

2. **Pitla, S.K,** R. DasGupta, J. Bradley**,** Y. Ge, J. Luck, Y. Shi. 2018. Un-manned Agricultural Ground Vehicle (UAGV) Swarm for Over and Under the Canopy High Resolution Crop Sensing. System Science Collaborative Initiative. **$149,531**

3. Luck, L, **S.K. Pitla**. 2018. Development and validation of a sensor for collecting equine exercise data for use in determining energy requirements for the equine athlete. USA Equestrian Trust. **$26,517**

4. **Pitla, S.K,** J. Bradley, Y.Ge, J.D. Luck, H. Nemala. 2017. Intelligent multi-robot framework (iMRF) development for the deployment of field usable heterogeneous Un-manned Agricultural Ground Vehicle (UAGV) Swarm. NSF-National Robotics Intitiative. **$1,174,535**

5. **Pitla, S. K**, A. Guru, D. Keshwani and J. D. Luck. 2016. Automated Organic Grain Traceability and Identify Preservation Systems (GTIPS) for Improved Profitability and Marketability. Organic Agriculture Research – NIFA, **$992,045**

6. **Pitla, S. K**, Y. Ge, J.D. Luck and R. Ferguson. 2016. Flexible Structured Robotic Vehicle (Flex-Ro) as a Nutrient Management (P and N) Tool for Corn Production. USDA/AFRI, **$498,563**

7. **Pitla, S. K**, T. Daher, D. Mabie and E. Curtis. 2016. Teaching Software Programming to Non-Engineering Students for Automation Applications in Agriculture. Academic Affairs - Grants for Scholarship of Teaching and Learning, **$8000**

8. A. Guru, M. Herian and **S.K. Pitla**. 2016. Real Time Measurement Techniques to Objectively and Automatically Assess Learning Processes and Performance. DOD-

Army Rsch Inst for Behav & Social Sci, **$484,861**

9. A. Guru, L. Hawley, **S.K. Pitla**, D. Rosenbaum**.** 2016. DesignLab21: Creating Pathways to 21st Century Skills. SBIR: A computational approach for optimizing rapid training and development of collective expertise, DOD-Navy, **$50,000**

10. A. Guru, D. Dev, L. Hawley, G. Nugent, **S.K. Pitla**, J. Thomas, H. YU. A. Zimbroff. 2016. DesignLab21: Creating Pathways to 21st Century Skills. NSF, **$1,055,088**

11. **Pitla, S. K**, Y. Ge, A.J. Jhala, J.D. Luck and G. Myer. 2015. Flexible Structured Robotic Vehicle Development for Weed Management in Broad Acre Row Crop Production. . USDA/AFRI, **$498,089**

12. **Pitla, S. K**, J.D. Luck, D. Keshwani and R. Hoy. 2015. In Field Tractor Load Cycle Determination for Improved Machinery Management and Fuel Savings USDA/AFRI CARE, **$198,758**
13. Ge, Y., A. Lorenz and **S.K. Pitla**. 2015. Breed-Bot: A Field Robot for In Vivo Plant Sensing in Plant Breeding, NSF, **$550,496**

## 2.3. Research Patents

### 5.1.4. Research Patent Awarded

1. **S.K. Pitla**, S.A. Shearer, J.D. Luck, M.P. Sama, R. S. Zandonadi, J. H. Posselius, C. H. Foster. Multi-Robot System Control Architecture. Patent Number: 9,527,211 (**Issued**: Dec 27th, 2016)

### 2.3.2. Patents In-review and related activities

1. Title Invention: Flex-Ro Robotic Planter. *Provisional Patent **Filed** Dec 2022*. I. Tempelmeyer, S.K. Pitla, R. Hoy, P. Jasa. Patent Application Number: US 2024/0180064.

2. NU-SensiTray: Dev D. A., **Pitla S.K**., Guru A., Weng A., & Guru H. International Patent Application No. PCT/US2019/057770; Filed: October 24, 2019. Claiming Priority to U.S. Serial No. 62/749,700; filed October 24, 2018 Entitled: Methods and Systems for Measuring Diet and Nutrition in Children

## 2.4. Research Professional Development

### 2.4.1. Grant Writing Enhancement Activities

1. Research Leaders Program, UNL VC-Research Office (2021-2022)
2. NSF-CAREER workshop "How to Write a Winning CAREER Proposal". 2018. Arbor Suite, Nebraska East Union.

3. Selected as a Fellow, 2014 Research Development Fellows Program (RDFP), an initiative by the Office of Research & Economic Development, University of Nebraska-Lincoln.

# 3. Teaching Accomplishments

## 3.1 Class Room Teaching

- AGEN/BSEN 100, Introduction to Agricultural and Biological Engineering (2017 to Present)
- MSYM 245, Electrical Service Systems (2014 to Present)
- AGEN/BSEN 212B, Computational Tools & Modeling for Ag & Biological Sys Engr: Control Systems (2014 to 2017)
- MSYM 395 , Undergraduate Internship Program (2018 to Present)
- MSYM 412/812, Hydraulic Power Systems (2014 to Present)
- MSYM 416/816, Sensors and Control Systems for Agri-Industries (2014 to Present)
- AGEN 436/836, Embedded Controls for Agricultural Applications (2017 to Present)

### 3.1.1 Independent Studies Directed

AGEN 496, Independent Study, Inter-row Robotic Trctr Dsgn; AGEN 896, Special Problems; PLUS + 1 Lab Dev; AGEN 998, Advanced Topics; CAN Hardware/GUIDE Software; AGEN 496, Independent Study; Automated Solar Powered Device; AGEN 896, Special Problems; Appld Cntrl in Auto Ag Machnry.

## 3.2. Ph.D. Students

### 3.2.2. Ph.D Completed

1. 2015-2018 John Evans (co-advisor) Ph.D. Biological Systems Engineering
2. 2015-2020 Abbas Atefi (co-advisor) Ph.D. Biological Systems Engineering

### 3.2.3 Ph.D. In Progress

1. 2022 - Krishna Muvva Ph.D. School of Computing
2. 2022 – Ankita Kalra Ph.D. Biological Systems Engineering
3. 2022 – Katie Mowat Ph.D. UNL EER
4. 2022 – Hassan Fazayeli Ph.D. Biological Systems Engineering
5. 2019 - Andrew Donesky Ph.D. Biological Systems Engineering

## 3.3. M.S. Students

### 3.3.1 M.S. (thesis option) Completed

1. Thomas Monroe (2023) M.S. Biological Systems Engineering
2. Ian Tempelmeyer (2023) M.S. Biological Systems Engineering
3. Mark Freyhof (2022) M.S. Biological Systems Engineering
4. CheeTown Liew (2021) M.S. Biological Systems Engineering
5. Andrew Donesky (2021) M.S. Biological Systems Engineering
6. Josh Murman (2019) M.S. Biological Systems Engineering
7. Gabe Stoll (2019) M.S. Biological Systems Engineering
8. Ryan Humphries (2019) M.S. Electrical Engineering
9. Caleb Lindhorst (2018) M.S. Biological Systems Engineering
10. Tyler Troyer (2017) M.S. Biological Systems Engineering
11. Jared Werner (2016) M.S. Biological Systems Engineering
12. James Roeber (2016) M.S. Biological Systems Engineering

### 3.3.2. M.S. (thesis option) In Progress

1. Krishna Muvva (2022) M.S. Biological Systems Engineering
2. Amlan Balabantaray (2022) M.S. Biological Systems Engineering
3. Shaswati Behera (2022) M.S. Biological Systems Engineering
4. Salem Nyacyesa (2022) M.S. Biological Systems Engineering
5. Terence Irumva (2021) M.S. Biological Systems Engineering
6. Herve Mwunguzi (2021) M.S. Biological Systems Engineering

### 3.3.3. M.S. Independent Research Projects Supervised

6. C.Lindhorst. 2018. Plus+1 Controller GUIDE Application Development. Biological Systems Engineering
7. T.A.Troyer1. 2017. Non-Contact Optical Crop Canopy Moisture Sensor Development. Biological Systems Engineering
8. R.A. Rohrer, D. 2016. Real-time CAN bus application development using MATLAB for tractor performance data acquisition. Biological Systems Engineering.
9. S.E. Marx, D. 2015. CAN bus application development using MATLAB. Biological Systems Engineering.
10. J.T. Evans1. 2015. CAN bus demonstrator design, development and evaluations. Biological Systems Engineering

### 3.3.4. M.S. & Ph.D. Student Committees Served on

1. 2022 Sam E. Marx Ph.D. Biological Systems Engineering
2. 2021 Rodney Rohrer Ph.D. Biological Systems Engineering

3. 2020 Jessie Johnson M.S. Biological Systems Engineering
4. 2019 Chandler Folkerts M.S. Biological Systems Engineering
5. 2018 Aaron Shearer M.S. Biological Systems Engineering
6. 2017 Rachel Stevens M.S. Mechanized Systems Management
7. 2017 Carol Thompson M.S. Department of Animal Science
8. 2016 Bryan Smith M.S. Biological Systems Engineering
9. 2016 Shane Forney M.S. Biological Systems Engineering
10. 2015 Sam Marx M.S. Biological Systems Engineering
11. 2014 Nannan Lin M.S. FABE, Ohio State University

## 3.4. Undergraduate Students

### 3.4.1. Independent Research/Undergraduate Creative Activities and Research Experience (UCARE) students

1. 2022 Kaden Monk Biological Systems Engineering
2. 2017 Michaela Horn Biological Systems Engineering
3. 2017 John Wagner Biological Systems Engineering
4. 2016 Jeremy Blackford Biological Systems Engineering
5. 2015 Ethan Nutter Biological Systems Engineering

### 3.4.2. Average Number of Undergraduates Advised per Year

| Year | 2017 | 2018 | 2019 | 2020 | 2022 |
|---|---|---|---|---|---|
| Undergraduate advisees | 9 | 12 | 10 | 5 | 0 |
| UCARE advisees | 2 | 3 | 2 | 1 | 2 |

## 3.5. Teaching Professional Development

### 3.5.1. Teaching / Advising Enhancement Activities

1. Teaching faculty fellows program for student success. 2020-2021. Executive Vice-Chancellor Office, UNL.
2. Developed Teaching Fellows Development Program (TFDP), a faculty program for sustained teaching improvement and student learning. Endorsed by CASNR, UNL, Nov 2017.
3. Developed a new class related to advanced machinery embedded controls, and data acquisition for AGEN/MSYM Senior and Graduate Students. AGEN 492/892 special topics: Embedded Controls for Agricultural Applications was taught in Fall 2016 successfully.

4. Started advising 5 new freshmen students in addition to 2 senior MSYM students during Fall 2016.
5. Peer Review of Teaching Project. An 8-month long active participation of investigation of student's learning, assessment, documenting teaching effectiveness. UNL. Fall 2015.
6. Research Based Instructional Strategies. Participated on a semester-long workshop series (biweekly) on experimenting with research-based instructional design strategies to improve teaching and student engagement. Fall 2014.

### 3.5.2. Student Recruitment Activities

1. Engage students yearly
2. 2015 State fair Demonstration (Agricultural Robotics booth)
3. Conducted tours and presentations for departmental recruitment – 2014 to present

# 4. Service Accomplishments

## 4.1. Professional Service

### 4.1.1. Technical reviewer for Journals

On an average 5-6 manuscripts reviewed per year

1. Journal of the ASABE (formerly called Transactions of ASABE)
2. Applied Engineering in Agriculture
3. Biosystems Engineering
4. Computers and Electronics in Agriculture
5. Precision Agriculture
6. Agronomy Research
7. Journal of Engineering
8. Agriculture

### 4.1.2. Leadership positions

1. Elected to the ASABE leadership nominating committee, Applied Science and Engineering. Term 2023-2025
2. Member of the Agricultural Equipment Technology Conference (AETC) 2022-2024 planning committee.
3. Chair, 2023 ASABE A.W. Farrall Young Education Awards Committee

4. Chair, 2022-2024, Education and Professional Development (EOPD) 206: Engineering Technology & Management Committee. ASABE
5. **Director**, Machine Automation and Agricultural Robotics (**MAARS**). 2014 to Present
6. **Director,** Biological Systems Engineering – Product Innovation (**BSE-PI**), student run service center. 2017 to Present
7. **Chair**, 2020-2022. ASABE's ITSC-318 Mechatronics and Biorobotics Technical Committee.
8. **Session Organizer and Moderator**: Machinery Data and Task Optimization. ASABE Machinery Systems (MS-49) Technical Community
9. **Awards Chair,** NE ASABE Section Committee 2020
10. **Session Moderator.** 2015 -2 020**.** ASABE Machinery Systems (MS-49) Technical Community**.**
11. **Designer** of the ASABE 2011 Robotics Competition.
12. Previously held positions at the ASABE, **Chairman, Vice-Chairman and Secretary** (2006-2009) of Soil Dynamics Research (PM-45) committee.

## 4.2. University Service

1. Member of the DEI advisory board to the Associate Vice-Chancellor of Faculty Success 2021 – present
2. Chair of Roger's Memorial Farm (RMF) – 2022 to present
3. Board member of Nebraska Tractor Test Board (NTTB) - 2014 to present
4. Member of FIT Committee - 2019 to present
5. MSYM club Advisor - 2015 to present
6. Advisor ASABE Robotics Team - 2015 to present
7. Elected member of Teaching and Learning Improvement Council (TLIC) – 2017 to 2019
8. Advisor to Mechanical Engineering Senior Design Team – Fall 2016
9. Advisor to Ag Engineering Senior Design Team – 2016 to 2017
10. Advisor, two senior design teams – 2015 to 2016
11. BSE representative for CASNR Faculty Advisory Committee (FAC) – 2015 to 2017