BRENDA V. ORTIZ

Office:
224 Funches Hall-Auburn University
Auburn, AL (3849-5417)
Phone: 334-844-5534
Email: bortiz@auburn.edu

Home:
2320 Morgan Drive
Auburn, AL (36830)
Phone: 334-703-6412
Email: brevaortiz@yahoo.es

I am an Agricultural Engineer (PhD), Professor at Auburn University in the College of Agriculture. Currently, I have research (25%) and extension (75%) responsibilities in the area of Precision Agriculture, and I am the leader of the statewide Precision Agriculture Extension Program of the Alabama Cooperative Extension System. I am also a member of the board of the International Society of Precision Agriculture.

A. EDUCATION

Ph.D. Biological and Agricultural Engineering. **The University of Georgia**. 2008. Dissertation: "S*tudy of the spatial variability of the southern root-knot nematode (meloidogyne incognita) and its impact on cotton yield"*

B.S. Agricultural Engineering. **Universidad Nacional de Colombia and Universidad del Valle, Colombia.** 1997

B. PROFESSIONAL EXPERIENCE

Auburn University, Auburn, AL – October 2019 to now
Professor –Precision Agriculture Specialist, Crop, Soil and Environmental Sciences Department.
Adjunct faculty in the Biosystems Engineering Department.

Sao Paulo State University (UNESP), Brazil – 2019 to now
UNESP Adjunct Faculty – Jaboticabal Campus

Auburn University, Auburn, AL, November 2008 – September 2019
Assistant/Associate professor –Precision Agriculture Specialist, Crop, Soil and Environmental Sciences Department.

The University of Georgia, Athens, GA, August 2004 – October 2008
Research Assistant, Department of Biological and Agricultural Engineering.

Colombian Sugar Cane Research Center - Centro de Investigación de la Caña de Azúcar de Colombia, CENICAÑA, August 1997-August 2004
Research Assistant, Geographic Information System area.

C. RESEARCH FOCUS

- Evaluation of precision agriculture technologies for variable rate application of inputs (e.g., water, nutrient, seed).
- Evaluation and identification of precision irrigation strategies applied to row crops agriculture.
- Use of crop growth simulation modeling to study crop response to the management × environment interaction.
- Evaluation and use of artificial intelligence techniques in row crops agriculture.
- Remote sensing applications to crop management.
- Evaluation of sensors and controls on row crops planters.
- Evaluation of identification of adaptation strategies to reduce climate-related risk in agriculture.
- Evaluation of methodologies to assess within-field spatial variability in soil, terrain, and crop characteristics.
- Evaluation of how changes in farmers' engagement processes influence the adoption of best agricultural management practices.

D. SELECTED GRANT RECEIVED (Listed below are federal competitive grants received in the last five years)

Total funding as PI: 3'518.576 / Total as Co-PI: 9'805.825

- **Ortiz, B.,** K. Migliaccio, A. Thomasson. 2021. Envisioning 2050 in the Southeast: AI-driven innovations in Agriculture. Source: USDA-NIFA. Conference grant. Total amount: **$50,000 from USDA.** Dollars collected through conference registration and sponsorships: **$49,768.**
- Prasad, R., **B. Ortiz**, A. Gamble, M. Worosz, L. Duzy. 2020. The Future of Farming: Increasing Adoption of Conservation Practices among Alabama Row Crop Farmers. Source: NRCS CIG program. Total amount: **$3,000,000.** Ortiz's portion: $900,000
- Vellidis, G., C. Butts, M. Cabrera, C. Furman, V. Liakos, **B. Ortiz**, C. Perry, A. Rabia. 2020. A SmartIrrigation Mobile App for Corn, Cotton, Peanut, and Soybean. Source: USDA NIFA. Total amount: **$374,999**.
- Tian, D., **B. Ortiz**, Q. Peter He., W. Batchelor, I. Kisseka. 2019. FACT: A Data-Driven Framework of Climate-Smart Analytics for Irrigation Management. Source: USDA-AFRI program. Total amount: **$500,000.**
- Tian, D., S. Kumar, P. Srivastava, **B. Ortiz,** X. Fang, et. al. 2018. A Prototype Framework of Climate Services for Decision Making. Source: AUBURN-PAIR program. Total amount: **$150,000**
- **Ortiz, B. V.,** Lamba, J., Srivastava, P. 2017. Increasing adoption of climate and water-smart irrigation practices among Tennessee Valley farmers of Alabama and Tennessee. Source: NRCS, CIG program. Total amount: **$946,648**.
- **Ortiz, B**. 2017. Integrating Precision Irrigation Technologies to demonstrate a Farmer-Ready Dynamic Variable Rate Irrigation System. Sources: NRCS – CIG program. Subaward through the Flint River Soil and Water Conversation District. Total amount: **$106,108**.

E. SELECTED HONORS AND AWARDS (Last five years)

- 2022. Selected as the Secretary of the International Society of Precision Agriculture.
- 2022. Invited speaker 2nd African Conference of Precision Agriculture. December 7-9, 2022. Nairobi, Kenya.
- 2022. Invited speaker to the XX International Palm Oil Conference. September 26-29, 2022. Cartagena, Colombia.

- 2022. Invited speaker to the Agricultura 4.0 forum organized by the Colombia Surgarcane Research Center (only USA speaker). June 7-8, 2022. Florida, Valle del Cauca, Colombia.
- 2022. Invited speaker to the 2022 Winter Conference-Southeast chapter of the Precision Planting Company. *Precision Planting's Winter Conference is an annual event attended by over 5,000 farmers globally (in-person and online).*
- 2021. 1st place **Digital Communications** award for *Alabama Irrigation Management Program Newsletter*. 2021 Extension Education Community Educational Materials Award Program. American Society of Agronomy.
- 2021. 3rd place **Long publications award** for *DigitalAG@Farms*. 2021 Extension Education Community Educational Materials Award Program. American Society of Agronomy.
- 2020. **Dean's Grantsmanship Award**, Auburn University College of Agriculture and Alabama Agricultural Experiment Station.
- 2020. **Rittenour Award for Excellence** in Production Agriculture & Forestry Research from the Alabama Farmers Federation. Montgomery, Alabama. September 2020.
- 2019. **Visiting Scientist** at the Food and Agriculture Organization (FAO) of United Nations. (09/19 to 02/20)
- 2019. **Invited speaker** to the 2019 APEC workshop on Smart Agriculture Policies for Sustainable Growth. Seoul, Korea, June 11-12, 2019. Note: USDA-Foreign Agricultural Service suggested my name to the organizers.
- 2019. **Lead21 – Class 14**. One of two AU College of Agriculture faculty selected to attend this leadership program.
- 2018. Selected as a **member of the International Technical Advisory Committee** of the Colombian Oil Palm Research Center. Appointment for 3 years.
- 2018. **Invited speaker to** XLVII Brazilian Congress of Agricultural Engineering - CONBEA. August 7th, 2018.
- 2018. Appointed **Adjunct faculty** at Sao Paulo State University, Brazil. August 2018.
- 2018. **Invited by the Sao Paulo State University** in Brazil to be part of a group international and national faculty teaching the course: Advances in Peanut Production. August 1-8, 2018.
- 2018. **Invited speaker** to the 2018 APEC workshop "Promoting Gender Inclusion in Smart Agriculture – Harnessing Inclusive Opportunities, Embracing the Digital Future in Smart Agriculture". Taipei, Taiwan. October 22-24, 2018. Note: I was selected by USDA-Foreign Agricultural Service to speak and represent USA at this meeting.
- 2017. 2017 **ASABE Educational Aids Blue Ribbon Award**. Category: Publications, Comprehensive (33 or more pages). Award received for the iBook "Climate and Crops: Adapting Farming to a Variable Climate".
- 2017. **Richard L. Guthrie Award** for Achievement in International Agriculture. Auburn University College of Agriculture.
- 2017. **Dean's Grantsmanship Award**, Auburn University College of Agriculture and Alabama Agricultural Experiment Station.
- 2017. The Climate and Crops iBook was **selected as an <u>international finalist</u>** in two categories as **Best Book of the Year** during the 2017 iBooks Author Conference. The Climate and Crops iBook was finalist in the categories of: Best Book of the Year, Education (Science) and Best Book of the Year, Education (Overall).
- 2017. **Invited by the Sao Paulo State University** in Brazil to give three Precision Agriculture lectures with field practices and discuss research opportunities. February 11-19, 2017.
- **Visitor Scholar Fellowship from Technical University of Munich** (TUM), Germany. May 1-10, 2016.

F. PUBLICATIONS

Referred Journal Articles (*Graduate student/PostDoctoral Fellow)

- *Freire de Oliveira, M., **B. V. Ortiz**, G. Trimer Morata, A-F Jiménez, G. de Souza Rolim, R. Pereira da Silva. 2022. Training Machine Learning Algorithms Using Remote Sensing. and Topographic Indices for Corn Yield Prediction. *Remote Sensing*. **2022**, 14, 6171. https://doi.org/10.3390/rs14236171

- Kerry, R., B. Ingram, M. Orellana, **B.V. Ortiz**, B. Scully. 2023. Development of a method to assess the risk of aflatoxin contamination of corn within counties in southern Georgia, USA using remotely sensed data. *Smart Agricultural Technology*. 3 (2023) 100124. https://doi.org/10.1016/j.atech.2022.100124. **Accepted 3 October 2022**

- Kerry, R., B. Ingram, **B. V. Ortiz,** and Arnold Salvacion. 2022. Using Soil, Plant, Topographic and Remotely Sensed Data to Determine the Best Method for Defining Aflatoxin Contamination Risk Zones within Fields for Precision Management. *Agronomy*. 12, 2524. https://doi.org/10.3390/agronomy12102524

- *Bondesan, L., **B. V. Ortiz**, F. Morlin, G. Morata, L. Duzy, E. van Santen, B. P. Lena, G. Vellidis. 2022. A comparison of precision and conventional irrigation in corn production in Southeast Alabama. *Journal of Precision Agriculture*. https://doi.org/10.1007/s11119-022-09930-2

- Kumar, H., P. Srivastava, J. Lamba, E. Diamantopoulos, **B.V. Ortiz**, G. Morata, B.S. Takhellambam, and L. Bondesan. 2022. Site-specific irrigation scheduling using one-layer soil hydraulic properties and inverse modeling". *Journal of Agricultural Water Management* 273(1). 107877, ISSN 0378-3774, https://doi.org/10.1016/j.agwat.2022.107877.

- Kumar, H., Srivastava, P., Lamba, J., **Ortiz, B. V**., Way, T. R., Sangha, L., Takhellambam, B. S., Morata, G., Molinari, R. 2022. Within-field variability in nutrients for site-specific agricultural management in irrigated corn field. *Journal of the ASABE* 65(4):865-880. https://doi.org/10.13031/ja.15042.

- *Lena, B. P., L. Bondesan, E. A. R. Pinheiro, **B. V. Ortiz**, G. Morata, H. Kumar. 2022. Determination of irrigation scheduling thresholds based on HYDRUS-1D simulations of field capacity for multilayered agronomic soils in AL, USA. *Agricultural Water Management* 259:107234. https://doi.org/10.1016/j.agwat.2021.107234

- *Kumar, H., P. Srivastava, **B.V. Ortiz**, G. Morata, B.S., Takhellambam, J. Lamba, L. Bondesan. 2021. Field-scale spatial and temporal soil water variability in irrigated croplands. *Transactions of ASABE* 64(4): 1277-1294

- Kerry, R., B. Ingram, E. Garcia-Cela, N. Magan, B. V. Ortiz and B.Scully. 2021. Determining Future Aflatoxin Contamination Risk Scenarios for Corn in Southern Georgia, USA using Spatio-temporal Modelling and Future Climate Simulations. *Scientific Reports* 11:13522. https://doi.org/10.1038/s41598-021-92557-6

- *Morata, G., **B. V. Ortiz**, L. Bondesan, H. Kumar, F. O' Donnell, B. Lena, N. Billor, S. Rogers. Evaluation of terrain attributes to characterize spatial variability of soil water status with purposes of irrigation management zones delineation. Submitted in October 2021 to *Journal of Precision Agriculture*.

- *Jimenez, A-F., **B. V. Ortiz**, L. Bondesan, G. Morata. D. Damianidis. 2020. Evaluation of two recurrent neural network methods for prediction of irrigation rate and timing. *Transactions of the ASABE* 63(5): 1327-1348. doi: 10.13031/trans.13765 - **2021 ASABE Superior Paper**

- *Jimenez, A-F., **B. V. Ortiz**, L. Bondesan, G. Morata. 2020. Long short-term memory neural network for irrigation management: a case study from Southern Alabama, USA. *Precision Agriculture* 22:475-492. https://doi.org/10.1007/s11119-020-09753-z

- *Lena, B., **B. V. Ortiz**, A-F. Jimenez, A. Sanz-Saez, S. O'Shaughnessy, M. K. Durstock, G. Pate. 2020. Evaluation of infrared canopy temperature data in relation to soil water-based irrigation scheduling in a humid subtropical climate. *Transactions of the ASABE* 63(5): 1217-1231

- Rudnick, D. R., M. Stockton, S. Taghvaeian, J. Warren, M. D. Dukes, A. Kremen, C. G. Henry, J. Aguilar, **B. Ortiz**, A. Andales, C. A. Burr, X. Qiao, W. Liang, S. Walthour, S. H. Amosson. 2020. Innovative Extension Methods in the U.S. to promote irrigation water management. *Transactions of ASABE* 63(5): 1549-1558. doi: 10.13031/trans.13929 - **2021 ASABE Superior Paper**

- *Filho, JFDCL, **B. V. Ortiz**, K. Balkcom, D. Damianidis, T. J. Knappenberger, M. Dougherty. 2020. Evaluation of Two Irrigation Scheduling Methods and Nitrogen Rates on Corn Production in Alabama. *International Journal of Agronomy* 2020: 8869383. https://doi.org/10.1155/2020/8869383

- *Filho, JFDCL, **B. V. Ortiz**, D. Damianidis, K. Balkcom, M. Dougherty, T. J. Knappenberger. 2020. Irrigation Scheduling to Promote Corn Productivity in Central Alabama. *Journal of Agricultural Science* 12(9).

- Poncet, A. M., T. Knappenberger, C. Brodbeck, M. Fogle, J. N Shaw, **B. V. Ortiz**. 2019. Multispectral UAS Data Accuracy for Different Radiometric Calibration Methods. *Remote Sensing* 11(16): 1917

- *Damianidis, D., **B. V. Ortiz,** G. Windham, K. l. Bowen, G. Hoogemboom, B. T. Scully, A. Hagan, T. Knapenberger, P. Woli, W. P. Williams. 2018. Evaluating a generic drought index as a predictive tool for aflatoxin contamination of corn: From plot to regional level. *Crop Protection* 113: 64-74. https://doi.org/10.1016/j.cropro.2018.07.013.

- *Damianos Damianidis; **B V. Ortiz**; Kira Bowen; Gary Windham; Gerrit Hoogenboom; Austin Hagan; Thorsten Knappenberger; Hamed Abbas; Brian Scully; Spyridon Mourtzinis. 2018. Minimum temperature, rainfall and agronomic management impacts on corn grain aflatoxin contamination. *Agronomy Journal* 110(5):1697–1708. doi: 10.2134/agronj2017.11.0628

- Eunhye Yoo, Ruth Kerry, Ben Ingram, **B V. Ortiz**, Brian Scully. 2018. Defining and Characterizing Aflatoxin Contamination Risk Areas for Corn in Georgia, USA: Adjusting for Collinearity and Spatial Correlation. *Spatial Statistics* 28: 84-104. https://doi.org/10.1016/j.spasta.2018.06.003.

- Kerry, R., **B. V. Ortiz**, B. R. Ingram, B. T. Scully. 2016. A Spatio-Temporal investigation of risk factors for aflatoxin contamination of corn in southern Georgia, USA using geostatistical methods. *Crop Protection* 94:144–158; http://dx.doi.org/10.1016/j.cropro.2016.12.005

- *Mourtzinis, S., **B. V. Ortiz**, D. Damianidis. 2016. Climate Change and ENSO Effects on Southeastern US Climate Patterns and Maize Yield. *Scientific Reports* 6: 29777; doi: 10.1038/srep29777.

- *Sarkar, R., **B. V. Ortiz**, K. Balkcom. 2015. Strategic adaptation of nitrogen management for El Nino Southern Oscillation-induced winter wheat systems. *Mitigation and Adaptation Strategies for Global Change* 22:369-398. DOI 10.1007/s11027-015-9676-6
- *Woli, P, **B. V. Ortiz**, J. Johnson, G. Hoogenboom. 2015. El Niño-Southern Oscillation effects on winter wheat in the southeastern USA. 2015. *Agronomy Journal* 107:2193–2204
- Tian, D., S. Asseng, C. J. Martinez, V. Misra, D. Cammarano, **B. V. Ortiz**. 2015. Does decadal climate variation influence wheat and maize production in the southeast USA? *Agricultural and Forest Meteorology* 204:1–9
- Bowen, K. L., K. L. Flanders, A. K. Hagan, **B. Ortiz**. 2014. Insect damage, aflatoxin content and yield of Bt corn in Alabama. *Journal of Economic Entomology* 107(5): 1818-1827 doi: 10.1603/EC13442
- Vellidis, G., **B. Ortiz**, J. Beasley, R. Hill, H. Henry, H. Brannen. 2014. Reducing Digging Losses by Using Automated Steering to Plant and Invert Peanuts. *Agronomy* 4(3): 337-348. doi:10.3390/agronomy4030337
- *Torino, M. S., **B.V. Ortiz**, J. P. Fulton, K. S. Balkcom, and C. W. Wood. 2014. Evaluation of Vegetation Indices for Early Assessment of Corn Status and Yield Potential in the Southeastern United States. *Agronomy Journal* 106:1389–1401. doi:10.2134/agronj13.0578.
- *Woli, P., **B.V. Ortiz**, D. Buntin, K. Flanders. 2014. El Niño-Southern Oscillation (ENSO) Effects on Hessian Fly (Diptera: Cecidomyiidae) Infestation in the Southeastern USA. *Environmental Entomology Journal* 43(6): 1641–1649. https://doi.org/10.1603/EN14032
- **Ortiz, B. V.,** K. B. Balkcom, L. Duzy, E. van Santen, D. L. Hartzog. 2013. Evaluation of agronomic and economic benefits of using RTK-based autoguidance systems on peanut production. *Journal of Precision Agriculture* 14(4): 357-375. doi:10.1007/s11119-012-9297-y
- *Tapley, M., **B. V. Ortiz,** and E. van Santen. 2013. Location, Seeding Date, and Variety Interactions on Winter Wheat Yield in the Southeast USA. *Agronomy Journal* 105:509-518. doi:10.2134/agronj2012.0379
- Cammarano, D., L. Stefanova, **B. Ortiz**, M. R. Rodrigues, S. Asseng, G. Vellidis, V. Misra, G. Wilkerson, B. Basso, J. W. Jones, K. Boote. 2013. Evaluating the fidelity of downscaled climate data on simulated wheat and maize production in the southeastern US. *Regional Environmental Change Journal.* Published online 02/06/2013. doi: 10.1007/s10113-013-0410-1.
- Bartels, W., C.A., Furman, D.C., Diehl, F.S., Royce, D.R., Dourte, **B.**, **Ortiz,** D., Zierden, T.A., Irani, C., Fraisse, and J., Jones. 2012. Warming up to climate change: A participatory approach to engaging with agricultural stakeholders in the Southeast US. *Journal of Regional Environmental Change.* Published online: *November 2012.* DOI 10.1007/s10113-012-0371-9
- **Ortiz, B. V.,** D. G. Sullivan, C. Perry, P. Lu, R. Kemerait, R. F .Davis, A. Smith, G. Vellidis, R. Nicholds. 2012. Variable Rate Application of Nematicides on cotton Fields: A Promising Site-Specific Management Strategy. *Journal of Nematology* 44(1): 31-39.
- Mourtzinis, F., F. J. Arriaga, K. S. Balkcom, **B. V. Ortiz**. 2013. Corn Grain and Stover Yield Prediction at R1 Growth Stage. *Agronomy Journal* 105:1045-1050.
- Davis, R. F., S. K. Aryal, C. D. Perry, D. G. Sullivan, P. Timper, **B. V. Ortiz**, K. L. Stevenson, G. Vellidis, and G. Hawkins. 2013. Utilizing Management Zones for *Rotylenchulus reniformis* in Cotton: effects on nematode levels, crop damage, and *Pasteuria* sp. *Journal of Crop Protection* 50:53-60.

- **Ortiz, B. V.,** D. G. Sullivan, C. Perry, G. Vellidis. 2011. Delineation of management zones for southern root-knot nematode using fuzzy clustering of terrain and edaphic field characteristics. *Communications in Soil Science and Plant Analysis journal* 42(16): 1972-1994.

- **Ortiz, B. V**., S. Thomson, Huang, Y., K. N. Reddy, W. Ding. 2011. Determination of differences in crop injury from aerial application of glyphosate using vegetation indices. *Computers and Electronics in Agriculture* 77:204-213

- Persson, T., **Ortiz, B.**, D. Bransby, S. Sladden, W. Wu, G. Hoogenboom. 2011. Determining the impact of climate and soil variability on switchgrass (Panicum virgatum L.) production in the southeastern USA; a simulation study. *Biofuels, Bioproducts & Bioenergy journal* (DOI: 10.1002/bbb.288).

- **Ortiz, B. V.,** C. Perry, G. Vellidis, D. G. Sullivan. 2010. Geostatistical modeling of the spatial variability and risk areas of southern root-knot nematodes in relation to soil properties. *Geoderma* 156:243-252

- Persson, T., A. Garcia y Garcia, J. Paz, **B.V. Ortiz**, G. Hoogemboom. 2010. Simulating the production potential and net energy yield of maize-ethanol in the southeastern USA. *European Journal of Agronomy* 32:272-279

- Huang, Y., S. Thomson, **B. V. Ortiz,** K. N. Reddy, W. Ding, R.M. Zablotowicz, and J. R. Bright. 2010. Airborne Remote Sensing Assessment of the Damage to Cotton Caused by Spray Drift from Aerially Applied Glyphosate through Spray Deposition Measurements. *Biosystems Engineering* 107:212-220

- **Ortiz, B. V.,** G. Hoogenboom, G. Vellidis, K. Boote, R. F. Davis, C. Perry. 2009. Adapting the CROPGRO cotton model to simulate cotton biomass and yield under southern root-knot nematode parasitism. *Transactions of ASABE* 52(6):2129-2140.

- Van Etten ML, L.B. Prevost, A.C. Deen, **B. V. Ortiz**, L.A. Donovan, S-M. Chang. 2008. Gender differences in reproductive and physiological traits in a gynodioecious species, *Geranium maculatum* (Geraniaceae). *International Journal of Plant Sciences* 169 (2).

Extension Publications (Last seven years)

- Lena, B. P., **B. V. Ortiz**, L. Pereira De Oliveira, G. Morata, M. Freire De Oliveira, F. Morlin, A. Sanz-Saez, Y, Bao, Pierce McClendon, M. Thurmond. 2022. DigitalAG@Farms. Alabama Cooperative Extension System. 32p. https://www.aces.edu/blog/topics/crop-production/digitalagfarms/

- **Ortiz, B. V**., G. Morata, H. Kumar, J. Lamba, B. P. Lena, L. Bondesan, L. Laljeet Sangha. P. Srivastava, L. Duzy, T. Raper, D. Davis. 2021. Increasing Adoption of Climate & Water-Smart Irrigation Practices Among Tennessee Valley Farmers in Alabama & Tennessee: Findings and Lessons Learned (2017-2021). ANR-2776. Auburn University and Alabama Cooperative Extension System. https://www.aces.edu/wp-content/uploads/2021/11/ANR-2776-Increasing-Adoption-of-Climate-Smart-Water-Irrigation_111021L-G.pdf

- **Ortiz, B. V**., P. McClendon, G. Morata, L. Bondesan, L. Duzy. 2021. Operation and Maintenance Problems of Center Pivot Irrigation. ANR-2772. Alabama Cooperative Extension System. https://www.aces.edu/wp-content/uploads/2021/05/ANR-2772-Operation-Maintenance-Center-Irrigation_051921L-G.pdf

- **Ortiz, B. V**., L. Bondesan, G. Morata, P. McClendon, H. Kumar. 2021. Maintaining Water Application Uniformity in Irrigation Systems. ANR-2773. Alabama Cooperative Extension System.

- Lena, B., L. Bondesan, **B. V. Ortiz**, G. Morata, H. Kumar. 2021. Irrigation scheduling using soil water tension sensors. ANR-2774. Alabama Cooperative Extension System.

- Lena, B., G. Morata, **B. V. Ortiz**. 2021. Installation of Soil sensors for irrigation scheduling. ANR-2775. Alabama Cooperative Extension System.

- **Ortiz, B. V**., G. Morata, H. Kumar, B. P. Lena, J. Lamba, L. Bondesan, L. Sangha, P. Srivastava, L. Duzy, T. Raper. D. Davis. 2021. Increasing Adoption of Climate & Water-Smart Irrigation Practices Among Tennessee Valley Farmers in Alabama & Tennessee: Findings and Lessons Learned – Major outputs. ANR-2777. Alabama Cooperative Extension System.

- Sangha, L., J. Lamba, H. Kumar, P. Srivastava, R. Prasad, **B. V. Ortiz**, M. Dougherty. 2021. ENSO Forecast to plan water withdrawals for irrigation. ANR-2832. Alabama Cooperative Extension System.

- **Ortiz, B. V**., B. P. Lena, G. Morata, L. Bondesan, Pereira De Oliveira, L., J. Oldag, A F. Jimenez-Lopez, H. Kumar, K. Balkcom, G. Pate, A. Sanz-Saez. 2020. DigitalAg@Farms – 2019 report. Alabama Cooperative Extenison System. 27p (prepared in 2020, published on Jan. 2021).

- Morata, G., B. Goodrich, **B. V. Ortiz**. 2019. Investment Costs of Center Pivot Irrigation in Alabama – Three Scenarios. ANR-2541. Alabama Cooperative Extension System.

- **Ortiz, B**., A. Hagan, R. Kemerait, K. Flanders, S. Tubs, S. Monfort, M. Abney, E. Sikora, D. Buntin, D. Delaney, D. Monks, W. Birdsong, D. Wright, J. Johnson, K. Balkcom, J. Langcuster. 2016. Climate and Crops – Adapting crops to a variable Climate. iBook. Publisher: Alabama Cooperative Extension System. 129 p. https://www.aces.edu/blog/topics/crop-production/climate-and-crops-ibook/

- Woli, P; **Ortiz, B.**, K. Flanders, A. Hagan, B. Kemerait, D. Wright. 2014. Adapting Corn Production to climate in Alabama. ANR-2090. http://www.aces.edu/pubs/docs/A/ANR-2090/ANR-2090.pdf

- Woli, P; **Ortiz, B.**, K. Flanders, A. Hagan, B. Kemerait, D. Wright. 2014. Adapting Wheat Production to climate in Alabama. ANR-2046. http://www.aces.edu/pubs/docs/A/ANR-2046/ANR-2046.pdf

- Woli, P; **Ortiz, B.** 2014. El Niño-Southern Oscillation and its Impact on Alabama's Climate. ANR-2091. http://www.aces.edu/pubs/docs/A/ANR-2091/ANR-2091.pdf

Extension Digital Irrigation Newsletter

- As part of the Alabama Irrigation Extension Program, 17 digital newsletters were prepared in 2020 (14) and 2021 (3). https://www.aces.edu/blog/topics/farming/alabama-irrigation-management-newsletter/

Abstracts - Proceedings / Conference papers / Posters (Last five years). Graduate student/PostDoctoral Fellow are indicated with asterisk (*)

***** Oliveira, M. F, J.B.C. Souza, **B.V. Ortiz**, Y. Bao, A. Sanz-Saez, Rouverson Pereira da Silva. 2023. Integrating artificial neural networks and remote sensing for prediction of peanut maturity as a

function of management zones. *In* Proceedings of the 14th European Conference of Precision Agriculture. Bologna, Italy. **Peer review conference proceedings paper.**

*****Oliveira, M. F., F. Morlin Carneiro, M. Thurmond, M. D. Del Val, **B. Ortiz**, L. P. Oliveira, A. Sanz-Saez, D. Tedesco. 2022. Predicting below and above ground peanut biomass and maturity using multi-target regression. *Submitted* to 15th International Conference on Precision Agriculture. June 26-29, Minneapolis, Minnesota. 2022.

*****Oliveira, M. F., **B. Ortiz**, G. Morata, R. P. Silva, A. Jimenez. 2022. Coupling machine Learning Algorithms and GIS for crop yield predictions based on remote sensing imagery and topographic indices. *Submitted* to 15th International Conference on Precision Agriculture. June 26-29, Minneapolis, Minnesota. 2022.

Ortiz, B.V., L. Bondesan, F. Morlin Carneiro, G. Morata, L. Duzy, B. P. Lena. 2021. Right water rate at the right time and right place: On-farm evaluation of soil sensors and variable rate irrigation to increase irrigation water use efficiency. ***In*** Proceedings of ASA, CSSA and SSSA International Annual Meetings in Virtual Meeting. November 7-10, Salt Lake City, Utah. 2021.

Vellidis, G., Chris Butts, Ioannis Gallios, Vasileios Liakos, **B. V. Ortiz**. 2021. Cropfit – an integrated Smart irrigation mobile App for corn, cotton, peanut, and soybean. ***In*** Proceedings of ASA, CSSA and SSSA International Annual Meetings in Virtual Meeting. November 7-10, Salt Lake City, Utah. 2021.

Jiménez-López A.F., **Lena B.P.**, Ortiz B.V. 2021. Real-time mapping of crop temperature using a wireless network of infrared thermometers on a central pivot. 2021 ASE, CSSA, SSSA International Annual Meeting. ***In*** Proceedings of ASE, CSSA, SSSA International Annual Meeting. November 7-10, Salt Lake City, Utah. 2021.

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*McClendon, C. P., **Ortiz, B. V.**, Rabinowitz, A. V., Morata, G., & Balkcom, K. B. 2021. A Comparison of Two Methods of Irrigation Scheduling on Peanut Fields in South Alabama. ***In*** Proceedings of ASA, CSSA, SSSA International Annual Meeting, Salt Lake City, UT. Poster.

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*Oliveira, L.P., **Ortiz, B.V.,** Morata, G. T., Jones, J., Squires, T. 2022. Is row-unit vibration affected by planter speeds and downforce?. Abstract submitted to the 15th International Conference on Precision Agriculture. 26-29 June, Minneapolis, USA, 2022.

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*Oliveira, L.P., **Ortiz, B.V.,** Silva, R.P., Way, T.R., Oliveira, M.F., Pate, G. 2021. Variability of Gauge-Wheel Loads Resulting from a Hydraulic Downforce System and the Impacts on Corn Seeding Depth and Emergence. ***In*** Proceedings of the ASABE 2021 Annual International Meeting. July 12-16, Virtual and On-Demand. 2021.

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*Oliveira, L.P., **Ortiz, B.V.,** Silva, R.P., Pate, G. 2021. Variability of the active hydraulic downforce system related to cotton seed depth and emergence. ***In*** papers presented at the 13th European Conference on Precision Agriculture. July 18-22, Budapest, Hungary. 2021.

*****Lena B.P., **Ortiz B.V.,** Jiménez-López A.F., Sanz-Sáez A., O'Shaughnessy S.A., Durstock M.K., Pate G. 2021. Evaluation of infrared canopy temperature data in relation to soil water-based irrigation scheduling in a humid subtropical climate. ***In*** Proceedings of 6th Decennial National Irrigation Symposium. December 6-8, San Diego, California. 2021

*Oliveira, L.P., **B. V. Ortiz**, R. Pereira da Silva, K. Balkcom, G. Pate, M. Oliveira. 2020. Impact of Hydraulic Downforce on Cotton Crop and Soil Properties after Planting. ***In*** Proceedings of ASA, CSSA and SSSA International Annual Meetings in Virtual Meeting. November 9-13, 2020.

*Oliveira, M., **B. V. Ortiz**, R. Pereira da Silva, G. Morata, A-F Jimenez Lopez. 2020. Can we improve the accuracy of corn yield forecasting using the concept of management zones through machine learning models? ***In*** Proceedings of ASA, CSSA and SSSA International Annual Meetings in Virtual Meeting. November 9-13, 2020. (Poster).

Ortiz, B. V., G. Morata, L. Bondesan, B. P. Lena, H. Kumar, Jasmeet Lamba, P. Srivastava, T. B. Raper. 2020. Putting Irrigation Technology into the hands of Alabama Farmers. ***In*** Proceedings of ASA, CSSA and SSSA International Annual Meetings in Virtual Meeting. November 9-13, 2020.

*Massey, P. and **B. V. Ortiz**. 2020. Training Farmers to Utilize Soil Sensor Data and Variable Rate Irrigation to Increase Crop Yield and Decrease Irrigation Water Use. ***In*** Proceedings of ASA, CSSA and SSSA International Annual Meetings in Virtual Meeting. November 9-13, 2020. Undergraduate Poster.

*Thurmond, M., **B. V. Ortiz**, P. Massey, H. Whatley, T. Stephenson, B Mason, B. P. Lena. 2020. Undergraduate students and their efforts towards informing Alabama farmers of innovative irrigation

management practices. ***In*** Proceedings of ASA, CSSA and SSSA International Annual Meetings in Virtual Meeting. November 9-13, 2020. Undergraduate Poster.

*Kumar, H., Srivastava, P., **Ortiz, B. V**., Takhellambam, B. S., Morata, G., Bondesan, L., Lamba, J. (2020). Spatiotemporal Soil Moisture Variability in Corn and Cotton Fields with Uniform Irrigation During the Growing Season. AGU Fall meeting, December 1-17, 2020. *Conference proceedings poster*.

*Bondesan, L., **B. V. Ortiz**, G. T. Morata, D. Damianidis, A. F. Jimenez, G. Vellidis, F. Morari. 2019. Evaluating and improving soil sensor-based variable irrigation scheduling on farmers' fields in Alabama. In: J.A. Taylor (Ed.), Precision Agriculture'19 – *Proceedings of the 12th European Conference on Precision Agriculture (ECPA2019)*, Montpellier, FR *(peer reviewed paper).*

*Jimenez, A-F., **B. V. Ortiz**, L. Bondesan, G. T. Morata, D. Damianidis. 2019. Artificial Neural Networks for irrigation management: a case study from Southern Alabama, USA. In: J.A. Taylor (Ed.), Precision Agriculture'19 – *Proceedings of the 12th European Conference on Precision Agriculture (ECPA2019)*, Montpellier, FR *(peer reviewed paper).*

Ortiz, B. V., A. Hagan, R. C. Kemerait, K. Flanders, S. Tubbs, D. Monks, W. S. Monfort, M. Abney, W. Birdsong, D. Wright, D. Zierden, E. Sikora, D. P. Delaney, D. Buntin, J. Johnson, K. Balkcom, A. Majundar. 2017. Helping Southeast Us Farmers To Adapt To Climate Variability: A Climate Ibook. In Proceedings of the International Congress of Agricultural Sciences – AGROCIENCIAS. Havana, Cuba, 20-24 November, 2017.

Ortiz, B. V., F. Morlin, C. Brodbeck. Exploring the use of Canopy Temperature for irrigation Scheduling. American Society of Agronomy Meeting. Tampa, Florida. 22-25 October, 2017.

*Del Corso, M., **B. V. Ortiz**, and C. Brodbeck. Study of Irrigation and Nitrogen Rate Impact on Corn Yield and Spectral Reflectance in Alabama. American Society of Agronomy Meeting. Tampa, Florida. 22-25 October, 2017.

Kerry, R., B. R. Ingram**,** F. Navarro, **B. V.Ortiz**, B. T. Scully. 2017. Determining Corn Aflatoxin Risk within Counties in Southern Georgia using Remotely Sensed Data, USA**.** In: J.A. Taylor (Ed.), Precision Agriculture'17 – *Proceedings of the 11th European Conference on Precision Agriculture (ECPA2017)*, Edinburgh, Scotland *(peer reviewed paper).*

Felipe, N., B. R. Ingram**,** R. Kerry, **B. V.Ortiz**, , B. T. Scully. 2017. A Web-based GIS Decision Support Tool for Determining Corn Aflatoxin Risk: A Case Study Data from Southern Georgia, USA. In: J. A. Taylor (Ed.), Precision Agriculture'17 – *Proceedings of the 11th European Conference on Precision Agriculture (ECPA2017)*, Edinburgh, Scotland *(peer reviewed paper).*

Ortiz, B. V., W. Bartels, C. Fraisse, D. Zierden. 2017. Increasing agricultural production and resilience through data services and decision support systems. INFORMS Conference. (Invited Presentation). Houston, Texas. October 23-26, 2017.

Ortiz, B. V., A. Hagan, R. C. Kemerait, K. Flanders, S. Tubbs, W. S. Monfort, M. Abney, E. Sikora, D. Buntin, D. P. Delaney, D. Monks, W. Birdsong, D. Wright, D, J. Johnson, K. Balkcom. 2017. Climate and Crops

iBook – A resource to help Southeast farming adapting to a Variable Climate. In Proceedings of the Beltwide Cotton Conference. Dallas, Texas. 4-6, January, 2017.

Ortiz, B. V., M. Del Corso, G. Pate. 2017. Impact of Late Nitrogen Application on Corn Yield and Spectral Reflectance. Results of Preliminary studies in Alabama. 15th Annual Nitrogen Use Efficiency Meeting. Baton Rouge, Louisiana. 7-9, August, 2017.

*Morlin, F., **B. V. Ortiz**, P. C. de Menezes, L. A. da Silva Gírio, C. Zerbato, M. del Corso, C. E. Angeli Furlani. Evaluation of Two Canopy Sensors for Estimation of Spatio-Temporal Variability of Soybean Growth. 15th Annual Nitrogen Use Efficiency Meeting. Baton Rouge, Louisiana. 7-9, August, 2017. (Poster). 3rd place graduate student poster competition.

G. RECENT PROFESSIONAL ACTIVITIES

- **Conference organization (Last five years)**

  - 2022- Conference funded by USDA-NIFA: "*Envisioning 2050 in the Southeast: AI-Driven applications in Agriculture*". Regional to National scope). Auburn, AL. March 9-11,2022. Number of participants: 200 in-person and 150 online.
  - 2021 – Organizer of the E.T. York Lecture series in Spring 2021 – Auburn University College of Agriculture. The speaker was former Ambassador to USA Mission of United Nations in Rome Mr. Kip Tom. Note: I established a working relationship with Ambassador Kip Tom while I was working at FAO in Rome during a 2019 sabbatical leave.
  - 2021 - Symposium organized at the 2021 ASA Annual meeting: "*Lessons learned from strengthening the impact of extension programs by changing and tracking stakeholder engagement processes".*
  - 2019 – Alabama Precision Agriculture Workshop. Birmingham, AL. July 30th, 2019. 70 participants.
  - 2018 Alabama Row Crops Short Course. Auburn, AL. December 13-14, 2018. 260 people. Co-organizer
  - 2017 Alabama Row Crops Short Course. Auburn, AL. December 12-13, 2017. 180 people. Co-organizer
  - 2016 Crop Growth Simulation Modeling Workshop for Cuban Scientists. San Jose de Las Lajas, Cuba. October 2016. 60 participants.

- **Selected international invited presentations (last five years)**

  - 2022. The role of smart-advisory services in climate resilient agriculture. Second African Conference of Precision Agriculture. Nairobi, Kenya. December 7-9, 2023
  - 2020. Do we have to adapt extension approaches to the digital farming environment? Final seminar. Food and Agriculture Organization (FAO). Rome, Italy. February 21, 2020.
  - 2020. Should farmers or the extension approach adapt to the possibilities of digital agriculture? Technical University of Munich. Freising, Germany. February 7th, 2020.
  - 2019. Are We Designing and Implementing Sustainable and Impactful Extension Programs? Invitation from the International Food Policy Research Institute. Washington DC, November 7-8, 2019.

- 2019. Invited by USDA- Foreign Agricultural Service to represent USA during an APEC workshop in Korea. Workshop title: Smart Agriculture Policies for Sustainable Growth. Presentation title: Smart Farming: Key Strategies to Sustainable Agriculture USA Perspective. Seoul, Korea. June 11-12, 2019.
- 2018. Invited by USDA- Foreign Agricultural Service to represent USA on an APEC meeting in Taipei, Taiwan. Workshop title: Promoting gender inclusion in Smart Agriculture. Presentation title: Challenges and opportunities to closing the gap between ageing farmers and youth in agriculture. Taipei, Taiwan. October 22-24, 2018.
- 2018. Crop Growth Simulation Modeling applied to Peanut Production. Graduate Course: Advances in Peanut Production. Sao Paulo State University, Jaboticabal campus, Brazil. August 1-3, 2018.

- **Professional Memberships**

  - American Society of Agricultural and Biological Engineers (ASABE), 2004-present
  - International Society of Precision Agriculture (ISPA), 2018-present
  - American Society of Agronomy (ASA), 2009-present
  - Crop Science Society of America, 2009-present

- **Public and Professional Service**

  - 2021 *Leader* of ASA Extension and Education Systems Community
  - 2021 *Vice-leader* of ISPA Nutrient Management Community
  - 2020 *Vice-leader* of ASA Extension and Education Systems Community
  - 2015 *Leader* of American Society of Agronomy (ASA) Precision Agriculture Systems Community
  - 2014 *Vice-leader* of ASA Precision Agriculture Systems Community
  - 2015: *Reviewer, Grant Proposal* - USDA/CARE program
  - 2013: *Reviewer, Grant Proposal* - USDA/A3141 NIFA program
  - 2012: *Reviewer, Grant Proposal* – Alabama Agricultural Experimental Station
  - 2010-2011: *Reviewer, Grant Proposal* - USDA/SBIR
  - 2009 - PRESENT: Leader of the Cuba working group of Auburn University – College of Agriculture.
  - 2011 - *Editor, Associate Editor* - Trans of ASABE and Applied Engineering in Agriculture
  - 2008 - 2011: *Editor, Associate Editor* – Agronomy Journal