Kelly R. Thorp, Ph.D., P.E. (he/him/his)

Curriculum Vitae

808 E. Blackland Rd.
Temple, TX 76502
+1 (520) 840 9032
+1 (254) 770 6500
FAX +1 (254) 770 6561
kelly.thorp@usda.gov
Last Updated: 09/13/2023

"Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals, and happiness." ~Thomas Jefferson

Education

5/2006 **Ph.D., Agricultural Engineering**, *Iowa State University (ISU)*, Ames, IA.

- Dissertation: Integration of Remote Sensing and Crop Growth Modeling for Nitrogen Management Decision Support in Corn
- Advisors: Dr. William D. Batchelor and Dr. Brian L. Steward
- Minor in Statistics

12/2002 **M.S., Agricultural Engineering**, *University of Illinois at Urbana-Champaign (UIUC)*.

- Thesis: Variable-rate Applications of Herbicide Using Weed Maps Generated from Remote Sensing Imagery
- Advisor: Dr. Lei Tian

5/2000 **B.S., Agricultural Engineering**, *University of Illinois at Urbana-Champaign (UIUC)*.

5/1998 **A.S., Engineering Science**, *Parkland College*, Champaign, IL.

Professional Experience

2023–present **Research Agricultural Engineer (GS-0890-15)**, *United States Department of Agriculture (USDA), Agricultural Research Service (ARS), Grassland Soil and Water Research Laboratory (GSWRL)*, Temple, TX.

- Conducts personal and team research on the development of informational technologies to understand agroecosystem processes and improve management of soil, water, and nutrient resources for crop and forage production.
- Prepares manuscripts with original research results for publication in refereed journals.
- Performs technology transfer activities by communicating research results, releasing original software, and establishing research collaborations with external stakeholders.
- Supervises field technicians, computer programmers, and student laborers.

2019–2023 **Research Agricultural Engineer and Lead Scientist (GS-0890-15)**, *USDA-ARS, U. S. Arid-Land Agricultural Research Center (ALARC)*, Maricopa, AZ.

- Conducted personal and team research on the development of informational technologies to understand irrigated cropping system processes, improve management of water and nutrients for crop production, and enhance plant breeding and genetics research.
- Prepared original manuscripts for publication, performed technology transfer activities, and supervised field technicians and student laborers.

2010–2023 **Adjunct Professor**, *Biosystems Engineering, University of Arizona*, Tucson, AZ.
- Participated on the departmental advisory committee.
- Mentored students by advising summer internships and graduate student research.

2014–2019 **Research Agricultural Engineer and Lead Scientist (GS-0890-14)**, *USDA-ARS-ALARC*, Maricopa, AZ.

2010–2014 **Research Agricultural Engineer (GS-0890-13)**, *USDA-ARS-ALARC*, Maricopa, AZ.

2007–2010 **Research Agricultural Engineer (GS-0890-12)**, *USDA-ARS-ALARC*, Maricopa, AZ.

2006–2007 **Postdoctoral Research Associate (GS-0890-11)**, *USDA-ARS, National Soil Tilth Laboratory (NSTL),* now the *National Laboratory for Agriculture and the Environment (NLAE)*, Ames, IA.
- Evaluated water quality models using data from an Iowa field site.
- Conducted a regional simulation study on drainage water management impacts.

2003–2006 **Graduate Research Assistant**, *Agricultural & Biosystems Engineering, ISU*, Ames, IA.
- Developed crop growth models for precision nitrogen management in corn.
- Estimated corn plant stand density using hyperspectral remote sensing imagery.

2000–2003 **Graduate Research Assistant**, *Agricultural Engineering, UIUC*, Urbana, IL.
- Used remote sensing imagery to map weed infestations in soybeans.
- Tested map-based variable-rate herbicide applications in the field.

1999–2001 **Research Intern**, *Institute for Technology Development (Spectral Visions)*, Urbana, IL.
- Supported field experiments for Ag 20/20 remote sensing projects.
- Processed remote sensing imagery to support field experiments.

Professional Affiliations

1998–present American Society of Agricultural and Biological Engineers (ASABE), formerly the American Society of Agricultural Engineers (ASAE)

1999–present Alpha Epsilon Agricultural Engineering Honor Society

2000–present The Order of the Engineer

2006–present American Society of Agronomy (ASA)

2014–present International Environmental Modelling and Software Society (iEMSs)

Honors and Awards

7/2023 Outstanding Manuscript Reviewer, ASABE Natural Resources and Environmental Systems (NRES) Community

7/2022 Outstanding Associate Editor, ASABE Natural Resources and Environmental Systems (NRES) Community

7/2022 Outstanding Manuscript Reviewer, ASABE Information, Technology, and Control Systems (ITCS) Community

11/2019 L. R. Ahuja Ag Systems Modeling Award, Soil Science Society of America.

7/2018 ASABE Superior Paper Award: Thorp, K. R., Hunsaker, D. J., Bronson, K. F., Andrade-Sanchez, P., Barnes, E. M., 2017. Cotton irrigation scheduling using a crop growth model and FAO-56 methods: Field and simulations studies. Transactions of the ASABE 60(6), 2023–2039.

6/2018 ASCE-EWRI Superior Paper Award: Bautista, E., Warrick, A. W., Schlegel, J. L., Thorp, K. R., Hunsaker, D. J., 2016. Approximate furrow infiltration model for time-variable ponding depth. Journal of Irrigation and Drainage Engineering 142 (11).

7/2017 Outstanding Associate Editor, ASABE NRES Community

7/2017 Outstanding Manuscript Reviewer, ASABE NRES Community

2/2017 Outstanding Manuscript Reviewer for Crop Science journal

7/2015 ASABE Superior Paper Award: Thorp, K. R., Barnes, E. M., Hunsaker, D. J., Kimball, B. A., White, J. W., Nazareth, V. J., Hoogenboom, G., 2014. Evaluation of CSM-CROPGRO-Cotton for simulating effects of management and climate change on cotton growth and evapotranspiration in an arid environment. Transactions of the ASABE 57(6), 1627–1642.

6/2009 Outstanding Manuscript Reviewer, ASABE Information and Electronic Technologies (IET) Division.

4/2006 Graduate Student of the Year, ASABE Mid-Central Section.

7/2005 ASAE IET Select Paper Award: Thorp, K. R., Batchelor, W. D., Paz, J. O., 2005. A cross validation approach to evaluate CERES-Maize simulations of corn yield spatial variability. ASAE Paper No. 05-3002. ASAE, St. Joseph, MI.

Licensure and Certifications

2022–present Certified Instructor for The Carpentries (https://carpentries.org/)

2018–present FAA Remote Pilot Certification for Small Unmanned Aircraft Systems

2011–2023 Registered Professional Engineer, State of Arizona (#52156)

2000–2011 Professional Engineer Intern, State of Illinois (#061-029370)

Research Interests

I. Information Technology for Agricultural Systems

- Airborne and Satellite Remote Sensing
- Machine Vision and Proximal Sensing
- Geographic Information Systems
- Decision Support Systems

II. Soil and Water Engineering for Agricultural Systems

- Hydrologic and Water Quality Modeling
- ET Measurement and Modeling
- Drainage and Irrigation of Crop Lands
- Watershed Hydrology

III. Agronomic, Soil, and Crop Science

- Irrigation and Fertilizer Management
- Agroecosystem Modeling
- Precision Agriculture
- High-Throughput Plant Phenomics

Research Contributions and Impact

Dr. Thorp develops remote sensing, computer simulation models, and geospatial technologies for improving soil, water, nutrient, and pesticide management in cropping systems and for enhancing plant breeding and genetics research. He has published 120 articles in refereed journals, and he is the lead author on 36 of these. Five additional manuscripts are currently in review. Two lead author papers were selected for ASABE Superior Paper Awards in 2015 and 2018. Dr. Thorp has contributed 56 non-refereed papers and has given 72 oral presentations and 11 posters. His nationwide and international recognition is evidenced by 32 invitations to present research at regional, national, international, and on-line venues. Dr. Thorp has served in leadership positions on four technical committees of the American Society of Agricultural and Biological Engineers (ASABE) and was twice elected to serve on the Nominating Committee. He was previously recognized as an Outstanding Manuscript Reviewer for Crop Science and Transactions of the ASABE journals and as an Outstanding Associate Editor for the ASABE NRES Community. He was also recently awarded the L. R. Ahuja Ag Systems Modeling Award by the Soil Science Society of America. He has served as principle investigator or co-investigator on 27 extramural research grants totaling $15,290,615 ($607,653 to Dr. Thorp).

Refereed Publications

Asterisk (*) indicates graduate students and post-docs advised by Dr. Thorp.

[1] **Thorp, K. R.**, 2023. Combining soil water content data with computer simulation models for improved irrigation scheduling. Journal of the ASABE xx (x), xx–xx. Accepted 8/14/2023.

[2] **Thorp, K. R.**, Brekel, J., DeJonge, K. C., 2023. Version 1.2.0 - pyfao56: FAO-56 evapotranspiration in Python. SoftwareX xx (x), xx–xx. Accepted 9/3/2023.

[3] Rahman, M. M., Kamruzzaman, M., Shahid, S., **Thorp, K. R.**, Rahaman, H., Shahriyar, M. M., Islam, A. K. M. S., Huda, M. D., 2023. A GIS framework to demarcate suitable lands for combine harvesters using satellite DEM and physical properties of soil. Journal of Geovisualization and Spatial Analysis 7 (27). doi:10.1007/s41651-023-00156-y

[4] Ayankojo*, I. T., **Thorp, K. R.**, Thompson, A. L., 2023. Advances in the application of small unoccupied aircraft systems (sUAS) for high-throughput plant phenotyping. Remote Sensing 15 (2623). doi:10.3390/rs15102623

[5] Kamruzzaman, M., Wahid, S., Shahid, S., Alam, E., Mainuddin, M., Islam, H. M. T., Cho, J., Rahman, M. M., Biswas, J. C., **Thorp, K. R.**, 2023. Predicted changes in future precipitation and air temperature across Bangladesh using CMIP6 GCMs. Heliyon 9 (e16274). doi:10.1016/j.heliyon.2023.e16274

[6] Malone, R. W., Radke, A., Herbstritt, S., Wu, H., Qi, Z., Emmett, B. D., Helmers, M. J., Shulte, L. A., Feyereisen, G. W., O'Brien, P. L., Kovar, J. L., Rogovska, N., Kladivko, E. J., **Thorp, K. R.**, Kaspar, T. C., Jaynes, D. B., Karlen, D. L., Richard, T. L., 2023. Harvested winter rye energy cover crop: multiple benefits for North Central US. Environmental Research Letters 18 (074009). doi:10.1088/1748-9326/acd708

[7] Chen, X., Hou, Y., Kastner, T., Liu, L., Zhang, Y., Yin, T., Li, M., Malik, A., Li, M., **Thorp, K. R.**, Han, S., Liu, Y., Muhammad, T., Liu, J., Li, Y., 2023. Physical and virtual nutrient flows in global telecoupled agricultural trade networks. Nature Communications 14 (2391). doi:10.1038/s41467-023-38094-4

[8] Maqsood, H., Hunsaker, D. J., Waller, P., **Thorp, K. R.**, French, A., Elshikha, D. E., Loeffler, R., 2023. WINDS model demonstration with field data from a furrow-irrigated cotton experiment. Water 15 (1544). doi:10.3390/w15081544

[9] Marek, G. W., Evett, S. R., **Thorp, K. R.**, DeJonge, K. C., Marek, T. H., Brauer, D. K., 2023. Characterizing evaporative losses from sprinkler irrigation using large weighing lysimeters. Journal of the ASABE 66 (2), 353–365. doi:10.13031/ja.15300

[10] Brekel*, J., **Thorp, K. R.**, DeJonge, K. C., Trout, T. J., 2023. Version 1.1.0 - pyfao56: FAO-56 evapotranspiration in Python. SoftwareX 22 (101336). doi:10.1016/j.softx.2023.101336

[11] Kimball, B. A., **Thorp, K. R.**, Boote, K. J., Stockle, C. O., Suyker, A. E., Evett, S. R., Brauer, D. K., Coyle, G. G., Copeland, K. S., Marek, G. W., Colaizzi, P. D., Acutis, M., Alimagham, S., Archontoulis, S. V., Babacar. F., Barcza, Z., Basso, B., Bertuzzi, P., Constantin, J., De Antoni Migliorati, M., Dumont, B., Durand, J., Fodor, N., Gaiser, T., Garofalo, P., Gayler, S., Giglio, L., Grant, R., Guan, K., Hoogenboom, G., Jiang, Q., Kim, S., Kisekka, I., Lizaso, J. I., Masia, S., Meng, H., Mereu, V., Mukhtar, A., Perego, A., Peng, B., Priesack, E., Qi, Z., Shelia, V., Snyder, R., Soltani, A., Spano, D., Srivastava, A., Thomson, A., Timlin, D., Trabucco, A., Webber, H., Weber, T., Willaume, M., Williams, K., Van der Laan, M., Ventrella, D., Viswanathan, M., Xu, X., Zhou, W., 2023. Simulation of evapotranspiration and yield of maize: An inter-comparison among 41 maize models. Agricultural and Forest Meteorology 333 (109396). doi:10.1016/j.agrformet.2023.109396

[12] Elshikha, D. E. M., Wang, G., Waller, P. M., Hunsaker D. J., Dierig D. A., **Thorp, K. R.**, Thompson, A. L., Katterman, M. E., Herritt, M. T., Bautista, E., Ray, D. T., Wall, G. W., 2022. Guayule growth and yield responses to deficit irrigation strategies in the U.S. desert. Agricultural Water Management 277 (108093). doi:10.1016/j.agwat.2022.108093

[13] Kimball, B. A., **Thorp, K. R.**, Barnes, E. M., Choi, C. Y., Clarke, T. R., Colaizzi, P. D., Fitzgerald, G. J., Haberland, J. A., Hendrey, G., Hunsaker, D. J., Kostrzewski, M. A., LaMorte, R. L., Leavitt, S. W., Lewin, K., Mauney, J. R., Nagy, J., Pinter, Jr., P. J., Waller, P. M., 2022. Cotton response to CO_2, water, nitrogen, and plant density - A repository of FACE, AgIIS, and FISE experiment data. Open Data Journal for Agricultural Research 8 (1), 1–5. doi:10.18174/odjar.v8i0.18152

[14] **Thorp, K. R.**, 2022. pyfao56: FAO-56 evapotranspiration in Python. SoftwareX 19 (101208). doi:10.1016/j.softx.2022.101208

[15] Chen, X., Liu, C., Van Oel, P., Mekonnen, M. M., **Thorp, K. R.**, Yin, T., Wang, J., Muhammad, T., Li, Y., 2022. Water and carbon risks within hydropower development on national scale. Applied Energy 325 (119872). doi:10.1016/j.apenergy.2022.119872

[16] Herritt, M. T., Thompson, A. L., **Thorp, K. R.**, 2022. Irrigation management impacts on cotton reproductive development and boll distribution. Crop Science 62 (4), 1559–1572. doi:10.1002/csc2.20749

[17] Elshikha, D. E. M., Hunsaker, D. J., Waller, P. M., **Thorp, K. R.**, Dierig, D., Wang, G., Cruz, V. M. V., Katterman, M. E., Bronson, K. F., Wall, G. W., Thompson, A. L., 2022. Estimation of direct-seeded guayule cover, crop coefficient, and yield using UAS-based multispectral and RGB data. Agricultural Water Management 265 (107540). doi:10.1016/j.agwat.2022.107540

[18] Thompson, A. L., Conley, M. M., Herritt, M. T., **Thorp, K. R.**, 2022. Response of upland cotton (*Gossypium hirsutum* L.) leaf chloropyll content to high heat and low-soil water in the Arizona low desert. Photosynthetica 60 (2), 123–135. doi:10.32615/ps.2022.014

[19] **Thorp, K. R.**, Calleja, S., Pauli, D., Thompson, A. L., Elshikha, D. E., 2022. Agronomic outcomes of precision irrigation management technologies with varying complexity. Journal of the ASABE 65 (1), 135–150. doi:10.13031/ja.14950

[20] Pugh*, N. A., **Thorp, K. R.**, Gonzalez, E. M., Elshikha, D. E. M., Pauli, D., 2021. Comparison of image georeferencing strategies for agricultural applications of small unoccupied aircraft systems. The Plant Phenome Journal 4 (20026). doi:10.1002/ppj2.20026

[21] Melandri*, G., **Thorp, K. R.**, Broeckling, C., Thompson, A. L., Hinze, L., Pauli, D., 2021. Assessing drought and heat stress-induced changes in the cotton leaf metabolome and their relationship with hyperspectral reflectance. Frontiers in Plant Science 12 (751868). doi:10.3389/fpls.2021.751868

[22] **Thorp, K. R.**, Drajat, D., 2021. Deep machine learning with Sentinel satellite data to map paddy rice production stages across West Java, Indonesia. Remote Sensing of Environment 265 (112679). doi:10.1016/j.rse.2021.112679

[23] Elshikha, D. E. M., Waller, P. M., Hunsaker, D. J., Dierig, D. A., Wang, G., Cruz, V. M. V., **Thorp, K. R.**, Katterman, M. E., Bronson, K. F., Wall, G. W., 2021. Growth, water use, and crop coefficients of direct-seeded guayule with furrow and subsurface drip irrigation in Arizona. Industrial Crops and Products 170, 113819. doi:10.1016/j.indcrop.2021.113819

[24] Wang, D. R., Venturas, M. D., Mackay, D. S., Hunsaker, D. J., **Thorp, K. R.**, Gore, M. A., Pauli, D., 2020. Use of hydraulic traits for modeling genotype-specific acclimation in cotton under drought. New Phytologist 228 (3), 898–909. doi:10.1111/nph.16751

[25] Ayankojo*, I. T., **Thorp, K. R.**, Morgan, K. T., Kothari, K., Ale, S., 2020. Assessing the impacts of future climate on cotton production in the Arizona low desert. Transactions of the ASABE 63 (4), 1087–1098. doi:10.13031/trans.13731

[26] **Thorp, K. R.**, DeJonge, K. C., Marek, G. W., Evett, S. R., 2020. Comparison of evapotranspiration methods in the DSSAT Cropping System Model: I. Global sensitivity analysis. Computers and Electronics in Agriculture 177 (105658). doi:10.1016/j.compag.2020.105658

[27] **Thorp, K. R.**, Marek, G. W., DeJonge, K. C., Evett, S. R., 2020. Comparison of evapotranspiration methods in the DSSAT Cropping System Model: II. Algorithm performance. Computers and Electronics in Agriculture 177 (105679). doi:10.1016/j.compag.2020.105679

[28] Thompson, A. L., **Thorp, K. R.**, Conley, M. M., Roybal, M., Moller, D., Long, J. C., 2020. A data workflow to support plant breeding decisions from a terrestrial field-based high-throughput plant phenotyping system. Plant Methods 16 (97). doi:10.1186/s13007-020-00639-9

[29] Barnes, E. M., Campbell, B. T., Vellidis, G., Porter, W. M., Payero, J. O., Leib, B. G., Sui, R., Fisher, D. K., Anapalli, S., Colaizzi, P. D., Bordovsky, J. P., Porter, D. O., Ale, S., Mahan, J., Taghvaeian, S., **Thorp, K. R.**, 2020. Forty years of increasing cotton's water productivity and why the trend will continue. Applied Engineering in Agriculture 36 (4), 457–478. doi:10.13031/aea.13911

[30] Bronson, K. F., Conley, M. M., French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Barnes, E. M., 2020. Which active optical sensor vegetation index is best for nitrogen status assessment in irrigated cotton? Agronomy Journal 112, 2205–2218. doi:10.1002/agj2.20120

[31] De la Cruz Jiménez*, J., Leiva, L., Cardoso, J. A., French, A. N., **Thorp, K. R.**, 2020. Proximal sensing of *Urochloa* grasses increases selection accuracy. Crop & Pasture Science 71 (4), 401–409. doi:10.1071/CP19324

[32] DeJonge, K. C., **Thorp, K. R.**, Marek, G. W., 2020. The apples and oranges of reference and potential evapotranspiration: Implications for agroecosystem models. Agricultural & Environmental Letters 5 (e20011). doi:10.1002/ael2.20011

[33] Huang*, J., Ridoutt, B. G., Sun, Z., Lan, K., **Thorp, K. R.**, Wang, X., Yin, X., Huang, J., Chen, F., Scherer, L., 2020. Balancing food production within the planetary water boundary. Journal of Cleaner Production 253 (119900). doi:10.1016/j.jclepro.2019.119900

[34] **Thorp, K. R.**, Thompson, A. L., Bronson, K. F., 2020. Irrigation rate and timing effects on Arizona cotton yield, water productivity, and fiber quality. Agricultural Water Management 234 (106146). doi:10.1016/j.agwat.2020.106146

[35] Ale, S., Omani, N., Himanshu, S. K., Bordovsky, J. P., **Thorp, K. R.**, Barnes, E. M., 2020. Determining optimum irrigation termination periods for cotton production in the Texas High Plains. Transactions of the ASABE 63 (1), 105–115. doi:10.13031/trans.13483

[36] Chen, X., **Thorp, K. R.**, Van Oel, P. R., Xu, Z., Zhou, B., Li, Y., 2020. Environmental impact assessment of water-saving irrigation systems across 60 irrigation construction projects in northern China. Journal of Cleaner Production 245 (118883). doi:10.1016/j.jclepro.2019.118883

[37] **Thorp, K. R.**, 2020. Long-term simulations of site-specific irrigation management for Arizona cotton production. Irrigation Science 38 (1), 49–64. doi:10.1007/s00271-019-00650-6

[38] Luo*, Z., **Thorp, K. R.**, Abdel-Haleem, H., 2019. A high-throughput quantification of resin and rubber contents in *Parthenium argentatum* using near-infrared (NIR) spectroscopy. Plant Methods 15 (154). doi:10.1186/s13007-019-0544-3

[39] Bronson, K. F., Hunsaker, D. J., Meisinger, J. J., Rockholt, S. M., **Thorp, K. R.**, Conley, M. M., Williams, C. F., Norton, E. R., Barnes, E. M., 2019. Improving nitrogen fertilizer use efficiency in subsurface drip-irrigated cotton in the Desert Southwest. Soil Science Society of America Journal 83 (6), 1712–1721. doi:10.2136/sssaj2019.07.0210

[40] Joshi*, V. R., **Thorp, K. R.**, Coulter, J. A., Johnson, G. A., Porter, P. M., Strock, J. S., Garcia y Garcia, A., 2019. Improving site-specific maize yield estimation by integrating satellite multispectral data into a crop model. Agronomy 9 (719). doi:10.3390/agronomy9110719

[41] Huang*, J., Ridoutt, B. G., **Thorp, K. R.**, Wang, X., Lan, K., Liao, J., Tao, X., Wu, C., Huang, J., Chen, F., Scherer, L., 2019. Water-scarcity footprints and water productivities indicate unsustainable wheat production in China. Agricultural Water Management 224 (105744). doi:10.1016/j.agwat.2019.105744

[42] Zerihun, D., Sanchez, C. A., **Thorp, K. R.**, Hagler, M. J., 2019. Hydraulics of linear-move sprinkler irrigation systems, III: Model evaluation. Irrigation & Drainage Systems Engineering 8 (2), 237.

[43] Bronson, K. F., Hunsaker, D. J., **Thorp, K. R.**, 2019. Nitrogen fertilizer and irrigation effects on seed yield and oil in camelina. Agronomy Journal 111 (4), 1712–1719. doi:10.2134/agronj2018.10.0644

[44] Huang*, J., Scherer, L., Lan, K., Chen, F., **Thorp, K. R.**, 2019. Advancing the application of a model-independent open-source geospatial tool for large spatiotemporal simulations. Environmental Modelling & Software 119, 374–378. doi:10.1016/j.envsoft.2019.07.003

[45] **Thorp, K. R.**, Marek, G. W., DeJonge, K. C., Evett, S. R., Lascano, R. J., 2019. Novel methodology to evaluate and compare evapotranspiration algorithms in an agroecosystem model. Environmental Modelling & Software 119, 214–227. doi:10.1016/j.envsoft.2019.06.007

[46] Chen, X., **Thorp, K. R.**, Ouyang, Z., Hou, Y., Zhou, B., Li, Y., 2019. Energy consumption due to groundwater pumping for irrigation in the North China Plain. Science of the Total Environment 669, 1033–1042. doi:10.1016/j.scitotenv.2019.03.179

[47] Kimball, B. A., Boote, K. J., Hatfield, J. L., Ahuja, L. R., Stockle, C., Archontoulis, S., Baron, C., Basso, B., Bertuzzi, P., Constantin, J., Deryng, D., Dumont, B., Durand, J., Ewert, F., Gaiser, T., Gayler, S., Hoffmann, M. P., Jiang, Q., Kim, S., Lizaso, J., Moulin, S., Nendel, C., Parker, P., Palosuo, T., Priesack, E., Qi, Z., Srivastava, A., Stella, T., Tao, F., **Thorp, K. R.**, Timlin, D., Twine, T. E., Webber, H., Willaume, M., Williams, K., 2019. Simulation of maize evapotranspiration: An intercomparison among 29 maize models. Agricultural and Forest Meteorology 271, 264–284. doi:10.1016/j.agrformet.2019.02.037

[48] Thompson, A. L., **Thorp, K. R.**, Conley, M. M., El-Shikha, D., French, A. N., Andrade-Sanchez, P., Pauli, D., 2019. Comparing nadir and multi-angle view sensor technologies for measuring in-field plant height of upland cotton. Remote Sensing 11 (700). doi:10.3390/rs11060700

[49] Kothari*, K., Ale, S., Bordovsky, J. P., **Thorp, K. R.**, Porter, D. O., Munster, C. L., 2019. Simulation of efficient irrigation management strategies for grain sorghum production over different climate variability classes. Agricultural Systems 170, 49–62. doi:10.1016/j.agsy.2018.12.011

[50] Bronson, K. F., Hunsaker, D. J., Williams, C. F., **Thorp, K. R.**, Rockholt, S. M., Del Grosso, S. J., Venterea, R. T., Barnes, E. M., 2018. Erratum: Nitrogen management affects nitrous oxide emissions under varying cotton irrigation systems in the Desert Southwest, USA (Journal of Environmental Quality 47:(1), 70–78. doi:10.2134/jeq2017.10.0389). Journal of Environmental Quality 47 (6), 1572–1572. doi:10.2134/jeq2017.10.0389er

[51] **Thorp, K. R.**, Thompson, A. L., Harders, S. J., French, A. N., Ward, R. W., 2018. High-throughput phenotyping of crop water use efficiency via multispectral drone imagery and a daily soil water balance model. Remote Sensing 10 (1682). doi:10.3390/rs10111682

[52] Shamshiri, R. R., Jones, J. W., **Thorp, K. R.**, Ahmad, D., Man, H. C., Taheri, S., 2018. Review of optimum temperature, humidity, and vapour pressure deficit for microclimate evaluation and control in greenhouse cultivation of tomato: a review. International Agrophysics 32 (2), 287–302. doi:10.1515/intag-2017-0005

[53] Lamsal*, A., Welch, S. M., White, J. W., **Thorp, K. R.**, Bello, N., 2018. Estimating parametric phenotypes that determine anthesis date in Zea mays: Challenges in combining ecophysiological models with genetics. PLOS ONE 13 (4), e0195841. doi:10.1371/journal.pone.0195841

[54] Thompson, A. L., **Thorp, K. R.**, Conley, M. M., Andrade-Sanchez, P., Heun, J. T., Dyer, J. M., White, J. W., 2018. Deploying a proximal sensing cart to identify drought-adaptive traits in upland cotton for high-throughput phenotyping. Frontiers in Plant Science 9 (507). doi:10.3389/fpls.2018.00507

[55] Bronson, K. F., Hunsaker, D. J., Williams, C. F., **Thorp, K. R.**, Rockholt, S. M., Del Grosso, S. J., Venterea, R. T., Barnes, E. M., 2018. Nitrogen management affects nitrous oxide emissions under varying cotton irrigation systems in the Desert Southwest, USA. Journal of Environmental Quality 47 (1), 70–78. doi:10.2134/jeq2017.10.0389

[56] Shamshiri, R. R., Kalantari, F., Ting, K. C., **Thorp, K. R.**, Hameed, I. A., Weltzien, C., Ahmad, D., Shad, Z. M., 2018. Advances in greenhouse automation and controlled environment agriculture: A transition to plant factories and urban farming. International Journal of Agricultural and Biological Engineering 11 (1), 1–22. doi:10.25165/j.ijabe.20181101.3210

[57] Youssef, M. A., Abdelbaki, A. M., Negm, L. M., Skaggs, R. W., **Thorp, K. R.**, Jaynes, D. B., 2018. DRAINMOD-simulated performance of controlled drainage across the U.S. Midwest. Agricultural Water Management 197, 54–66. doi:10.1016/j.agwat.2017.11.012

[58] Adhikari*, P., Ale, S., DeLaune, P. B., **Thorp, K. R.**, Barnes, E. M., 2017. Simulated effects of winter wheat cover crop on the cotton production systems of the Texas Rolling Plains. Transactions of the ASABE 60 (6), 2083–2096. doi:10.13031/trans.12272

[59] Bronson, K. F., Hunsaker, D. J., Mon, J., Andrade-Sanchez, P., White, J. W., Conley, M. M., **Thorp, K. R.**, Bautista, E., Barnes, E. M., 2017. Improving nitrogen fertilizer use efficiency in surface- and overhead sprinkler-irrigated cotton in the Desert Southwest. Soil Science Society of America Journal 81 (6), 1401–1412. doi:10.2136/sssaj2017.07.0225

[60] DeJonge, K. C., **Thorp, K. R.**, 2017. Implementing standardized reference evapotranspiration and dual crop coefficient approach in the DSSAT Cropping System Model. Transactions of the ASABE 60 (6), 1965–1981. doi:10.13031/trans.12321

[61] **Thorp, K. R.**, Hunsaker, D. J., Bronson, K. F., Andrade-Sanchez, P., Barnes, E. M., 2017. Cotton irrigation scheduling using a crop growth model and FAO-56 methods: Field and simulation studies. Transactions of the ASABE 60 (6), 2023–2039. doi:10.13031/trans.12323

[62] Mauget, S. A., Adhikari, P., Leiker, G., Baumhardt, R. L., **Thorp, K. R.**, Ale, S., 2017. Modeling the effects of management and elevation on West Texas dryland cotton production. Agricultural and Forest Meteorology 247, 385–398. doi:10.1016/j.agrformet.2017.07.009

[63] Pauli, D., White, J. W., Andrade-Sanchez, P., Conley, M. M., Heun, J., **Thorp, K. R.**, French, A. N., Hunsaker, D. J., Carmo-Silva, A. E., Wang, G., Gore, M. A., 2017. Investigation of the influence of leaf thickness on canopy reflectance and physiological traits in upland and Pima cotton populations. Frontiers in Plant Science 8 (1405). doi:10.3389/fpls.2017.01405

[64] Bronson, K. F., White, J. W., Conley, M. M., Hunsaker, D. J., **Thorp, K. R.**, French, A. N., Mackey, B. E., Holland, K. H., 2017. Active optical sensors in irrigated durum wheat: Nitrogen and water effects. Agronomy Journal 109 (3), 1060–1071. doi:10.2134/agronj2016.07.0390

[65] **Thorp, K. R.**, Wang, G., Bronson, K. F., Badaruddin, M., Mon, J., 2017. Hyperspectral data mining to identify relevant canopy spectral features for estimating durum wheat growth, nitrogen status, and grain yield. Computers and Electronics in Agriculture 136, 1–12. doi:10.1016/j.compag.2017.02.024

[66] Bautista, E., Schlegel, J., **Thorp, K. R.**, Hunsaker, D. J., 2016. Approximate furrow infiltration model for time-variable ponding depth. Journal of Irrigation and Drainage Engineering 142 (11). doi:10.1061/(ASCE)IR.1943-4774.0001057

[67] Wang*, X., **Thorp, K. R.**, White, J. W., French, A. N., Poland, J. A., 2016. Approaches for geospatial processing of field-based high-throughput plant phenomics data from ground vehicle platforms. Transactions of the ASABE 59 (5), 1053–1067. doi:10.13031/trans.59.11502

[68] Mon, J., Bronson, K. F., Hunsaker, D. J., **Thorp, K. R.**, White, J. W., French, A. N., Conley, M. M., 2016. Interactive effect of nitrogen fertilization and irrigation on grain yield, canopy temperature, and nitrogen use efficiency in overhead sprinkler-irrigated durum wheat. Field Crops Research 191, 54–65. doi:10.1016/j.fcr.2016.02.011

[69] Pauli, D., Andrade-Sanchez, P., Carmo-Silva, A. E., Gazave, E., French, A. N., Heun, J., Hunsaker, D. J., Lipka, A. E., Setter, T. L., Strand, R. J., **Thorp, K. R.**, Wang, S., White, J. W., Gore, M. A., 2016. Field-based, high-throughput plant phenotyping reveals the temporal patterns of quantitative trait loci associated with stress-responsive traits in cotton. G3: Genes, Genomes, Genetics 6 (4), 865–879. doi: 10.1534/g3.115.023515

[70] **Thorp, K. R.**, Wang, G., Badaruddin, M., Bronson, K. F., 2016. Lesquerella seed yield estimation using color image segmentation to track flowering dynamics in response to variable water and nitrogen management. Industrial Crops and Products 86, 186–195. doi:10.1016/j.indcrop.2016.03.035

[71] Chu, Q., Liu, J., Bali, K., **Thorp, K. R.**, Smith, R., Wang, G., 2016. Automated thinning increases uniformity of in-row spacing and plant size in romaine lettuce. HortTechnology 26 (1), 12–19.

[72] Adhikari*, P., Ale, S., Bordovsky, J. P., **Thorp, K. R.**, Modala, N. R., Rajan, N., Barnes, E. M., 2016. Simulating future climate change impacts on seed cotton yield in the Texas High Plains using the CSM-CROPGRO-Cotton model. Agricultural Water Management 164, 317–330. doi:10.1016/j.agwat.2015.10.011

[73] Cendrero-Mateo*, M. P., Moran, M. S., Papuga, S. A., **Thorp, K. R.**, Alonso, L., Moreno, J., Ponce-Campos, G., Rascher, U., Wang, G., 2016. Plant chlorophyll fluorescence: active and passive measurements at canopy and leaf scales with different nitrogen treatments. Journal of Experimental Botany 67 (1), 275–286. doi:10.1093/jxb/erv456

[74] **Thorp, K. R.**, Gore, M. A., Andrade-Sanchez, P., Carmo-Silva, A. E., Welch, S. M., White, J. W., French, A. N., 2015. Proximal hyperspectral sensing and data analysis approaches for field-based plant phenomics. Computers and Electronics in Agriculture 118, 225–236. doi:10.1016/j.compag.2015.09.005

[75] Liu, J., Wang, G., **Thorp, K. R.**, Zhang, Y., Yang, M., Chu, Q., 2015. Effect of nitrogen and water deficit type on the yield gap between the potential and attainable wheat yield. Chilean Journal of Agricultural Research 75 (4), 457–464. doi:10.4067/S0718-58392015000500011

[76] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., Bautista, E., Bronson, K. F., 2015. Integrating geospatial data and cropping system simulation within a geographic information system to analyze spatial seed cotton yield, water use, and irrigation requirements. Precision Agriculture 16 (5), 532–557. doi:10.1007/s11119-015-9393-x

[77] Groenendyk*, D. G., Ferré, T. P. A., **Thorp, K. R.**, Rice, A. K., 2015. Hydrologic-process-based soil texture classification for improved visualization of landscape function. PLOS ONE 10 (6), e0131299. doi:10.1371/journal.pone.0131299

[78] Hunsaker, D. J., French, A. N., Waller, P. M., Bautista, E., **Thorp, K. R.**, Bronson, K. F., Andrade-Sanchez, P., 2015. Comparison of traditional and ET-based irrigation scheduling of surface-irrigated cotton in the arid southwestern USA. Agricultural Water Management 159, 209–224. doi:10.1016/j.agwat.2015.06.016

[79] Modala, N. R., Ale, S., Rajan, N., Munster, C. L., DeLaune, P. B., **Thorp, K. R.**, Nair, S. S., Barnes, E. M., 2015. Evaluation of the CSM-CROPGRO-Cotton model for the Texas Rolling Plains region and simulation of deficit irrigation strategies for increasing water use efficiency. Transactions of the ASABE 58 (3), 685–696. doi:10.13031/trans.58.10833

[80] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, 2015. Remote sensing of evapotranspiration over cotton using the TSEB and METRIC energy balance models. Remote Sensing of Environment 158, 281–294. doi:10.1016/j.rse.2014.11.003

[81] **Thorp, K. R.**, Barnes, E. M., Hunsaker, D. J., Kimball, B. A., White, J. W., Nazareth, V. J., Hoogenboom, G., 2014. Evaluation of CSM-CROPGRO-Cotton for simulating effects of management and climate change on cotton growth and evapotranspiration in an arid environment. Transactions of the ASABE 57 (6), 1627–1642. doi:10.13031/trans.57.10612

[82] Malone, R. W., Jaynes, D. B., Kaspar, T. C., **Thorp, K. R.**, Kladivko, E., Ma, L., James, D. E., Singer, J., Morin, X. K., Searchinger, T., 2014. Cover crops in the upper midwestern United States: Simulated effect on nitrate leaching with artificial drainage. Journal of Soil and Water Conservation 69 (4), 292–305. doi:10.2489/jswc.69.4.292

[83] Liu, J., Bronson, K. F., **Thorp, K. R.**, Mon, J., Badaruddin, M., McCloskey, W. B., Ray, D. T., Chu, Q., Wang, G., 2014. Lesquerella seed and oil yield response to split-applied fertilizer. Industrial Crops and Products 60, 273–279. 10.1016/j.indcrop.2014.06.024

[84] Liang, Z., Bronson, K. F., **Thorp, K. R.**, Mon, J., Badaruddin, M., Wang, G., 2014. Cultivar and N fertilizer rate affect yield and N use efficiency in irrigated durum wheat. Crop Science 54 (3), 1175–1183. doi:10.2135/cropsci2013.03.0159

[85] **Thorp, K. R.**, Ale, S., Bange, M. P., Barnes, E. M., Hoogenboom, G., Lascano, R. J., McCarthy, A. C., Nair, S., Paz, J. O., Rajan, N., Reddy, K. R., Wall, G. W., White, J. W., 2014. Development and application of process-based simulation models for cotton production: A review of past, present, and future directions. Journal of Cotton Science 18 (1), 1–38.

[86] Wang, G., Bronson, K. F., **Thorp, K. R.**, Mon, J., Badaruddin, M., 2014. Multiple leaf measurements improve effectiveness of chlorophyll meter for durum wheat nitrogen management. Crop Science 54 (2), 817–826. doi:10.2135/cropsci2013.03.0160

[87] Andrade-Sanchez, P., Gore, M. A., Heun, J. T., **Thorp, K. R.**, Carmo-Silva, A. E., French, A. N., Salvucci, M. E., White, J. W., 2014. Development and evaluation of a field-based, high-throughput phenotyping platform. Functional Plant Biology 41 (1), 68–79. doi:10.1071/FP13126

[88] **Thorp, K. R.**, Bronson, K. F., 2013. A model-independent open-source geospatial tool for managing point-based environmental model simulations at multiple spatial locations. Environmental Modelling & Software 50, 25–36. doi:10.1016/j.envsoft.2013.09.002

[89] Hunsaker, D. J., French, A. N., **Thorp, K. R.**, 2013. Camelina water use and seed yield response to irrigation scheduling in an arid environment. Irrigation Science 31 (5), 911–929. doi:10.1007/s00271-012-0368-7

[90] **Thorp, K. R.**, French, A. N., Rango, A., 2013. Effect of image spatial and spectral characteristics on mapping semi-arid rangeland vegetation using multiple endmember spectral mixture analysis (MESMA). Remote Sensing of Environment 132, 120–130. doi:10.1016/j.rse.2013.01.008

[91] French, A. N., Alfieri, J. G., Kustas, W. P., Prueger, J. H., Hipps, L. E., Chávez, J. L., Evett, S. R., Howell, T. A., Gowda, P. H., Hunsaker, D. J., **Thorp, K. R.**, 2012. Estimation of surface energy fluxes using surface renewal and flux variance techniques over an advective irrigated agricultural site. Advances in Water Resources 50, 91–105. doi:10.1016/j.advwatres.2012.07.007

[92] **Thorp, K. R.**, Wang, G., West, A. L., Moran, M. S., Bronson, K. F., White, J. W., Mon, J., 2012. Estimating crop biophysical properties from remote sensing data by inverting linked radiative transfer and ecophysiological models. Remote Sensing of Environment 124, 224–233. doi:10.1016/j.rse.2012.05.013

[93] White, J. W., Andrade-Sanchez, P., Gore, M. A., Bronson, K. F., Coffelt, T. A., Conley, M. M., Feldmann, K. A., French, A. N., Heun, J. T., Hunsaker, D. J., Jenks, M. A., Kimball, B. A., Roth, R. L., Strand, R. J., **Thorp, K. R.**, Wall, G. W., Wang, G., 2012. Field-based phenomics for plant genetics research. Field Crops Research 133, 101–112. doi:10.1016/j.fcr.2012.04.003

[94] Gutierrez, M., Norton, R., **Thorp, K. R.**, Wang, G., 2012. Association of spectral reflectance indices with plant growth and lint yield in upland cotton. Crop Science 52 (2), 849–857. doi:10.2135/cropsci2011.04.0222

[95] Nearing*, G. S., Crow, W. T., **Thorp, K. R.**, Moran, M. S., Reichle, R. H., Gupta, H. V., 2012. Assimilating remote sensing observations of leaf area index and soil moisture for wheat yield estimates: An observing system simulation experiment. Water Resources Research 48 (5). doi:10.1029/2011WR011420

[96] **Thorp, K. R.**, White, J. W., Porter, C. H., Hoogenboom, G., Nearing, G. S., French, A. N., 2012. Methodology to evaluate the performance of simulation models for alternative compiler and operating system configurations. Computers and Electronics in Agriculture 81 (1), 62–71. doi:10.1016/j.compag.2011.11.008

[97] Fang, Q. X., Malone, R. W., Ma, L., Jaynes, D. B., **Thorp, K. R.**, Green, T. R., Ahuja, L. R., 2012. Modeling the effects of controlled drainage, N rate and weather on nitrate loss to subsurface drainage. Agricultural Water Management 103, 150–161. doi:10.1016/j.agwat.2011.11.006

[98] Nolan, B. T., Malone, R. W., Gronberg, J. A., **Thorp, K. R.**, Ma, L., 2012. Verifiable metamodels for nitrate losses to drains and groundwater in the Corn Belt, USA. Environmental Science & Technology 46 (2), 901–908. doi:10.1021/es202875e

[99] Sánchez, J. M., French, A. N., Mira, M., Hunsaker, D. J., **Thorp, K. R.**, Valor, E., Caselles, V., 2011. Thermal infrared emissivity dependence on soil moisture in field conditions. IEEE Transactions on Geoscience and Remote Sensing 49 (11 Part 2), 4652–4659. doi:10.1109/TGRS.2011.2142000

[100] Dierig, D. A., Wang, G., McCloskey, W. B., **Thorp, K. R.**, Isbell, T. A., Ray, D. T., Foster, M. A., 2011. Lesquerella: New crop development and commercialization in the U.S. Industrial Crops and Products 34 (2), 1381–1385. doi:10.1016/j.indcrop.2010.12.023

[101] Qi, Z., Helmers, M. J., Malone, R. W., **Thorp, K. R.**, 2011. Simulating long-term impacts of winter rye cover crop on hydrologic cycling and nitrogen dynamics for a corn-soybean crop system. Transactions of the ASABE 54 (5), 1575–1588. doi:10.13031/2013.39836

[102] **Thorp, K. R.**, Dierig, D. A., 2011. Color image segmentation approach to monitor flowering in lesquerella. Industrial Crops and Products 34 (1), 1150–1159. doi:10.1016/j.indcrop.2011.04.002

[103] **Thorp, K. R.**, Dierig, D. A., French, A. N., Hunsaker, D. J., 2011. Analysis of hyperspectral reflectance data for monitoring growth and development of lesquerella. Industrial Crops and Products 33 (2), 524–531. doi:10.1016/j.indcrop.2010.10.003

[104] Nearing*, G. S., Moran, M. S., **Thorp, K. R.**, Holifield Collins, C. D., Slack, D. C., 2010. Likelihood parameter estimation for calibrating a soil moisture model using radar backscatter. Remote Sensing of Environment 114 (11), 2564–2574. doi:10.1016/j.rse.2010.05.031

[105] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., 2010. Assimilating leaf area index estimates from remote sensing into the simulations of a cropping systems model. Transactions of the ASABE 53 (1), 251–262. doi:10.13031/2013.29490

[106] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., White, J. W., Clarke, T. R., Pinter, Jr., P. J., 2010. Evaluation of the CSM-CROPSIM-CERES-Wheat model as a tool for crop water management. Transactions of the ASABE 53 (1), 87–102. doi:10.13031/2013.29505

[107] Hunsaker, D. J., El-Shikha, D. M., Clarke, T. R., French, A. N., **Thorp, K. R.**, 2009. Using ESAP software for predicting the spatial distributions of NDVI and transpiration of cotton. Agricultural Water Management 96 (9), 1293–1304. doi:10.1016/j.agwat.2009.04.014

[108] **Thorp, K. R.**, Youssef, M. A., Jaynes, D. B., Malone, R. W., Ma, L., 2009. DRAINMOD-N II: Evaluated for an agricultural system in Iowa and compared to RZWQM-DSSAT. Transactions of the ASABE 52 (5), 1557–1573. doi:10.13031/2013.29144

[109] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Clarke, T. R., 2009. Evapotranspiration over a camelina crop at Maricopa, Arizona. Industrial Crops and Products 29 (2-3), 289–300. doi:10.1016/j.indcrop.2008.06.001

[110] **Thorp, K. R.**, DeJonge, K. C., Kaleita, A. L., Batchelor, W. D., Paz, J. O., 2008. Methodology for the use of DSSAT models for precision agriculture decision support. Computers and Electronics in Agriculture 64 (2), 276–285. doi:10.1016/j.compag.2008.05.022

[111] Ma, L., Malone, R. W., Jaynes, D. B., **Thorp, K. R.**, Ahuja, L. R., 2008. Simulated effects of nitrogen management and soil microbes on soil nitrogen balance and crop production. Soil Science Society of America Journal 72 (6), 1594–1603. doi:10.2136/sssaj2007.0404

[112] Li, L., Malone, R. W., Ma, L., Kaspar, T. C., Jaynes, D. B., Saseendran, S. A., **Thorp, K. R.**, Yu, Q., Ahuja, L. R., 2008. Winter cover crop effects on nitrate leaching in subsurface drainage as simulated by RZWQM-DSSAT. Transactions of the ASABE 51 (5), 1575–1583. doi:10.13031/2013.25314

[113] **Thorp, K. R.**, Jaynes, D. B., Malone, R. W., 2008. Simulating the long-term performance of drainage water management across the midwestern United States. Transactions of the ASABE 51 (3), 961–976. doi:10.13031/2013.24534

[114] **Thorp, K. R.**, Steward, B. L., Kaleita, A. L., Batchelor, W. D., 2008. Using aerial hyperspectral remote sensing imagery to estimate corn plant stand density. Transactions of the ASABE 51 (1), 311–320. doi:10.13031/2013.24207

[115] DeJonge, K. C., Kaleita, A. L., **Thorp, K. R.**, 2007. Simulating the effects of spatially variable irrigation on corn yields, costs, and revenue in Iowa. Agricultural Water Management 92 (1-2), 99–109. doi:10.1016/j.agwat.2007.05.008

[116] **Thorp, K. R.**, Batchelor, W. D., Paz, J. O., Kaleita, A. L., DeJonge, K. C., 2007. Using cross-validation to evaluate CERES-Maize yield simulations within a decision support system for precision agriculture. Transactions of the ASABE 50 (4), 1467–1479. doi:10.13031/2013.23605

[117] **Thorp, K. R.**, Malone, R. W., Jaynes, D. B., 2007. Simulating long-term effects of nitrogen fertilizer application rates on corn yield and nitrogen dynamics. Transactions of the ASABE 50 (4), 1287–1303. doi:10.13031/2013.23640

[118] **Thorp, K. R.**, Batchelor, W. D., Paz, J. O., Steward, B. L., Caragea, P. C., 2006. Methodology to link production and environmental risks of precision nitrogen management strategies in corn. Agricultural Systems 89 (2-3), 272–298. doi:10.1016/j.agsy.2005.09.005

[119] **Thorp, K. R.**, Tian, L. F., 2004. A review on remote sensing of weeds in agriculture. Precision Agriculture 5 (5), 477–508. doi:10.1007/s11119-004-5321-1

[120] **Thorp, K. R.**, Tian, L. F., 2004. Performance study of variable-rate herbicide applications based on remote sensing imagery. Biosystems Engineering 88 (1), 35–47. doi:10.1016/j.biosystemseng.2004.01.012

[121] **Thorp, K. R.**, Tian, L., Yao, H., Tang, L., 2004. Narrow-band and derivative-based vegetation indices for hyperspectral data. Transactions of the ASAE 47 (1), 291–299. doi:10.13031/2013.15854

Manuscripts In Review

[122] Chen, X., Dong, H., Feng, S., Gui, D., Ma, L., **Thorp, K. R.**, Wu, H., Liu, B., Qi, Z., 2023. RZWQM2 simulated irrigation strategies to mitigate climate change impacts on cotton production in hyper-arid areas. Agronomy xx (x), xx–xx. Submitted 8/9/2023.

[123] Chen, X., Dong, H., Gui, D., Ma, L., **Thorp, K. R.**, Malone, R., Wu, H., Liu, B., Feng, S., Qi, Z., 2023. Potential deficit irrigation adaptation strategies under climate change for sustaining cotton production in hyper-arid areas. Computers and Electronics in Agriculture xx (x), xx–xx. Submitted 8/30/2023.

[124] Elshikha, D. E. M., Waller, P. M., Hunsaker, D. J., **Thorp, K. R.**, Wang, G., Dierig, D., Cruz, V. M. V., Attalah, S., Katterman, M. E., Williams, C., Bautista, E., Ray, D. T., Orr, E., Sanyal, D., Norton, R., Wall, G., Ogden, K., 2023. Water use, growth, and yield of ratooned guayule under subsurface drip and furrow irrigation in the US Southwest Desert. Water xx (x), xx–xx. Submitted 8/31/2023.

[125] Chen, X., Liu, J., Yin, T., **Thorp, K. R.**, Singh, V., Kasmu, X., Yang, G., Dong W., Wang, Z., Zhou, B., Zhang Y., Wang, P., 2023. Developing efficient irrigation to promote

Sustainable Development Goals in global oasis regions. Nature Sustainability xx (x), xx–xx. Submitted 3/31/2023.

[126] Thompson, A. L., **Thorp, K. R.**, Conley, M. M., Pauli, D., 2022. A proximal sensing cart and custom cooling box for improved hyperspectral sensing in a desert environment. Plant Methods xx (x), xx–xx. Submitted 10/6/2022.

Non-Refereed Publications

[127] Elshikha, D. E., Waller, P., **Thorp, K. R.**, Angadi, S., Grover, K., Masson, R., 2023. Using drones for management of crops. Tech. Rep. az2031, University of Arizona, College of Agriculture and Life Science, Cooperative Extension, Tucson, AZ.

[128] Shamshiri, R. R., Hameed, I. A., **Thorp, K. R.**, Balasundram, S. K., Shafian, S., Fatemieh, M., Sultan, M., Mahns, B., Samiei S., 2021. Greenhouse automation using wireless sensors and IoT instruments integrated with artificial intelligence. In: Next-Generation Greenhouses for Food Security. InTechOpen, London, United Kingdom.

[129] LeBauer, D., Maxwell, B., Demieville, J., Fahlgren, N., French, A., Garnett, R., Hu, Z., Huynh, K., Kooper, R., Li, Z., Maimaitijiang, M., Mao, J., Mockler, T., Morris, G., Newcomb, M., Ottman, M., Ozersky, P., Paheding, S., Pauli, D., Pless, R., Qin, W., Riemer, K., Rohde, G., Rooney, W., Sagan, V., Shakoor, N., Stylianou, A., **Thorp, K. R.**, Ward, R., White, J., Willis, C., Zender, C., 2020. Data From: TERRA-REF, An open reference data set from high resolution genomics, phenomics, and imaging sensors. Dryad Dataset. doi:10.5061/dryad.4b8gtht99

[130] Melzer, M., Vanstone, N., Neethirajan, S., Moore, A., Both, A. J., Van Nahmen, A., McLaughlin, B., Drollinger, D., Pola, P. R., Lumkes Jr., J. H., Bohlen, A., Livingston, P., Lanning, D., Williams, S., Funk, P., Schuster, J., Francis, P., **Thorp, K. R.**, Ko-Madden, C., 2018. Visualchallenge7: This is how I see it - Images of agricultural and biological engineering. Resource: Engineering and Technology for a Sustainable World 25 (1), 22–27.

[131] Shamshiri, R. R., Mahadi, M. R., **Thorp, K. R.**, Ismail, W. I. W., Ahmad, D., Man, H. C., 2017. Adaptive management framework for evaluating and adjusting microclimate parameters in tropical greenhouse crop production systems. In: Jurić, S. (Ed.), Plant Engineering. InTech, London, United Kingdom, Ch. 9, pp. 167–191.

[132] **Thorp, K. R.**, 2014. Book review of "Precision Agriculture for Grain Production Systems" by Brett Whelan and James Taylor. Field Crops Research 155, 133. doi:10.1016/j.fcr.2013.09.014

[133] **Thorp, K. R.**, 2013. Book review of "Spatial Data Analysis in Ecology and Agriculture Using R" by R. E. Plant. Field Crops Research 149, 261. doi:10.1016/j.fcr.2013.05.017

[134] **Thorp, K. R.**, 2013. Precision agriculture. In: Njoku, E. G. (Ed.), Encyclopedia of Remote Sensing, Encyclopedia of Earth Sciences Series, Springer Reference (www.springerreference.com). Springer, Verlag-Berlin-Heidelberg, Germany.

[135] **Thorp, K. R.**, Andrade-Sanchez, P., Gore, M. A., White, J. W., French, A. N., 2012. Information technologies for field-based high-throughput phenotyping. Resource: Engineering and Technology for a Sustainable World 19 (5), 8–9.

[136] Jaynes, D. B., Malone, R. W., **Thorp, K. R.**, 2011. Drainage water management for reducing nitrate losses from tile drained fields. In: Rudebusch, L. (Ed.), Getting into Soil and Water 2011. Iowa Water Center, Iowa State University, Ames, IA., pp. 28–30.

[137] Hunsaker, D. J., French, A. N., **Thorp, K. R.**, 2011. Optimized water management: Using irrigation scheduling and remote sensing as decision support tools. Resource: Engineering and Technology for a Sustainable World 18 (3), 6–8.

[138] Wang, G., Gutierrez, M., Ottman, M., **Thorp, K. R.**, 2010. Durum wheat yield prediction at flowering stage for late N management. In: Forage & Grain Report 2010. College of Agriculture and Life Sciences, University of Arizona, Tucson, AZ, pp. 38–47.

Non-Refereed Conference Proceedings and Meeting Papers

Asterisk (*) indicates graduate students and post-docs advised by Dr. Thorp.

[139] **Thorp, K. R.**, Elshikha, D. E., Andrade-Sanchez, P., 2020. Irrigation management outcomes using increasingly complex geospatial technologies. ASABE Paper No. irrig20–004. In: Proceedings of the 6th National Decennial Irrigation Conference, San Antonio, TX, 30 November – 4 December. ASABE, St. Joseph, MI.

[140] Huang*, J., Ridoutt, B. G., Sun, Z., Lan, K., **Thorp, K. R.**, Wang, X., Yin, X., Huang, J., Chen, F., Scherer L., 2020. Balancing China's food production within the planetary water boundary. In: Eberle, U., Smetana, S., Bos, U. (Eds.), Proceedings of the 12th International Conference on Life Cycle Assessment of Food (LCAFood2020), Berlin, Germany (Virtual), 13–16 October. DIL, Quakenbrück, Germany, pp. 3–7.

[141] Ale, S., Himanshu, S. K., Omani, N., Bordovsky, J., **Thorp, K. R.**, Barnes, E. M., 2019. Determining ideal irrigation termination dates under deficit irrigation strategies. In: Proceedings of the 2019 Beltwide Cotton Conference, New Orleans, LA, 8–10 January. National Cotton Council of America, Cordova, TN.

[142] Harders*, S. J., **Thorp, K. R.**, French, A. N., Ward, R., 2018. Unmanned aerial vehicle use in assessing crop vitality and height in arid land cotton crops. ASABE Paper No. 1800578. ASABE, St. Joseph, MI.

[143] Bronson, K. F., Hunsaker, D. J., **Thorp, K. R.**, Williams, C. L., Norton, R., Barnes, E. M., 2018. Improving nitrogen use efficiency in subsurface drip-irrigated cotton. In: Proceedings of the 2018 Beltwide Cotton Conference, San Antonio, TX, 3–5 January. National Cotton Council of America, Cordova, TN.

[144] Bronson, K. F., Hunsaker, D. J., **Thorp, K. R.**, Williams, C. L., 2017. Nitrous oxide emissions: Assessment and mitigation in irrigated cotton in the western USA. In: Proceedings of the Western Nutrient Management Conference, Reno, NV, 2–3 March. Vol. 12. pp. 47–55.

[145] Bronson, K. F., Hunsaker, D. J., Andrade-Sanchez, P., Williams, C. L., Norton, R., **Thorp, K. R.**, 2017. Improving nitrogen management for subsurface drip-irrigated cotton in Arizona. In: Proceedings of the 2017 Beltwide Cotton Conference, Dallas, TX, 4–6 January. National Cotton Council of America, Cordova, TN.

[146] Adhikari*, P., Ale, S., DeLaune, P., **Thorp, K. R.**, 2016. Assessing the feasibility of growing cover crops in cotton production systems of the Texas Rolling Plains. In: Proceedings of the 2016 Beltwide Cotton Conference, New Orleans, LA, 5–7 January. National Cotton Council of America, Cordova, TN.

[147] Bronson, K. F., **Thorp, K. R.**, White, J. W., French, A. N., Conley, M. M., Mon, J., Barnes, E. M., 2015. Combining active optical sensors, infrared thermometers and

ultrasonic height sensors for proximal sensing in irrigated cotton. In: Proceedings of the 10th European Conference on Precision Agriculture, Volcani Center, Israel, 12–16 July. Wageningen Academic Publishers, The Netherlands.

[148] Zanella*, V., Ortiz, B. V., **Thorp, K. R.**, Morari, F., Mosca, G., Hoogenboom, G., 2015. Combining crop sensing and simulation modeling to assess within-field corn nitrogen stress. In: Proceedings of the 10th European Conference on Precision Agriculture, Volcani Center, Israel, 12–16 July. Wageningen Academic Publishers, The Netherlands.

[149] Modala, N. R., Ale, S., Rajan, N., Munster, C., **Thorp, K. R.**, 2015. Simulating the impact of future climate variability and change on cotton production in the Texas Rolling Plains. In: Proceedings of the 2015 Beltwide Cotton Conference, San Antonio, TX, 5–7 January. National Cotton Council of America, Cordova, TN.

[150] Bronson, K. F., **Thorp, K. R.**, White, J. W., Conley, M. M., Mon, J., 2014. Use of active radiometers to estimate biomass, leaf area index, and plant height in cotton. In: Proceedings of the 12th International Conference on Precision Agriculture, Sacramento, CA, 20–23 July.

[151] Groenendyk*, D. G., **Thorp, K. R.**, Ferré, T. P. A., Crow, W. T., Hunsaker, D. J., 2014. A k-means clustering approach to assess wheat yield prediction uncertainty with a HYDRUS-1D coupled crop model. In: Ames, D. P., Quinn, N. W. T., Rizzoli, A. E. (Eds.), Proceedings of the 7th International Congress on Environmental Modelling and Software, San Diego, CA, 15–19 June.

[152] Bronson, K. F., Mon, J., Hunsaker, D. J., Bautista, E., **Thorp, K. R.**, French, A. N., White, J. W., 2013. Improving nitrogen fertilizer management for surface-irrigated cotton in Arizona. In: Proceedings of the 2013 Beltwide Cotton Conference, San Antonio, TX, 7–10 January. National Cotton Council of America, Cordova, TN.

[153] Groenendyk*, D. G., Kaleita, A. L., **Thorp, K. R.**, 2011. Assimilating in situ soil moisture measurements into the DSSAT-CSM using a Kalman filter. ASABE Paper No. 11–11093. ASABE, St. Joseph, MI.

[154] **Thorp, K. R.**, White, J. W., 2011. Evaluation of the DSSAT-CSM using three compilers on five operating systems. In: Proceedings of the 41st Biological Systems Simulation Group (BSSG) Conference, The University of Texas, Austin, TX, 19–21 April.

[155] White, J. W., **Thorp, K. R.**, 2011. Simulating stochastic crop management in cropping systems. In: Proceedings of the 41st Biological Systems Simulation Group (BSSG) Conference, The University of Texas, Austin, TX, 19–21 April.

[156] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, 2010. Remote sensing of evapotranspiration over crops using combined airborne and ground-based observations. ASABE Paper No. IRR10–9789. In: Proceedings of the 5th National Decennial Irrigation Conference, Phoenix, AZ, 5–8 December. ASABE, St. Joseph, MI.

[157] Hunsaker, D. J., French, A. N., Bautista, E., **Thorp, K. R.**, Waller, P. M., Royer, P. D., Andrade-Sanchez, P., Heun, J., 2010. Spatial estimation of crop evapotranspiration, soil properties, and infiltrated water for scheduling cotton surface irrigations. ASABE Paper No. IRR10–8655. In: Proceedings of the 5th National Decennial Irrigation Conference, Phoenix, AZ, 5–8 December. ASABE, St. Joseph, MI.

[158] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., 2010. Analyzing water management and production trade-offs using crop systems models. ASABE Paper No. IRR10–9783. In: Proceedings of the 5th National Decennial Irrigation Conference, Phoenix, AZ, 5–8 December. ASABE, St. Joseph, MI.

[159] Hunsaker, D. J., French, A. N., Waller, P., Bautista, E., Royer, P., **Thorp, K. R.**, Andrade-Sanchez, P., Heun, J., 2010. Irrigation scheduling decision support for field-scale, surface irrigation using remote sensing and ground-based data. In: Proceedings of the 2010 IAHS Remote Sensing and Hydrology Symposium, Jackson Hole, WY, 27–30 September. International Association of Hydrological Sciences (IAHS) Press, Wallingford, Oxfordshire, UK.

[160] Sánchez, J. M., French, A. N., Mira, M., Hunsaker, D. J., **Thorp, K. R.**, Valor, E., Caselles, V., 2010. Field thermal infrared emissivity dependence on soil moisture. In: Proceedings of the 2010 IAHS Remote Sensing and Hydrology Symposium, Jackson Hole, WY, 27–30 September. International Association of Hydrological Sciences (IAHS) Press, Wallingford, Oxfordshire, UK.

[161] Jaynes, D. B., **Thorp, K. R.**, James, D. E., 2010. Potential water quality impact of drainage water management in the Midwest USA. ASABE Paper No. IDS-CSBE100084. In: Proceedings of the XVIIth World Congress of the International Commission of Agricultural Engineering (CIGR), Québec City, Canada, 13–17 June. ASABE, St. Joseph, MI.

[162] Youssef, M., Skaggs, R. W., **Thorp, K. R.**, Abdelbaki, A. M., Jaynes, D. B., 2010. DRAINMOD-simulated performance of drainage water management across the U.S. Midwest. ASABE Paper No. IDS-CSBE100206. In: Proceedings of the XVIIth World Congress of the International Commission of Agricultural Engineering (CIGR), Québec City, Canada, 13–17 June. ASABE, St. Joseph, MI.

[163] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, 2010. ET estimation by assimilating ground and airborne data. In: Proceedings of the 40th Biological Systems Simulation Group (BSSG) Conference, University of Arizona, Maricopa Agricultural Center, Maricopa, AZ, 13–15 April.

[164] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., 2010. Assimilating leaf area index estimates from remote sensing into the simulations of a cropping systems model. In: Proceedings of the 40th Biological Systems Simulation Group (BSSG) Conference, University of Arizona, Maricopa Agricultural Center, Maricopa, AZ, 13–15 April.

[165] White, J. W., **Thorp, K. R.**, 2010. Simulating interacting effects of climate change, environment and crop management. In: Proceedings of the 40th Biological Systems Simulation Group (BSSG) Conference, University of Arizona, Maricopa Agricultural Center, Maricopa, AZ, 13–15 April.

[166] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Clarke, T. R., 2009. Spatially distributed evapotranspiration estimation using remote sensing and ground-based radiometers over cotton at Maricopa, Arizona, USA. In: New Approaches to Hydrological Prediction in Data Sparse Regions, Proceedings of Symposium HS.2 at the Joint IAHS & IAH Convention, Hyderabad, India, 6–12 September, IAHS Publication 333. International Association of Hydrological Sciences (IAHS) Press, Wallingford, Oxfordshire, UK.

[167] **Thorp, K. R.**, 2009. Model development in a completely open-source integrated development environment. In: Proceedings of the 39th Biological Systems Simulation Group (BSSG) Conference, University of Georgia, Griffin, GA, 11–13 May.

[168] El-Shikha, D. M., Hunsaker, D. J., Lesch, S. M., Clarke, T. R., French, A. N., **Thorp, K. R.**, 2008. Determining fixed sensor locations for predicting the spatial distribution of NDVI using ESAP software. ASABE Paper No. 08–3580. ASABE, St. Joseph, MI.

[169] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Clarke, T. R., 2008. Estimating crop water use for camelina with remote sensing. ASABE Paper No. 08–4509. ASABE, St. Joseph, MI.

[170] DeJonge, K. C., Kaleita, A. L., **Thorp, K. R.**, 2006. Simulation of spatially variable precision irrigation and its effects on corn growth using CERES-Maize. In: Proceedings of the 8th International Conference on Precision Agriculture, Minneapolis, MN, 23–26 July.

[171] **Thorp, K. R.**, Steward, B. L., Kaleita, A. L., Batchelor, W. D., 2006. Estimation of corn plant population from hyperspectral remote sensing imagery using regression on principle components. In: Proceedings of the 8th International Conference on Precision Agriculture, Minneapolis, MN, 23–26 July.

[172] **Thorp, K. R.**, Steward, B. L., Kaleita, A. L., Batchelor, W. D., 2006. Using aerial hyperspectral remote sensing imagery to estimate corn plant stand density. ASABE Paper No. 06–3015. ASABE, St. Joseph, MI.

[173] **Thorp, K. R.**, Batchelor, W. D., Paz, J. O., 2005. A cross validation approach to evaluate CERES-Maize simulations of corn yield spatial variability. ASAE Paper No. 05–3002. ASAE, St. Joseph, MI.

[174] **Thorp, K. R.**, Batchelor, W. D., Paz, J. O., 2005. Programming ArcGIS to generate crop model input files for spatial simulations. ASAE Paper No. 05–3012. ASAE, St. Joseph, MI.

[175] Shrestha, D. S., Steward, B. L., Li, B., **Thorp, K. R.**, 2004. A rapid video frame correspondence algorithm using a Kalman filter. ASAE Paper No. 04–3058. ASAE, St. Joseph, MI.

[176] Batchelor, W. D., Paz, J. O., **Thorp, K. R.**, 2004. Development and evaluation of a decision support system for precision agriculture. In: Proceedings of the 7th International Conference on Precision Agriculture, Minneapolis, MN, 25–28 July.

[177] **Thorp, K. R.**, Batchelor, W. D., Paz, J. O., Steward, B. L., 2004. Estimating yield and environmental risks associated with variable rate nitrogen management for corn using Apollo. In: Proceedings of the 7th International Conference on Precision Agriculture, Minneapolis, MN, 25–28 July.

[178] Batchelor, W. D., Link, J., **Thorp, K. R.**, Graeff, S., Paz, J. O., 2004. The role of crop growth models in precision farming. In: Proceedings of the Precision Agriculture Conference: GIS and Crop Modeling, University of Hohenheim, Stuttgart, Germany, 13 May.

[179] Batchelor, W. D., Paz, J. O., **Thorp, K. R.**, 2004. APOLLO - A crop model based precision agriculture decision support system. In: Proceedings of the 34th Biological Systems Simulation Group (BSSG) Conference, University of Florida, Gainesville, FL, 8–10 March.

[180] **Thorp, K. R.**, Tian, L., Yao, H., Tang, L., 2002. Development of vegetation indices for hyperspectral data. ASAE Paper No. 02–1077. ASAE, St. Joseph, MI.

[181] Yao, H., Tian, L., Tang, L., **Thorp, K. R.**, 2002. Corn canopy reflectance study with a real-time high-density spectral-image mapping system. ASAE Paper No. 02–3144. ASAE, St. Joseph, MI.

[182] Tang, L., Yao, H., Tian, L., **Thorp, K. R.**, 2001. A real-time in-field variability mapping system. ASAE Paper No. 01–1025. ASAE, St. Joseph, MI.

Published Abstracts

Asterisk (*) indicates graduate students and post-docs advised by Dr. Thorp.

[183] Kimball, B. A., Boote, K. J., Stockle, C. O., **Thorp, K. R.**, Suyker, A. E., Evett, S. R., Brauer, D. K., Coyle, G. G., Copeland, K. S., Marek, G. W., Colaizzi, P. D., Acutis, M., Alimagham, S., Archontoulis, S. V., Babacar, F., Barcza, Z., Basso, B., Bertuzzi, P., Constantin, J., De Antoni Migliorati, M., Dumont, B., Durand, J., Nandor, F., Gaiser, T., Garofalo, P., Gayler, S., Giglio, L., Grant, R., Guan, K., Hoogenboom, G., Jiang, Q., Kim, S., Kisekka, I., Lizaso, J. I., Masia, S., Meng, H., Mereu, V., Mukhtar, A., Perego, A., Peng, B., Priesack, E., Qi, Z., Shelia, V., Snyder, R., Soltani, A., Spano, D., Srivastava, A., Thomson, A., Timlin, D., Trabucco, A., Webber, H., Weber, T., Willaume, M., Williams, K., Van der Laan, M., Ventrella, D., Viswanathan, M., Xu, X., Zhou, W., 2022. Prediction of evapotranspiration and yield of maize: An inter-comparison among 41 maize models. In: Abstracts of the 2022 ASA-SSSA-CSSA Meeting, Baltimore, MD, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[184] Pugh*, N. A., **Thorp, K. R.**, Gonzalez, E. M., Elshikha, D., Pauli, D., 2022. Comparison of image georeferencing strategies for agricultural applications of small unoccupied aircraft systems. In: Abstracts of the 2022 ASA-SSSA-CSSA Meeting, Baltimore, MD, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[185] Salmeron Cortasa, M., Kothari, K., Battisti, R., Boote, K. J., Archontoulis, S. V., Constantin, J., Cuadra, S. V., Debaeke, P., Babacar, F., Fleisher, D. H., Grant, B., Hoogenboom, G., Jing, Q., Kisekka, I., Kimball, B. A., Leung, F., Marin, F. R., Meng, H., Pattey, E., Qian, B., Nendel, C., Schoving, C., Shelia, V., Da Silva, E., Smith, W., Srivastava, A., Sun, W., Suyker, A., **Thorp, K. R.**, Timlin, D., Van der Laan, M., Vieira Jr., N., Williams, K., 2022. What did we learn from the evaluation of multiple process-based soybean models for simulation of evapotranspiration. In: Abstracts of the 2022 ASA-SSSA-CSSA Meeting, Baltimore, MD, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[186] Serba, D. D., Elshikha, D. E. M., Hejl, R., **Thorp, K. R.**, Wu, Y., Williams, C. F., 2022. Remote sensing the effect of deficit irrigation on canopy characteristics and genotypic variability in bermudagrass. In: Abstracts of the 2022 ASA-SSSA-CSSA Meeting, Baltimore, MD, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[187] Kimball, B. A., Boote, K. J., Stockle, C. O., **Thorp, K. R.**, Suyker, A. E., Evett, S. R., Alimagham, S., Archontoulis, S. V., Babacar, F., Barcza, Z., Basso, B., Bertuzzi, P., Constantin, J., De Antoni Migliorati, M., Dumont, B., Durand, J., Fodor, N., Gaiser, T., Garofalo, P., Gayler, S., Giglio, L., Grant, R., Guan, K., Hoogenboom, G., Jiang, Q., Kim, S., Kisekka, I., Lizaso, J. I., Masia, S., Meng, H., Mereu, V., Mukhtar, A., Perego, A., Peng, B., Priesack, E., Qi, Z., Shelia, V., Snyder, R., Soltani, A., Spano, D., Srivastava, A., Thomson, A., Timlin, D., Trabucco, A., Webber, H., Willaume, M., Williams, K., Van der Laan, M., Ventrella, D., Xu, X., Zhou, W., 2021. Prediction of evapotranspiration and yields of maize: An inter-comparison among 41 maize models. In: Abstracts of the 2021 ASA-SSSA-CSSA Meeting, Salt Lake City, UT, 7–10 November. ASA-SSSA-CSSA, Madison, WI.

[188] Kothari, K., Salmeron Cortasa, M., Battisti, R., Boote, K. J., Archontoulis, S. V., Constantin, J., Cuadra, S. V., Debaeke, P., Babacar, F., Fleisher, D. H., Grant, B., Hoogenboom,

G., Jing, Q., Kimball, B. A., Leung, F., Marin, F. R., Nendel, C., Pattey, E., Qian, B., Schoving, C., Shelia, V., Da Silva, E., Smith, W., Srivastava, A., Sun, W., Suyker, A., **Thorp, K. R.**, Timlin, D., Vieira Jr., N., Williams, K., 2021. How well can soybean models simulate daily evapotranspiration. In: Abstracts of the 2021 ASA-SSSA-CSSA Meeting, Salt Lake City, UT, 7–10 November. ASA-SSSA-CSSA, Madison, WI.

[189] Salmeron Cortasa, M., Kothari, K., Battisti, R., Boote, K. J., Archontoulis, S. V., Constantin, J., Cuadra, S. V., Debaeke, P., Faye, B., Fleisher, D. H., Grant, B., Hoogenboom, G., Jing, Q., Kimball, B. A., Leung, F., Marin, F. R., Nendel, C., Qian, B., Schoving, C., Shelia, V., Da Silva, E., Smith, W., Srivastava, A., Sun, W., Suyker, A., **Thorp, K. R.**, Timlin, D., Vieira Jr., N., Williams, K., 2021. Opportunities for improving simulation of evapotranspiration based on sensitivity analysis of multiple soybean models. In: Abstracts of the 2021 ASA-SSSA-CSSA Meeting, Salt Lake City, UT, 7–10 November. ASA-SSSA-CSSA, Madison, WI.

[190] **Thorp, K. R.**, Elshikha, D., Pauli, D., Andrade-Sanchez, P., 2021. Modern geospatial technologies for cotton irrigation management. In: Proceedings of the 2021 Beltwide Cotton Conferences, Virtual, 5–7 January. National Cotton Council of America, Cordova, TN.

[191] Kimball, B. A., Boote, K. J., Stockle, C. O., **Thorp, K. R.**, Suyker, A., Evett, S., Alimagham, M., Archontoulis, S. V., Babacar, F., Barcza, Z., Basso, B., Bertuzzi, P., Constantin, J., De Antoni Migliorati, M., Dumont, B., Durand, J., Fodor, N., Gaiser, T., Garofalo, P., Gayler, S., Giglio, L., Grant, R., Yang, Y., Hoogenboom, G., Jiang, Q., Kim, S., Kisekka, I., Lizaso, J. I., Masia, S., Meng, H., Mukhtar, A., Perego, A., Peng, B., Priesack, E., Pullens, J., Qi, Z., Shelia, V., Snyder, R., Soltani, A., Spano, D., Srivastava, A., Thomson, A., Timlin, D., Trabucco, A., Webber, H., Willaume, M., Williams, K., Van der Laan, M., Ventrella, D., Xu, X., Zhao, J., Mereu, V., Zhou, W., 2020. Prediction of evapotranspiration and yields of maize: Phase 1 and 2 of an inter-comparison among 42 maize models and future plans. In: Abstracts of the 2020 ASA-SSSA-CSSA Meeting, Virtual, 9–13 November. ASA-SSSA-CSSA, Madison, WI.

[192] Salmeron Cortasa, M., Kothari, K., Battisti, R., Boote, K. J., Archontoulis, S. V., Constantin, J., Cuadra, S. V., Debaeke, P., Faye, B., Fleisher, D. H., Grant, B., Hoogenboom, G., Jing, Q., Kimball, B. A., Kisekka, I., Leung, F., Marin, F. R., Meng, H., Nendel, C., Qian, B., Schoving, C., Shelia, V., Da Silva, E., Smith, W., Srivastava, A., Sun, W., Suyker, A. E., **Thorp, K. R.**, Timlin, D., Vieira Jr., N., Williams, K., Xu, X., 2020. Evapotranspiration and water stress response in soybean: Multi-model sensitivity analysis. In: Abstracts of the 2020 ASA-SSSA-CSSA Meeting, Virtual, 9–13 November. ASA-SSSA-CSSA, Madison, WI.

[193] **Thorp, K. R.**, DeJonge, K. C., Hunsaker, D. J., Marek, G. W., Evett, S. R., 2020. Standardized evapotranspiration methods as a basis for crop model improvements. In: Abstracts of the 2020 ASA-SSSA-CSSA Meeting, Virtual, 9–13 November. ASA-SSSA-CSSA, Madison, WI.

[194] **Thorp, K. R.**, Thompson, A. L., Bronson, K. F., 2020. Cotton yield and water use response to variable irrigation rate and timing. In: Proceedings of the 2020 Beltwide Cotton Conferences, Austin, TX, 8–10 January. National Cotton Council of America, Cordova, TN.

[195] **Thorp, K. R.**, Thompson, A. L., Harders, S. J., French, A. N., Ward, R. W., 2020. Phenotyping cotton water use with multispectral drone imagery and geospatial FAO-56

methods. In: Proceedings of the 2020 Beltwide Cotton Conferences, Austin, TX, 8–10 January. National Cotton Council of America, Cordova, TN.

[196] Ale, S., Himanshu, S. K., Omani, N., Bordovsky, J. P., **Thorp, K. R.**, Barnes, E. M., 2019. A modeling approach to determine optimum irrigation termination periods for cotton. In: Abstracts of the 2019 ASA-SSSA-CSSA Meeting, San Antonio, TX, 10–13 November. ASA-SSSA-CSSA, Madison, WI.

[197] Kimball, B. A., Boote, K. J., Hatfield, J. L., Ahuja, L. R., Stockle, C. O., Archontoulis, S. V., Baron, C., Basso, B., Bertuzzi, P., Constantin, J., Deryng, D., Dumont, B., Durand, J., Ewert, F., Gaiser, T., Gayler, S., Hoffman, M. P., Jiang, Q., Kim, S., Lizaso, J. I., Moulin, S., Nendel, C., Parker, P., Palosuo, T. I., Priesack, E., Qi, Z., Srivastava, A., Stella, T., Tao, F., **Thorp, K. R.**, Timlin, D., Twine, T., Webber, H., Willaume, M., Williams, K., Suyker, A. E., Evett, S. R., 2019. Prediction of evapotranspiration and yields of maize: An inter-comparison among 29 maize models and future plans. In: Abstracts of the 2019 ASA-SSSA-CSSA Meeting, San Antonio, TX, 10–13 November. ASA-SSSA-CSSA, Madison, WI.

[198] Malone, R. W., Jaynes, D. B., Ma, L., Richard, T., Feyereisen, G., Herbstritt, S. M., Kaspar, T. C., Karlen, D. L., Kladivko, E. J., **Thorp, K. R.**, 2019. Harvesting fertilized rye cover crop across the U.S. Midwest: Simulated revenue, net energy, and drainage nitogen loss. In: Abstracts of the 2019 ASA-SSSA-CSSA Meeting, San Antonio, TX, 10–13 November. ASA-SSSA-CSSA, Madison, WI.

[199] **Thorp, K. R.**, DeJonge, K. C., Marek, G. W., 2019. Comparison of evapotranspiration methods in the DSSAT Cropping System Model. In: Abstracts of the 2019 ASA-SSSA-CSSA Meeting, San Antonio, TX, 10–13 November. ASA-SSSA-CSSA, Madison, WI.

[200] Bronson, K. F., Hunsaker, D. J., **Thorp, K. R.**, French, A. N., Barnes, E. M., 2018. Use of multiple sensor platforms to manage nutrients and irrigation in a changing climate. In: Abstracts of the 2018 ASA-SSSA-CSSA Meeting, Baltimore, MD, 4–7 November. ASA-SSSA-CSSA, Madison, WI.

[201] DeJonge, K. C., **Thorp, K. R.**, 2018. Evapotranspiration in DSSAT: Using global sensitivity analysis and standardized crop coefficient methods to evaluate model sensitivity and behavior. In: Abstracts of the 2018 ASA-SSSA-CSSA Meeting, Baltimore, MD, 4–7 November. ASA-SSSA-CSSA, Madison, WI.

[202] Joshi, V. R., **Thorp, K. R.**, Coulter, J. A., Johnson, G. A., Strock, J. S., Garcia y Garcia, A., 2018. Site-specific estimation of maize yield response to fertilizer nitrogen with remote sensing and crop modeling. In: Abstracts of the 2018 ASA-SSSA-CSSA Meeting, Baltimore, MD, 4–7 November. ASA-SSSA-CSSA, Madison, WI.

[203] Kimball, B. A., Boote, K. J., Hatfield, J. L., Ahuja, L. R., Stockle, C. O., Archontoulis, S. V., Baron, C., Basso, B., Bertuzzi, P., Constantin, J., Deryng, D., Dumont, B., Durand, J., Ewert, F., Gaiser, T., Gayler, S., Griffis, T., Hoffman, M., Jiang, Q., Kim, S., Lizaso, J. I., Moulin, S., Nendel, C., Parker, P., Palosuo, T. I., Priesack, E., Qi, Z., Srivastava, A., Stella, T., Tao, F., **Thorp, K. R.**, Timlin, D., Twine, T., Webber, H., Willaume, M., Williams, K., 2018. Simulation of evapotranspiration and yields of maize: An inter-comparison among 29 maize models. In: Abstracts of the 2018 ASA-SSSA-CSSA Meeting, Baltimore, MD, 4–7 November. ASA-SSSA-CSSA, Madison, WI.

[204] **Thorp, K. R.**, 2018. Simulating spatially variable irrigation recommendations for precision irrigation management. In: Abstracts of the 2018 ASA-SSSA-CSSA Meeting, Baltimore, MD, 4–7 November. ASA-SSSA-CSSA, Madison, WI.

[205] **Thorp, K. R.**, Marek, G. W., DeJonge, K. C., 2018. Multiobjective optimization approach to compare evapotranspiration methods in the Cotton2K agroecosystem model. In: Arabi, M., David, O., Carlson, J., Ames, D. P. (Eds.), Proceedings of the 9th International Congress on Environmental Modelling and Software, Fort Collins, CO, 24–28 June.

[206] Thompson, A. L., Conley, M. M., Conrad, A., **Thorp, K. R.**, French, A. N., White, J. W., 2018. Proximal sensing carts: A low-cost alternative for field-based high-throughput phenotyping. In: Proceedings of the 2018 Beltwide Cotton Conferences, San Antonio, TX, 3–5 January. National Cotton Council of America, Cordova, TN.

[207] **Thorp, K. R.**, Thompson, A. L., Bronson, K. F., 2018. Cotton yield and water use response to variable irrigation rate and timing. In: Proceedings of the 2018 Beltwide Cotton Conferences, San Antonio, TX, 3–5 January. National Cotton Council of America, Cordova, TN.

[208] Bronson, K. F., Hunsaker, D. J., **Thorp, K. R.**, White, J. W., 2017. Nitrogen and irrigation effects on seed yield, oil content and nitrogen use efficiency of camelina. In: Abstracts of the 2017 ASA-SSSA-CSSA Meeting, Tampa, FL, 22–25 October. ASA-SSSA-CSSA, Madison, WI.

[209] Kimball, B. A., Boote, K. J., Hatfield, J. L., Ahuja, L. R., Stockle, C. O., Archontoulis, S. V., Baron, C., Basso, B., Bertuzzi, P., Chen, M., Constantin, J., Deryng, D., Dumont, B., Durand, J., Ewert, F., Gaiser, T., Gayler, S., Griffis, T., Hoffman, M., Jiang, Q., Kim, S., Lizaso, J. I., Moulin, S., Nendel, C., Parker, P., Palosuo, T. I., Priesack, E., Qi, Z., Srivastava, A., Stella, T., Tao, F., **Thorp, K. R.**, Timlin, D., Twine, T., Webber, H., Willaume, M., Williams, K., 2017. Prediction of evapotranspiration and yields of maize: An inter-comparison among 31 maize models. In: Abstracts of the 2017 ASA-SSSA-CSSA Meeting, Tampa, FL, 22–25 October. ASA-SSSA-CSSA, Madison, WI.

[210] **Thorp, K. R.**, Barnes, E. M., Kimball, B. A., Hunsaker, D. J., 2017. Evaluation of Cotton2K for Arizona conditions. In: Proceedings of the 2017 Beltwide Cotton Conferences, Dallas, TX, 4–6 January. National Cotton Council of America, Cordova, TN.

[211] Bronson, K. F., White, J. W., Conley, M. M., Hunsaker, D. J., **Thorp, K. R.**, Mon, J., French, A. N., 2016. Active optical sensing for irrigated durum wheat: Separating nitrogen and water effects. In: Abstracts of the 2016 ASA-SSSA-CSSA Meeting, Phoenix, AZ, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[212] DeJonge, K. C., **Thorp, K. R.**, 2016. Integrating standardized reference evapotranspiration and dual crop coefficient in the DSSAT-CSM. In: Abstracts of the 2016 ASA-SSSA-CSSA Meeting, Phoenix, AZ, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[213] Kimball, B. A., Boote, K. J., Hatfield, J. L., Ahuja, L. R., Stockle, C. O., Archontoulis, S. V., Baron, C., Basso, B., Bertuzzi, P., Constantin, J., Deryng, D., Dumont, B., Ewert, F., Gaiser, T., Griffis, T., Hoffman, M., Jiang, Q., Kim, S., Lizaso, J. I., Moulin, S., Parker, P., Palosuo, T. I., Qi, Z., Srivastava, A., Tao, F., **Thorp, K. R.**, Timlin, D., Webber, H., Willaume, M., Williams, K., Chen, M., Durand, J., Gayler, S., Priesack, E., Twine, T., 2016. Prediction of evapotranspiration and yields of maize: An inter-comparison among

29 maize models. In: Abstracts of the 2016 ASA-SSSA-CSSA Meeting, Phoenix, AZ, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[214] Pauli, W. D., Andrade-Sanchez, P., Ziegler, G., Gazare, E. E., French, A. N., Baxter, I., Setter, T. L., **Thorp, K. R.**, White, J. W., Gore, M. A., 2016. Genetic basis of stress-responsive traits in cotton revealed by next generation phenotyping. In: Abstracts of the 2016 ASA-SSSA-CSSA Meeting, Phoenix, AZ, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[215] **Thorp, K. R.**, Wang, G., Bronson, K. F., Badaruddin, M., Mon, J., 2016. Identifying important canopy hyperspectral reflectance features for estimating crop biophysical traits. In: Abstracts of the 2016 ASA-SSSA-CSSA Meeting, Phoenix, AZ, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[216] Ward, R. W., French, A. N., Newcomb, M., White, J. W., **Thorp, K. R.**, Andrade-Sanchez, P., 2016. Experiences with phenotyping from the sky with drones at UA-MAC. In: Abstracts of the 2016 ASA-SSSA-CSSA Meeting, Phoenix, AZ, 6–9 November. ASA-SSSA-CSSA, Madison, WI.

[217] **Thorp, K. R.**, Bronson, K. F., Hunsaker, D. J., 2016. Comparison of the FAO-56 water balance model and the DSSAT Cropping System Model for cotton irrigation scheduling in Arizona. In: Proceedings of the 2016 Beltwide Cotton Conferences, New Orleans, LA, 5–7 January. National Cotton Council of America, Cordova, TN.

[218] Bronson, K. F., **Thorp, K. R.**, Hunsaker, D. J., White, J. W., Conley, M. M., 2015. Comparing reflectance-based N management strategies for irrigated cotton. In: Abstracts of the 2015 ASA-SSSA-CSSA Meeting, Minneapolis, MN, 15–18 November. ASA-SSSA-CSSA, Madison, WI.

[219] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, 2015. Reducing ET modeling uncertainty using thermal infrared radiometers. In: Abstracts of the 2015 ASA-SSSA-CSSA Meeting, Minneapolis, MN, 15–18 November. ASA-SSSA-CSSA, Madison, WI.

[220] Kimball, B. A., Boote, K. J., Porter, C. H., Moreno Cadena, P., Hoogenboom, G., **Thorp, K. R.**, 2015. "Kicking the tires" of the energy balance routine within the CROPGRO crop growth models of DSSAT. In: Abstracts of the 2015 ASA-SSSA-CSSA Meeting, Minneapolis, MN, 15–18 November. ASA-SSSA-CSSA, Madison, WI.

[221] Ortiz, B. V., Zanella, V., **Thorp, K. R.**, Morari, F., Hoogenboom, G., 2015. Coupling crop simulation modeling and crop sensing to improve within-field nitrogen management. In: Abstracts of the 2015 ASA-SSSA-CSSA Meeting, Minneapolis, MN, 15–18 November. ASA-SSSA-CSSA, Madison, WI.

[222] **Thorp, K. R.**, 2015. Workflows for field-based plant phenomics data: geoprocessing, modeling, storage, and enhancement. In: Proceedings of the High Throughput Plant Phenotyping and Unmanned Aerial Vehicles in Agriculture Workshop, College Station, TX, 17–18 August. Texas A&M University, College Station, TX.

[223] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Strand, R., 2015. High-throughput phenotyping of cotton using reflectance, temperature, height, and LIDAR scanning. In: Proceedings of the 2015 Beltwide Cotton Conferences, San Antonio, TX, 5–7 January. National Cotton Council of America, Cordova, TN.

[224] Hunsaker, D. J., **Thorp, K. R.**, French, A. N., Bronson, K. F., 2015. Cotton irrigation management using linear-move sprinklers in the southwestern USA. In: Proceedings of the 2015 Beltwide Cotton Conferences, San Antonio, TX, 5–7 January. National Cotton Council of America, Cordova, TN.

[225] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., Bautista, E., Bronson, K. F., 2015. Integrating geospatial data and simulation modeling to analyze spatial seed cotton yield, evapotranspiration, and irrigation requirements. In: Proceedings of the 2015 Beltwide Cotton Conferences, San Antonio, TX, 5–7 January. National Cotton Council of America, Cordova, TN.

[226] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, 2014. Evaluating thermal infrared remote sensing of evapotranspiration over cotton with three surface energy balance models. In: Abstracts of the 2014 American Geophysical Union Meeting, San Fransisco, CA, 15–19 December. American Geophysical Union, Washington, DC.

[227] Groenendyk*, D. G., Ferré, T. P. A., **Thorp, K. R.**, Rice, A. K., Crow, W. T., 2014. Hydrologic-based soil texture classification. In: Abstracts of the 2014 American Geophysical Union Meeting, San Fransisco, CA, 15–19 December. American Geophysical Union, Washington, DC.

[228] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Bronson, K. F., 2014. Evapotranspiration estimation uncertainty from wireless temperature sensor. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[229] Gore, M. A., Andrade-Sanchez, P., Pauli, W. D., French, A. N., **Thorp, K. R.**, White, J. W., Poland, J. A., 2014. Time-related mapping of quantitative trait loci controlling developmental and physiological traits in cotton. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[230] Hunsaker, D. J., French, A. N., El-Shikha, D. M., **Thorp, K. R.**, 2014. Evaluation of vegetation index of passive and active sensors for estimating crop coefficients and evapotranspiration. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[231] Mon, J., Bronson, K. F., Hunsaker, D. J., **Thorp, K. R.**, French, A. N., White, J. W., 2014. Nitrogen recovery efficiency of durum wheat under variable irrigation. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[232] **Thorp, K. R.**, Barnes, E. M., Hunsaker, D. J., Kimball, B. A., White, J. W., Nazareth, V. J., Hoogenboom, G., 2014. Evaluation of CSM-CROPGRO-Cotton for simulating cotton growth and evapotranspiration in an arid environment. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[233] **Thorp, K. R.**, Welch, S. M., Lamsal, A., White, J. W., Holland, J. B., 2014. Experiences in high performance computing used to characterize maize phenology. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[234] White, J. W., Bronson, K. F., Conley, M. M., French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Andrade-Sanchez, P., 2014. Use of ultrasonic proximity sensor for high-throughput

characterization of crop canopies. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[235] White, J. W., Poland, J. A., French, A. N., **Thorp, K. R.**, Welch, S. M., 2014. Overview of proximal sensing and field phenomics. In: Abstracts of the 2014 ASA-SSSA-CSSA Meeting, Long Beach, CA, 2–5 November. ASA-SSSA-CSSA, Madison, WI.

[236] **Thorp, K. R.**, Barnes, E. M., Hunsaker, D. J., Kimball, B. A., White, J. W., Nazareth, V. J., 2014. Evaluation of CSM-CROPGRO-Cotton for simulating cotton growth responses to irrigation, nitrogen fertilizer, planting density, and free-air carbon dioxide enrichment in central Arizona. In: Proceedings of the 2014 Beltwide Cotton Conferences, New Orleans, LA, 6–8 January. National Cotton Council of America, Cordova, TN.

[237] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., Bautista, E., 2014. Combining GIS, remote sensing, and simulation modeling for spatial analysis of seed cotton yield and evapotranspiration. In: Proceedings of the 2014 Beltwide Cotton Conferences, New Orleans, LA, 6–8 January. National Cotton Council of America, Cordova, TN.

[238] Bronson, K. F., Mon, J., Hunsaker, D. J., Bautista, E., **Thorp, K. R.**, French, A. N., White, J. W., Andrade-Sanchez, P., 2013. Fate of nitrogen fertilizer in surface-irrigated cotton: fertigation vs. knifing. In: Abstracts of the 2013 ASA-SSSA-CSSA Meeting, Tampa, FL, 3–6 November. ASA-SSSA-CSSA, Madison, WI.

[239] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, White, J. W., 2013. Monitoring sprinkler irrigated wheat and camelina canopy temperatures with a wireless sensor network. In: Abstracts of the 2013 ASA-SSSA-CSSA Meeting, Tampa, FL, 3–6 November. ASA-SSSA-CSSA, Madison, WI.

[240] Mon, J., Wang, G., Bronson, K. F., White, J. W., Conley, M., **Thorp, K. R.**, 2013. Nitrogen fertilizer effects on canopy reflectance and yield in surface irrigated lesquerella. In: Abstracts of the 2013 ASA-SSSA-CSSA Meeting, Tampa, FL, 3–6 November. ASA-SSSA-CSSA, Madison, WI.

[241] White, J. W., Fonner, J., Holland, J. B., Lamsal, A., **Thorp, K. R.**, Vaughn, M. W., Welch, S. M., 2013. Have super-computers made parameter estimation and other optimization processes obsolete? In: Abstracts of the 2013 ASA-SSSA-CSSA Meeting, Tampa, FL, 3–6 November. ASA-SSSA-CSSA, Madison, WI.

[242] Wang, G., McCloskey, W. B., Bronson, K. F., **Thorp, K. R.**, Ray, D. T., 2013. Lesquerella yield and oil quality response to N fertilizer rate and irrigation. HortScience 48 (9), S252–S253.

[243] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., Bautista, E., 2013. Combining GIS, remote sensing, and simulation modeling for spatial analysis of seed cotton yield and ET in central Arizona, USA. In: Abstracts of the 2013 Australian Cotton Research Conference, Narrabri, NSW, Australia, 9–11 September. Association of Australian Cotton Scientists, Narrabri, NSW, Australia.

[244] Groenendyk*, D. G., **Thorp, K. R.**, Ferré, T. P. A., Crow, W. T., 2013. Simulation methodology to inform crop yield predictions from remotely sensed soil moisture time series. In: Abstracts of the 2013 NASA Terrestrial Ecology Science Team Meeting, La Jolla, CA, 30 April – 2 May. National Aeronautics and Space Administration, Washington, DC.

[245] Groenendyk*, D. G., Ferré, T. P. A., **Thorp, K. R.**, Crow, W. T., 2012. Testing an ensemble Kalman filter for assimilation of soil moisture into HYDRUS-1D and coupled crop model. In: Abstracts of the 2012 American Geophysical Union Meeting, San Fransisco, CA, 3–7 December. American Geophysical Union, Washington, DC.

[246] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, 2012. Using wireless-based thermal radiometers for monitoring crop water use at Maricopa, Arizona. In: Abstracts of the 2012 ASA-SSSA-CSSA Meeting, Cincinnati, OH, 21–24 October. ASA-SSSA-CSSA, Madison, WI.

[247] Gore, M. A., Andrade-Sanchez, P., French, A. N., Hunsaker, D. J., **Thorp, K. R.**, White, J. W., 2012. Expanding the breeder's toolbox: The growing need for field-based phenotyping tools. In: Abstracts of the 2012 ASA-SSSA-CSSA Meeting, Cincinnati, OH, 21–24 October. ASA-SSSA-CSSA, Madison, WI.

[248] Mon, J., Bronson, K. F., Wang, G., **Thorp, K. R.**, Hunsaker, D. J., French, A. N., White, J. W., 2012. Canopy reflectance estimates of nitrogen status in Arizona cool season crops. In: Abstracts of the 2012 ASA-SSSA-CSSA Meeting, Cincinnati, OH, 21–24 October. ASA-SSSA-CSSA, Madison, WI.

[249] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., 2012. Merging GIS, remote sensing, and simulation modeling for analyzing irrigation water management alternatives. In: Abstracts of the 2012 ASA-SSSA-CSSA Meeting, Cincinnati, OH, 21–24 October. ASA-SSSA-CSSA, Madison, WI.

[250] **Thorp, K. R.**, White, J. W., French, A. N., Gore, M. A., 2012. Estimating crop physiological traits from remote sensing data using inverse modeling. In: Abstracts of the 2012 ASA-SSSA-CSSA Meeting, Cincinnati, OH, 21–24 October. ASA-SSSA-CSSA, Madison, WI.

[251] Wang, G., **Thorp, K. R.**, Bronson, K. F., Laing, Z., 2012. Yield and quality response to N fertilizer by six durum wheat varieties. In: Abstracts of the 2012 ASA-SSSA-CSSA Meeting, Cincinnati, OH, 21–24 October. ASA-SSSA-CSSA, Madison, WI.

[252] Nolan, B. T., Malone, R. W., Gronberg, J., **Thorp, K. R.**, Ma, L., 2011. Bridging the gap between empirical and mechanistic models for nitrate in groundwater. In: Abstracts of the 2011 American Geophysical Union Meeting, San Fransisco, CA, 5–9 December. American Geophysical Union, Washington, DC.

[253] **Thorp, K. R.**, French, A. N., 2011. Land cover classification of the Jornada Experimental Range with simulated HyspIRI data. In: Abstracts of the 2011 American Geophysical Union Meeting, San Fransisco, CA, 5–9 December. American Geophysical Union, Washington, DC.

[254] **Thorp, K. R.**, Wang, G., West, A. L., Moran, M. S., Bronson, K. F., 2011. Comparison of remote sensing-based LAI estimation techniques for assimilation into crop growth simulations. In: Abstracts of the 2011 ASA-SSSA-CSSA Meeting, San Antonio, TX, 16–20 October. ASA-SSSA-CSSA, Madison, WI.

[255] French, A. N., Andrade-Sanchez, P., Gore, M. A., Salvucci, M. E., **Thorp, K. R.**, White, J. W., 2010. Field-based high-throughput phenotyping using radiometric observations. In: Abstracts of the 2010 ASA-SSSA-CSSA Meeting, Long Beach, CA, 31 October – 4 November. ASA-SSSA-CSSA, Madison, WI.

[256] Gore, M. A., French, A. N., Andrade-Sanchez, P., Salvucci, M. E., **Thorp, K. R.**, Carmo-Silva, E., White, J. W., 2010. High-throughput phenotyping the physiological responses of cotton to a hot, arid environment. In: Abstracts of the 2010 ASA-SSSA-CSSA Meeting, Long Beach, CA, 31 October – 4 November. ASA-SSSA-CSSA, Madison, WI.

[257] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., 2010. Analyzing water management and production trade-offs using crop systems models. In: Abstracts of the 2010 ASA-SSSA-CSSA Meeting, Long Beach, CA, 31 October – 4 November. ASA-SSSA-CSSA, Madison, WI.

[258] **Thorp, K. R.**, 2010. Combining remote sensing and crop systems modeling to develop decision tools for crop water management. In: Developing Partnerships for Sustainable Water Management and Agriculture in the Context of Climate and Global Change, Abstracts of the French American Water, Agriculture and Climate Change Symposium, West Lafayette, IN, 11–12 May. Purdue University, West Lafayette, IN.

[259] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., 2009. Improving crop model simulations by assimilating leaf area index estimated from canopy spectral reflectance. In: Abstracts of the 2009 ASA-SSSA-CSSA Meeting, Pittsburgh, PA, 1–5 November. ASA-SSSA-CSSA, Madison, WI.

[260] **Thorp, K. R.**, Hunsaker, D. J., French, A. N., White, J. W., 2008. Evaluation of CERES-Wheat under variable plant population, nitrogen, and irrigation treatments in Arizona. In: Abstracts of the 2008 ASA-SSSA-CSSA Meeting, Houston, TX, 5–9 October. ASA-SSSA-CSSA, Madison, WI.

[261] Malone, R. W., Chu, X., Ma, L., Li, L., Kaspar, T. C., Jaynes, D. B., Saseendran, S. A., **Thorp, K. R.**, Yu, Q., 2007. Winter cover crop effects on nitrate leaching in subsurface drainage as simulated by RZWQM-DSSAT. In: Abstracts of the 2007 American Geophysical Union Meeting, San Fransisco, CA, 10–14 December. American Geophysical Union, Washington, DC.

[262] French, A. N., Hunsaker, D. J., **Thorp, K. R.**, Clarke, T. R., 2007. Estimation of evapotranspiration over wheat using thermal infrared remote sensing and modeling with DSSAT/CERES. In: Abstracts of the 2007 ASA-SSSA-CSSA Meeting, New Orleans, LA, 3–8 November. ASA-SSSA-CSSA, Madison, WI.

[263] **Thorp, K. R.**, Jaynes, D. B., Malone, R. W., 2007. Using RZWQM-DSSAT to simulate drainage water management across the United States Corn Belt. In: Abstracts of the 2007 ASA-SSSA-CSSA Meeting, New Orleans, LA, 3–8 November. ASA-SSSA-CSSA, Madison, WI.

[264] **Thorp, K. R.**, Jaynes, D. B., Malone, R. W., 2006. Using RZWQM and Drainmod NII to simulate drainage water management in Iowa. In: Abstracts of the 2006 ASA-SSSA-CSSA Meeting, Indianapolis, IN, 12–16 November. ASA-SSSA-CSSA, Madison, WI.

[265] Batchelor, W. D., Paz, J. O., **Thorp, K. R.**, 2004. APOLLO: A crop model-based precision farming decision support system. In: Abstracts of the 2004 ASA-SSSA-CSSA Meeting, Seattle, WA, 31 October – 4 November. ASA-SSSA-CSSA, Madison, WI.

[266] Batchelor, W. D., **Thorp, K. R.**, Paz, J. O., 2004. Soil parameter estimation and uncertainty analysis for precision farming applications. In: Abstracts of the 2004 ASA-SSSA-CSSA Meeting, Seattle, WA, 31 October – 4 November. ASA-SSSA-CSSA, Madison, WI.

Thesis and Dissertation

[267] **Thorp, K. R.**, 2006. Integration of Remote Sensing and Crop Modeling for Nitrogen Management Decision Support in Corn. Ph.D. thesis, Department of Agricultural and Biosystems Engineering, Iowa State University, Ames, IA.

[268] **Thorp, K. R.**, 2002. Variable-rate Applications of Herbicide Using Weed Maps Generated from Remote Sensing Imagery. Master's thesis, Department of Agricultural Engineering, University of Illinois at Urbana-Champaign.

Software

[269] **Thorp, K. R.**, 2022. pyfao56: FAO-56 evapotranspiration in Python. Available for download through the Python Package Installer (PyPI) or online at https://github.com/kthorp/pyfao56.

[270] Hoogenboom, G., Porter, C. H., Shelia, V., Boote, K. J., Singh, U., White, J. W., Pavan, W., Oliveira, F. A. A., Moreno-Cadena, L. P., Lizaso, J. I., Asseng, S., Pequeno, D. N. L., Kimball, B. A., Alderman, P. D., **Thorp, K. R.**, Jones, M. R., Cuadra, S. V., Vianna, M. S., Villalobos, F. J., Ferreira, T. B., Batchelor, W. D., Koo, J., Hunt, L. A., Jones, J. W., 2022. Decision Support System for Agrotechnology Transfer (DSSAT) Version 4.8. DSSAT Foundation, Gainesville, Florida, USA. Available for download at http://dssat.net.

[271] **Thorp, K. R.**, 2014. HTP Geoprocessor, an open-source Quantum GIS plug-in for geoprocessing sensor data from high-throughput phenotyping vehicles. Available for download through the Quantum GIS plug-in installer or online at http://plugins.qgis.org/plugins/htpgeoprocessor/.

[272] **Thorp, K. R.**, 2013. Geospatial Simulation (GeoSim), an open-source Quantum GIS plug-in for managing point-based simulation models spatially. Available for download through the Quantum GIS plug-in installer or online at http://plugins.qgis.org/plugins/geospatialsimulation/.

Grants

Project Description	Total Funds	Funds to Thorp
Thorp, K. R. Evaluation and improvement of crop simulation models to meet the data needs of modern cotton production systems (renewed). Cotton, Inc. 1/1/2023–12/31/2023.	$20,000	$20,000
O'Shaughnessy, S. A., Colaizzi, P. D., **Thorp, K. R.**, Kim, Y. Demonstration of an advanced model for upland kimchi cabbage and red pepper digital farming based on growth and environmental information. Rural Development Administration (RDA) of the Republic of Korea. 11/1/2022–10/31/2023.	$34,147	$17,000
Sanyal, D., **Thorp, K. R.**, Bandaru, P. Evaluating winter small grain crops for water productivity and soil health dynamics under deficit irrigation regime in desert agricultural systems of Arizona. Arizona Grain Research and Promotion Council. 10/01/2022–12/31/2023.	$19,900	

Project Description	Total Funds	Funds to Thorp
Pauli, D., Udall, J., Wang, D., Nelson, A., Guadagno, C. R., Mackay, D. S., **Thorp, K. R.** Exploring the genetics of drought resistance with field-based phenomics and biophysical process-based modeling. National Science Foundation (NSF) Plant Genome Research Project. 2/1/2022–1/31/2027.	$2,670,232	
Thorp, K. R. Evaluation and improvement of crop simulation models to meet the data needs of modern cotton production systems (renewed). Cotton, Inc. 1/1/2022–12/31/2022.	$20,000	$20,000
Kisekka, I., Brown, P., Harter, T., Jessoe, K., Shukla, M., Nocco, M., Banerjee, S., Benes, S., Bird, M., Bradford, S., Daccache, A., Dahlke, H., Gaudin, A., Hillyer, C., Idowu, J., Johnson, B., Knight, R., Lazcano, C., Longley, K., Lubell, M., McPherson, F., Megdal, S., Mizuno, W., Norris, S., Ostoja, S., Parker, L., Sanyal, D., Sarge, G., Scott, T., Suvocarev, K., **Thorp, K. R.**, Wang, H., Weir, M., Wright, W., Xu, P., Zilberman, D. Sustaining groundwater and irrigated agriculture in the southwestern United States under a changing climate. USDA, National Institute of Food and Agriculture (NIFA), Agricultural and Food Research Initiative (AFRI), Sustainable Agricultural Systems. 9/1/2021–8/31/2026.	$10,000,000	$195,799
Thorp, K. R. Evaluation and improvement of crop simulation models to meet the data needs of modern cotton production systems (renewed). Cotton, Inc. 1/1/2021–12/31/2021.	$19,000	$19,000
Thorp, K. R. Evaluation and improvement of crop simulation models to meet the data needs of modern cotton production systems (renewed). Cotton, Inc. 1/1/2020–12/31/2020.	$25,000	$25,000
Thorp, K. R. Evaluation and improvement of crop simulation models to meet the data needs of modern cotton production systems (renewed). Cotton, Inc. 1/1/2019–12/31/2019.	$19,000	$19,000
Thorp, K. R., French, A. N., Bronson, K. F., Pauli, W. D. Remote sensing for estimation of harvested area and productivity of rice, maize, and soybean in Indonesia. USDA, Foreign Agriculture Service, Borlaug Fellowship Program. 10/1/2018–9/30/2020.	$29,418	$29,418
Thorp, K. R., Marek, G. W. Evaluation and improvement of crop simulation models to meet the data needs of modern cotton production systems (renewed). Cotton, Inc. 1/1/2018–12/31/2018.	$23,000	$23,000
Thorp, K. R., Marek, G. W. Evaluation and improvement of crop simulation models to meet the data needs of modern cotton production systems. Cotton, Inc. 1/1/2017–12/31/2017.	$19,000	$19,000
Ale, S., Bordovsky, J., **Thorp, K. R.** Determining ideal irrigation termination dates for cotton production in the Texas High Plains using the DSSAT Cropping System Model. Cotton, Inc. 1/1/2017–12/31/2017.	$14,000	
Poland, J., Price, K., Gore, M., French, A., **Thorp, K. R.**, White, J., Andrade-Sanchez, P., Fritz, A., Price, R., Schapaugh, W., Welch, S., Zhang, N. A field-based high-throughput phenotyping platform for plant genetics. National Science Foundation (NSF) Plant Genome Research Project. 2/1/2016–1/31/2018.	$871,561	

Project Description	Total Funds	Funds to Thorp
Thorp, K. R. Evaluation of the Cotton2K model for Arizona cotton production. Cotton, Inc. 1/1/2016–12/31/2016.	$19,000	$19,000
Ale, S., DeLaune, P., **Thorp, K. R.** Evaluating the feasibility of cover crops in the Texas Rolling Plains cotton production systems using the DSSAT Cropping System Model. Cotton, Inc. 1/1/2016–12/31/2016.	$14,000	
Thorp, K. R. Comparison of cotton simulation models for Arizona cotton production systems. Cotton, Inc. 1/1/2015–12/31/2015.	$19,000	$19,000
Ale, S., DeLaune, P., **Thorp, K. R.** Evaluating the feasibility of cover crops in the Texas Rolling Plains cotton production systems using the DSSAT Cropping System Model. Cotton, Inc. 1/1/2015–12/31/2015.	$14,000	
Thorp, K. R. Geospatial analysis of precision cotton irrigation management strategies by combining sensor data with a cotton simulation model. Cotton, Inc. 1/1/2014–12/31/2014.	$19,000	$19,000
Ale, S., Rajan, N., Bordovsky, J., **Thorp, K. R.** Assessing the climate change impacts on cotton production in the Texas High Plains using the DSSAT CROPGRO-Cotton model. Cotton, Inc. 1/1/2014–12/31/2014.	$14,000	
Poland, J., Price, K., Gore, M., French, A., **Thorp, K. R.**, White, J., Andrade-Sanchez, P., Fritz, A., Price, R., Schapaugh, W., Welch, S., Zhang, N. A field-based high-throughput phenotyping platform for plant genetics. National Science Foundation (NSF) Plant Genome Research Project. 2/1/2013–1/31/2016.	$768,054	
Thorp, K. R., White, J. W, Bronson, K. F., Hunsaker, D. J., Kimball, B. A., Wang, G. Evaluation of the CROPGRO-Cotton model for Arizona cotton production systems. Cotton, Inc. 1/1/2013–12/31/2013.	$19,000	$19,000
Ale, S., Rajan, N., **Thorp, K. R.** Assessment of water requirements and development of irrigation management plans for cotton production in the Texas High Plains using the DSSAT CROPGRO-Cotton model. Cotton, Inc. 1/1/2013–12/31/2013.	$17,000	
French, A. N., Schmugge, T., **Thorp, K. R.**, Sanchez, J. M., Coll, C., Valor, E., Hunsaker, D. Monitoring arid land cover change with simulated HyspIRI data. NASA Headquarters, Science Mission Directorate, Research Opportunities in Space and Earth Sciences (ROSES), HyspIRI Preparatory Activities Using Existing Imagery. 1/1/2011–12/31/2011.	$101,216	
Crow, W. T., Moran, M. S., Nearing, G., Reichle, R., **Thorp, K. R.** Ecological and agricultural productivity forecasting using root-zone soil moisture products derived from the NASA SMAP mission. NASA Headquarters, Science Mission Directorate, Research Opportunities in Space and Earth Sciences (ROSES), Terrestrial Ecology. 10/1/2010–9/30/2014.	$430,914	$144,436

Project Description	Total Funds	Funds to Thorp
Wang, G., Gutierrez, M., Ottman, M. J., **Thorp, K. R.** Managing N application for desirable grain protein content in durum wheat using image processing and canopy reflectance. Arizona Grain Research and Promotion Council. 10/1/2010–9/30/2012.	$7,964	
Wang, G., Nolte, K., **Thorp, K. R.** Improve management efficiency using crop models. Arizona Department of Agriculture, Arizona Specialty Crop Block Grant. 9/1/2010–8/31/2012.	$63,209	
Total	$15,290,615	$607,653

Invited Presentations

4/14/2023 Invited presentation entitled "The 'pyfao56' software package for Python: Codifying FAO-56 evapotranspiration in a modern programming language" for an ASABE NRES-21 engagement webinar.

3/15/2023 Invited presentation entitled "Modern technologies for improved irrigation management" at an American Phytopathological Society (APS) Symposium entitled "Abiotic impacts on biotic agriculture challenges," APS Pacific Division meeting, Tucson, AZ.

6/1/2022 Invited presentation entitled "New irrigation scheduling methods for cotton" at the University of Arizona Cooperative Extension's New Technologies Workshop, Maricopa, AZ.

11/10/2020 Invited presentation entitled "Standardized evapotranspiration methods as a basis for crop model improvements" at an ASA Climatology and Modeling Symposium entitled "Improving Communication and Understanding of Evapotranspiration Processes: From Theory, to Application, to Modeling," Virtual ASA-SSSA-CSSA Annual Meeting.

11/10/2019 Invited presentation entitled "Comparison of evapotranspiration methods in the DSSAT Cropping System Model" at an ASA Climatology and Modeling Symposium entitled "Progress of Evapotranspiration Simulations in Agricultural System Models," ASA-SSSA-CSSA Annual Meeting, San Antonio, TX.

9/9/2019 Invited plenary address entitled "UAS technologies for HTP and irrigation management" for an annual meeting of the Association for the Advancement of Industrial Crops, Tucson, AZ

3/8/2019 Invited keynote address entitled "Remote sensing and crop modeling technologies for precision crop management" for the Production Agriculture Symposium at the University of Minnesota, Minneapolis, MN.

11/6/2018 Invited presentation entitled "Simulating spatially variable irrigation recommendations for precision irrigation management" at an ASA Climatology & Modeling Symposium entitled "How Suitable are Models to Reflect Spatially Variable Field Conditions," ASA-SSSA-CSSA Annual Meeting, Baltimore, MD.

2/28/2018 Invited presentation entitled "Engineering technologies for improved irrigation management in central Arizona" at the Arizona State University, School of Sustainable Engineering and the Built Environment, Tempe, AZ.

6/20/2017 Invited keynote address entitled "Field-based plant phenotyping devices: Data collection and management strategies" at a symposium hosted by the Plant Phenotyping and Imaging Research Centre and the Global Institute for Food Security, University of Saskatchewan, Saskatoon, Canada

11/8/2016 Invited presentation entitled "A 'Big Data' workflow for field-based plant phenomics from ground vehicles" at an ASA Biometry and Statistical Computing Symposium entitled "Processing High-Throughput Data for Statistical Analysis," ASA-SSSA-CSSA Annual Meeting, Phoenix, AZ.

11/7/2016 Invited presentation entitled "Identifying important canopy hyperspectral reflectance features for estimating crop biophysical traits" at an ASA Climatology & Modeling Symposium entitled "Evolution of Biophysical Measurements: Legacy of the US Water Conservation Lab and Advances in Rapid Phenotyping," ASA-SSSA-CSSA Annual Meeting, Phoenix, AZ.

11/–/2016 Invited to present at an SSSA Soil Physics and Hydrology Division Symposium entitled "Remote Sensing of Land Surface and Vadose Zone Hydrologic Processes," ASA-SSSA-CSSA Annual Meeting, Phoenix, AZ. Declined.

8/3/2016 Invited presentation entitled "Crop simulation models and big data" at a meeting of the Cotton Incorporated Board of Directors, Scottsdale, AZ.

7/19/2016 Invited presentation entitled "Comparison of the FAO-56 water balance model and the DSSAT Cropping System Model for cotton irrigation scheduling in Arizona" at an ASABE invited session entitled "Crop Modeling and Decision Support for Optimizing Use of Limited Water," ASABE Annual International Meeting, Orlando, FL.

2/2/2016 Invited presentation entitled "Workflows for field-based plant phenomics data: Geoprocessing, modeling, storage, and enhancement" at a meeting of the National Corn Growers Association, University of Arizona, Maricopa Agricultural Center, Maricopa, AZ.

8/31/2015 Invited presentation entitled "Workflows for field-based plant phenomics data: Geoprocessing, modeling, storage, and enhancement" at the University of Arizona, Agricultural and Biosystems Engineering Department, Tucson, AZ.

8/17/2015 Invited presentation entitled "Workflows for field-based plant phenomics data: Geoprocessing, modeling, storage, and enhancement" at the High Throughput Plant Phenotyping and Unmanned Aerial Vehicles in Agriculture Workshop, Texas A&M University, College Station, TX.

11/4/2014 Invited presentation entitled "Evaluation of CSM-CROPGRO-Cotton for simulating cotton growth and evapotranspiration in an arid environment" at an ASA Climatology & Modeling Symposium entitled "Evapotranspiration in Crop and Hydrologic Models: Testing, Refinements and Cross-Comparisons," ASA-SSSA-CSSA Annual Meeting, Long Beach, CA.

11/3/2014 Invited presentation entitled "Experiences in high performance computing used to characterize maize phenology" at an ASA Climatology & Modeling Symposium entitled "Field Phenomics: Integrating Simulation Modeling and Proximal Sensing for Crop Research," ASA-SSSA-CSSA Annual Meeting, Long Beach, CA.

10/31/2013 Invited presentation entitled "Field Phenomics: Data Analysis" as an eXtension webinar. Available online at www.extension.org/pages/68270

2/6/2013 Invited presentation entitled "Application of the DSSAT-CSM for precision crop management" at the Agricultural Model Intercomparison and Improvement Project (AgMIP) Development Sprint, Texas Advanced Computing Center, University of Texas, Austin, TX.

1/28/2013 Invited presentation entitled "Enhancing water conservation and crop productivity in irrigated agriculture" at the ASABE Agricultural Equipment Technology Conference, Kansas City, MO.

10/22/2012 Invited presentation entitled "Merging GIS, remote sensing, and simulation modeling for analyzing irrigation water management alternatives" at an ASA Climatology & Modeling Symposium entitled "Sensor-based Water Management: Sensors and Algorithms," ASA-SSSA-CSSA Annual Meeting, Cincinnati, OH.

10/22/2012 Invited presentation entitled "Estimating crop physiological traits from remote sensing data using inverse modeling" at a CSSA-C2 Symposium entitled "Modeling of Physiological Traits for Crop Improvement," ASA-SSSA-CSSA Annual Meeting, Cincinnati, OH.

6/14/2012 Invited presentation entitled "Estimating crop biophysical properties from remote sensing data by inverting linked radiative transfer and ecophysiological models" at the Joint Climate Change Agriculture and Food Security (CCAFS) and Joint Research Centre (JRC) Crop Yield Estimation Workshop, Ispra, Italy. Declined due to USDA foreign travel restrictions.

3/29/2012 Invited presentation entitled "GeoSim: An open-source tool for incorporating geospatial data into 1-D simulation models" at the NCERA-180 Precision Agriculture Meeting, University of Arizona, Maricopa Agricultural Center, Maricopa, AZ.

10/31/2011 Invited presentation entitled "Techniques for merging remote sensing observations into the simulations of cropping systems models" at the University of Arizona, Agricultural and Biosystems Engineering Department, Tucson, AZ.

5/11/2010 Invited presentation entitled "Combining remote sensing and crop systems modeling to develop decision tools for crop water management" at a French-American symposium on Developing Partnerships for Sustainable Water Management and Agriculture in the Context of Climate and Global Change, Purdue University, West Lafayette, IN. Invited by the French Consulate in Chicago (Office for Science and Technology of the French Embassy) and the Purdue University Global Engineering Program.

3/11/2008 Invited presentation entitled "Managing agricultural systems using remote sensing and simulation modeling" at the USDA-ARS, Southwest Watershed Research Center, Tucson, AZ.

3/10/2008 Invited presentation entitled "Managing agricultural systems using remote sensing and simulation modeling" at the University of Arizona, Agricultural and Biosystems Engineering Department, Tucson, AZ.

1/14/2003 Invited presentation entitled "Remote sensing for weed detection and variable-rate herbicide applications" at the Gibson City Lions Club Meeting, Gibson City, IL.

Teaching Experience

2022–present Certified Instructor for The Carpentries (https://carpentries.org/).

- 3/2/2023 - Taught "Plotting and Programming in Python" for a USDA ARS SCINet Carpentries workshop.
- 5/9/2023 - Taught "Version Control with Git" for a USDA ARS SCINet Carpentries workshop.

2007–present Program of Study committee member and research advisor for graduate students.

- Advised Sebastian Calleja, Ph.D., Plant Science, University of Arizona, Tucson, AZ, 2020–present.
- Advised Caroline Schulte, M.S., Biosystems Engineering, University of Arizona, Tucson, AZ, 2020–2021.
- Advised Alanna Zubler, M.S., Biosystems Engineering, University of Arizona, Tucson, AZ, 2020–2021.

- Advised Sara Harders, M.S., Biosystems Engineering, University of Arizona, Tucson, AZ, 2016–2019.
- Advised Abhishes Lamsal, Ph.D., Agronomy, Kansas State University, Manhattan, KS, 2014–2017.
- Advised Maria Pilar Cendrero Mateo, Ph.D., Soil, Water, and Environmental Science, University of Arizona, Tucson, AZ, 2010–2013.
- Advised Derek Groenendyk, M.S., Agricultural Engineering, Iowa State University, Ames, IA, 2009–2011.
- Advised Grey Nearing, M.S., Agricultural Engineering, University of Arizona, Tucson, AZ, 2007–2009.

5/19/2022 Served as an Examiner for the Ph.D. thesis of Mr. David Johnston, University of Southern Queensland, Toowoomba, Queensland, Australia

12/21/2021 Served as an Examiner for the Ph.D. thesis of Mr. Stephen Leo, Queensland University of Technology, Brisbane, Australia

6/8/2021 Served as an External Examiner for the Ph.D. thesis of Mr. Muhammad Zeeshan Nadeem, University of Agriculture, Faisalabad, Pakistan

10/6/2020 Guest lecturer on "Tools and Technologies for Precision Irrigation" for Plant Science 306, Crop Science and Production, University of Arizona.

2019-2020 Advised Brenda Villa, Arizona State University, undergraduate Honor's thesis on modeling cotton production for future climate conditions.

11/27/2018 Guest lecturer on "Data Analytics and Precision Agriculture" for seniors in Biosystems Engineering at University of Arizona.

2014–2018 Instructor for 6 four-day workshops to educate graduate students, industry professionals, and government officials on high-throughput field-based plant phenomics.

- Workshop funding provided through National Science Foundation grants.
- Provided classroom lectures on several subjects, including passive spectral reflectance sensors, field layout planning, georeferencing sensor data, and model inversion.
- Led hands-on exercises on development of plot boundary maps and sensor data geoprocessing within a geographic information system.

2013–2018 Research mentor collaborating to provide 240 hours of scientific research experience to undergraduate students through courses at Central Arizona Community College (CACC) and South Mountain Community College (SMCC)

- Mentored Shreya Varra on the use of high-performance computers to conduct simulations with an agroecosystem model, Summer 2017.
- Mentored Dylan Polo on field calibration of neutron moisture meters, Summer 2016.
- Mentored Lawrence Hu on analysis of digital images for cotton canopy cover estimates, Summer 2015.
- Mentored Kendall Stratton on Python programming for analysis of hyperspectral remote sensing data, Summer 2013.

2005–2006 Student, Preparing Future Faculty Program, Iowa State University, Ames, IA.

- Participated in weekly discussions on course preparation, pedagogical strategies, classroom management, and other faculty life issues.
- Achieved the level of "Associate" in the program.

Summer 2004 Teaching Assistant, Agricultural Engineering 203: Computer Applications and Systems Modeling with Study Abroad Component in Germany, ISU, Ames, IA.

- Co-led 16 undergraduate students on a 3-week study abroad trip to Germany.
- Supervised lab sessions on programming numerical methods in Visual Basic.
- Toured various agricultural industries and research farms in southern Germany.

Fall 2002 Teaching Assistant, Agricultural Engineering 236: Machine Characteristics and Mechanisms, UIUC, Urbana, IL.

- Supervised lab sessions on design characteristics of agricultural machines.
- Graded homework, lab reports, and exams.
- Taught three stand-alone lectures.

Professional Service

I. American Society of Agricultural and Biological Engineers

2010–present Associate Editor, Journal of the ASABE and Applied Engineering in Agriculture, Natural Resources and Environmental Systems (NRES) Community. Handled 59 manuscripts.

2008–present Organizer of 27 technical sessions for ASABE Annual International Meetings.

2005–present Moderator of 11 technical sessions at ASABE Annual International Meetings.

2016–present Member, Cotton Engineering (MS-23/7/3).

2010–present Member, Publications Review (NRES-05).

2009–present Member, Irrigation Group (NRES-24).

2007–present Member, Computational Methods, Simulations, and Applications Committee (ITSC-217), Past-Chair (2016–2017), Chair (2014–2015), Vice-Chair (2012–2013), Secretary (2010–2011).

2007–present Member, Precision Agriculture Committee (MS-54), Past-Chair (2015–2016), Chair (2013–2014), Vice-Chair (2011–2012).

2007–present Member, Hydrology Group (NRES-21).

2024–2026 Member, Nominating Committee (elected by vote of society membership).

2016–2018 Member, Nominating Committee (elected by vote of society membership).

2011–2016 Member, Executive and Steering Committees for the ASABE Information Technology, Sensors, and Controls Community (ITSC-01/02), P-511 Representative (2014–2016), Past-Chair (2014), Chair (2013), Vice-Chair (2012), Secretary (2011).

2006–2011 Member, Drainage Group (NRES-23).

2005-2011 Member, Young Professionals Community (YPC), Publications Council Rep (2010–2011).

2003–2010 Member, Modeling Biological Processes Committee (BE-26), Past-Chair (2008), Chair (2007), Vice-Chair (2006), Secretary (2005), Interim Secretary (2004).

2009 Judge, G. B. Gunlogson Student Environmental Design Competition.

2004, 2012–14 Reviewer, IET Select Meeting Paper Award.

1998–2000 Member, Student Chapter of the ASAE at the UIUC, President (2000)

II. American Society of Agronomy

2021 Organizer of 4 technical sessions for the ASA International Annual Meeting.

2011–present Member, Evapotranspiration Measurement and Modeling Community, Chair (2021), Vice-Chair (2020)

2011–present Member, Model Applications in Field Research Community

III. Biological Systems Simulation Group

2010 Co-organizer of the 40th Biological Systems Simulation Group Conference, Maricopa, AZ, 13–15 April.

IV. Technical Reviewer for Scientific Journals

2008–present Agricultural & Forest Meteorology (10 reviews)
2018–present Agricultural Systems (4 reviews)
2006–present Agricultural Water Management (28 reviews)
2011–present Agronomy Journal (16 reviews)
2018 Agrosystems, Geosciences & Environment (1 review)
2003–present Applied Engineering in Agriculture (20 reviews)
2008 Biosystems Engineering (1 review)
2016 Climate Research (2 reviews)
2014 Climatic Change (2 reviews)
2005–present Computers and Electronics in Agriculture (14 reviews)
2017–2018 Computers in Industry (2 reviews)
2013–2018 Crop Science (7 reviews)
2013–2014 Environmental Modelling & Software (5 reviews)
2015 European Journal of Agronomy (1 review)
2008–present Field Crops Research (6 reviews)
2009–2016 IEEE Transactions on Geoscience and Remote Sensing (8 reviews)
2011 Industrial Crops and Products (1 review)
2015 Irrigation and Drainage (1 review)
2018–present Irrigation Science (4 reviews)
2013 Journal of Agricultural Science (1 review)
2010-2015 Journal of Applied Remote Sensing (2 reviews)
2012 Journal of Arid Environments (1 review)
2003–present Journal of the ASABE (66 reviews)
2017 Journal of Contemporary Water Research and Education (1 review)
2020 Journal of Cotton Science (1 review)
2008–2009 Journal of Environmental Management (2 reviews)
2013–2017 Journal of Environmental Quality (3 reviews)
2014 Journal of Hydrology (1 review)
2015 Journal of the Science of Food and Agriculture (1 review)
2011 Journal of Soil and Water Conservation (1 review)
2007 Photogrammetric Engineering and Remote Sensing (1 review)
2017–present The Plant Phenome Journal (2 reviews)
2015 Precision Agriculture (1 review)
2012–present Remote Sensing of Environment (6 reviews)
2023 Scientific Reports (2 reviews)

2023 Smart Agricultural Technology (1 review)

2022 Vadose Zone Journal (2 reviews)

V. Other Technical Reviewing Assignments

2005–present USDA-ARS Peer Manuscripts and Project Plans (18 reviews)

2019 Guest associate editor for a special collection entitled "High-throughput field phenotyping to boost precision agriculture and speed up plant breeding," published in Frontiers in Plant Science. Handled 6 manuscripts.

2008, 2012 United States - Israel Binational Agricultural Research and Development Fund (BARD) proposals (2 reviews)

2011 University of Arizona Extension Publications (1 review)

2012 Book Chapters (3 reviews)

VII. University Committees

2011–present Member, Industrial Advisory Council, Agricultural and Biosystems Engineering, University of Arizona, Tucson, AZ.

2003–2006 Senator, Graduate and Professional Student Senate (GPSS), Iowa State University, Ames, IA.

2003–2006 Member, Agricultural Engineering Graduate Organization (AEGO), Department of Agricultural and Biosystems Engineering, Iowa State University, Ames, IA.

International Experience

2019 Hosted Dena Drajat, an economist and statistician with Badan Pusat Statistik (Statistics Indonesia) in Indonesia, to collaborate on satellite remote sensing methods for mapping extent of rice production in Indonesia, 14 April – 7 July.

2018 Hosted Juan de la Cruz Jimenez, plant scientist from the International Center for Tropical Agriculture (CIAT) in Columbia and provided consultation on hyperspectral data analysis for high-throughput phenotyping of brachiaria grass, 6–8 August.

2017 Presented a keynote address at a symposium by the Plant Phenotyping and Imaging Research Centre, University of Saskatchewan, Saskatoon, Canada, 19–22 June.

2014 Hosted Valentina Zanella, graduate student from the University of Padova in Italy and provided consultation on use of the Geospatial Simulation software for precision nitrogen fertilization assessments, 21–24 September.

2014 Attended the 2014 ASABE Annual International Meeting, Montréal, Canada, 13–16 July.

2013 Presented research at the 2013 Australian Cotton Research Conference and met with scientists at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) facilities in Narrabri, NSW, Australia, 5–13 September. Travel sponsored by Cotton, Inc.

2011 Hosted Holger Lilienthal from the Julius Kühn-Institut (JKI) in Germany and discussed potential research collaborations, 12–16 December.

2011 Hosted Alison McCarthy, irrigation and mechatronics engineer from the University of Southern Queensland in Australia, for a two-day tour of USDA-ARS-ALARC, 17–18 March.

2005 Took a cross-country bus tour on precision agriculture in Sweden and presented a poster at the 5th European Conference on Precision Agriculture, Uppsala, Sweden, 4–13 June.

2004 Co-led a group of 16 ISU undergraduate students during a 3-week study abroad course in southern Germany and Switzerland, 1–19 August.

1999 Attended the 1999 American Society of Agricultural Engineers Annual International Meeting, Toronto, Canada, 18–22 July.

1995 Participated in a student exchange program called the German-American Partnership Program (GAPP), Stuttgart, Germany, 10 July – 10 August.

Press Releases

2/18/2023 Interviewed for an article entitled "How climate change is making tampons (and lots of other stuff) more expernsive" by Coral Davenport in the New York Times.

12/18/2020 Interviewed for an article entitled "How technology might finally start telling farmers things they didn't already know" by Rowan Moore Gerety in MIT Technology Review.

1/7/2020 Article entitled "Pinal farmers benefiting from eye in sky" by Miles Wilson and Dylan McKim in the Maricopa Monitor.

1/2–3/2020 Article entitled "Drone on the range: Farmers take to the skies to save water and money" by Miles Wilson and Dylan McKim in the Casa Grande Dispatch.

10/29/2019 Newscast entitled "Farmers' eyes in the skies" by Dylan McKim on Cronkite News, Arizona PBS.

10/16/2018 Article entitled "More crops with less water: USDA researchers in Maricopa developing new tech" by Bethany Blundell in the Maricopa Monitor.

6/14/2016 Radio interview and article entitled "Arizona's Ak-Chin Indian Community leads way in efficient, water-saving farm tech" by Casey Kuhn on National Public Radio (95.1 KJZZ Phoenix).

6/4/2016 Article entitled "Arizona trials target next generation of cotton irrigation" by Cary Blake in Western Farm Press.

10/8/2011 Article entitled "As water use pressures increase, remote sensing offers solutions" by Cary Blake in Western Farm Press.

10/14/2009 Article entitled "High-tech research in Maricopa could aid irrigation scheduling" in the Casa Grande Dispatch.

Professional Development Courses

2022 The Carpentries Instructor Training, Virtual, 24–27 October.

2014 Crucial Conversations: Tools for Talking when Stakes are High, USDA-ARS-ALARC, Maricopa, AZ, 22–24 April.

2011 USDA-ARS Object Modeling System (OMS) training, Fort Collins, CO, 24–25 October.

2008 Training Program on DSSAT 4.5, Assessing Crop Production, Nutrient Management, Climatic Risk, and Environmental Sustainability with Simulation Models, Griffin, GA, 12-21 May.

2008 Introduction to Supervision, USDA Graduate School, Tucson, AZ, 21–25 January.

2006 Agronomy for Engineers, Continuing Professional Development (CPD) Course, ASABE Annual Meeting, Portland, OR, 11 July.

2006 DRAINMOD-NII Training, North Carolina State University, Raleigh, NC, 24–28 April.

Computer Programming Languages

Python	Use regularly for routine data processing and analysis and for development of custom object-oriented software applications, notably the pyfao56 Python package and the Geospatial Simulation plug-in for QGIS.
Fortran	Use regularly to modify and improve algorithms in the DSSAT Cropping System Model.
LaTeX	Use regularly for manuscript preparation.
R	Use regularly for statistical analysis of data.
Visual Basic	Use occasionally for development of Microsoft Excel macros.
C/C++	Use occasionally for developing software applications, particularly for hardware control.
IDL	Use occasionally for digital image processing with the Environment for Visualizing Images (ENVI) remote sensing software package.
MATLAB	Basic knowledge.
Java	Basic knowledge.

References

Current Supervisor	**Dr. Douglas R. Smith**, Research Soil Scientist & Research Leader, USDA-ARS-GSWRL, Temple, TX, (254)-770-6562, douglas.r.smith@usda.gov
Project Manager	**Dr. Edward M. Barnes**, Director of Environmental and Agricultural Research, Cotton, Inc., Cary, NC, (919)-678-2368, ebarnes@cottoninc.com
Research Collaborator	**Dr. Kendall C. DeJonge**, Research Agricultural Engineer, USDA-ARS, Fort Collins, CO, (970)-492-7417, kendall.dejonge@usda.gov
Research Collaborator	**Dr. Alison L. Thompson**, Research Geneticist, USDA-ARS, Pullman, WA, alison.thompson@usda.gov
Research Collaborator	**Dr. Srinivasulu Ale**, Professor, Texas A&M Agrilife Research, Vernon, TX, (940)-647-3909, sriniale@ag.tamu.edu
Former Supervisor	**Dr. Robert W. Malone**, Research Agricultural Engineer, USDA-ARS-NLAE, Ames, IA, (515)-294-8327, rob.malone@usda.gov
Major Professor	**Dr. Brian L. Steward**, Professor, Agricultural and Biosystems Engineering, Iowa State University, Ames, IA, (515)-294-1452, bsteward@iastate.edu
Major Professor	**Dr. William D. Batchelor**, Professor, Biosystems Engineering, Auburn University, Auburn, AL, (334)-844-3533, wdb0007@auburn.edu
Major Professor	**Dr. Lei F. Tian**, Associate Professor, Agricultural & Biological Engineering, Urbana, IL, 61801, (217)-333-7534, lei-tian@illinois.edu