Graduate Student Field Day
Edisto Research and Education Center
August 15, 2019

CLEMSON®
College of AGRICULTURE,
FORESTRY AND LIFE SCIENCES

CLEMSON®
EDISTO RESEARCH &
EDUCATION CENTER

CAFLS

The College of Agriculture, Forestry and Life Sciences is at the core of Clemson University's land-grant heritage and is the beating heart of founder Thomas Green Clemson's vision of a high seminary of learning that would reach beyond the boundaries of the academy to benefit South Carolina, its people, land, wildlife, natural resources and economy.

CAFLS brings together the land-grant mission of teaching, research and Extension through world-class educational, inquiry and outreach opportunities, and partnerships with private industry and state and federal agencies.

CAFLS students benefit from rigorous classroom and experiential learning opportunities in plant, animal, human, molecular and packaging science. The world benefits from CAFLS research discoveries that help sustainably feed a growing global population and conserve our natural resources for future generations. And South Carolina benefits from a robust Clemson Cooperative Extension Service that imparts research-based information to support the state's $42 billion agribusiness and natural resources industry and strengthen communities, families and youth.

THE CLEMSON EXPERIMENT STATION

CAFLS professors conduct their research in campus laboratories and facilities, and at our six Research and Education Centers (RECs) strategically located throughout the state according to the state's distinct soil and climate regions. These RECs, collectively known as the Clemson Experiment Station, are a part of a nationwide system of scientists working to improve the quality of life for people in their home state, nation, and the world.

Clemson University Research and Education Centers:
- Belle W. Baruch Institute of Coastal Ecology and Forest Science   Georgetown
- Coastal Research and Education Center   Charleston
- Edisto Research and Education Center   Blackville
- Pee Dee Research and Education Center   Florence
- Sandhill Research and Education Center   Columbia
- Simpson Research and Education Center   Clemson

EDISTO REC

The Edisto Research & Education Center is located in Barnwell County, where scientists have studied and developed agricultural production practices since 1937. Currently, the main research focus at Edisto REC is precision agriculture, where temporal and spatial data are used to drive agricultural management decisions in an effort to maximize resource utilization efficiency, profitability, and sustainability. Research and Extension programs currently represented at Edisto REC include: Agricultural Engineering, Animal Feed Grains, Livestock and Forages, Entomology, Irrigation, Peanut Production, Plant Pathology, Precision Agriculture, Sensor Utilization and Automation, Soil Fertility, Weed Science, and Vegetable Production.

Edisto REC contains 2,400 acres of row crop, pasture, and forested land in the coastal plain of South Carolina, providing the ability to investigate many diverse areas of agriculture. Scientists at Edisto REC regularly collaborate with growers and industry professionals throughout South Carolina and beyond to conduct on-farm and on-station replicated trials and demonstrations. The research conducted at Edisto REC helps South Carolina farmers operate more profitably and more sustainably.

SCHEDULE OF EVENTS

Registration ....8:30 a.m. – 8:50 a.m.

Welcome ....8:50 a.m. – 9:05 a.m.
  Dr. Chris Ray, *Director, Edisto Research & Education Center*

Host Plant Resistance in Wild Cotton Landraces to Thrips Pests ....9:05 a.m. – 9:20 a.m.
  Sophia Conzemius, *Ph.D. Student, Entomology*

Yield Loss and Grade Effects of Peanut Combine Speed Settings ....9:30 a.m. – 9:45 a.m.
  Benjamin Fogle, *M.S. Student, Plant and Environmental Sciences*

Novel Methods for RGB Aerial Image Analysis ....9:45 a.m. – 10:00 a.m.
  Brennan Teddy, *M.S. Student, Plant and Environmental Sciences*

Optimization of Zone and Grid Management Strategies .... 10:00 a.m. – 10:15 a.m.
  Alexander Coleman, *M.S. Student, Plant and Environmental Sciences*

Comparisons of Methods to Measure Crop Water Use .... 10:20 a.m. – 10:35 a.m.
  Drew Ewing, *M.S. Student, Biosystems Engineering*

Determining the Optimum Planter Downforce Settings in Soybean.................................... 10:40 a.m. – 10:55 a.m.
  Tyler Soignier, *M.S. Student, Plant and Environmental Sciences*

Associating Site Factor and Plant Productivity Variables with
Pestiferous and Beneficial Arthropod Distributions in Soybean.. 11:00 a.m. – 11:15 a.m.
  Daniel Greene, *Ph.D. Student, Entomology*

Construction of Portable Spore Traps and Polymerase Chain Reaction (PCR) Based
Inoculum Detection System for *Nothopassalora personata* in Peanut Fields .... 11:20 a.m. – 11:35 a.m.
  Misbah Munir, *Ph.D. Student, Plant and Environmental Sciences*

Integrating Beneficial Microbes for Promoting Plant
Growth and Managing White Mold and Late Leaf Spot in Peanut .... 11:35 a.m. – 11:50 a.m.
  Austin Herbert, *M.S. Student, Plant and Environmental Sciences*

Epidemiological approaches for practical solutions to pertinent peanut problems............... 11:50 a.m. – 12:05 p.m.
  Hope Becton, *Ph.D. Student, Plant and Environmental Sciences*

Lunch ....12:10 p.m. – 12:45 p.m.

Keynote Address ....12:45 p.m. – 1:15 p.m.
  Dr. Carlyle Brewster, *Department Chair and Professor, Plant and Environmental Sciences Department*

Adjourn ....1:15 p.m.

Sophia Conzemius

Contact:
sconzem@g.clemson.edu

Department:
Plant and Environmental Sciences

Degree:
Ph.D. Entomology

Anticipated Graduation:
May 2022

Graduate Advisory Committee:
- Francis Reay-Jones (co-chair)
- Jeremy Greene (co-chair)
- Todd Campbell
- Dominic Reisig

Dissertation title:
Host Plant Resistance in Wild Cotton Landraces to Thrips Pests

Research objectives:
Our objective is to identify plant traits in wild cotton landraces that dissuade or inhibit thrips insect feeding and damage. In 2018, South and North Carolina field trials helped to determine wild cotton landraces with promising insect resistance traits to thrips. Putatively resistant and susceptible lines are currently being further analyzed at the Edisto REC to confirm and identify types of plant resistance. Experiments include plant-insect interaction bioassays, plant volatiles, and plant metabolite assessments. Research will be repeated for 2019 field data.

Bio:
Sophia received her B.S. in Agronomy and M.S. in Plant Science from South Dakota State University in 2015 and 2018, respectively. Growing up in Minnesota, she always enjoyed her summers as a camp counselor coordinating hiking and camping trips. It was not until her undergraduate Insect Pest Management course, though, that she found her interest in insect studies. The following semester, she began undergraduate research in insecticidal impacts on soybean insect pests aphids and thrips. Her Master's research then worked with host plant resistance, finding one soybean and two wild soybean plant types with naturally occurring resistance to a soybean aphid biotype. Sophia continues her research in plant resistance with the entomology program at Clemson University in efforts to protect seedling cotton from thrips damage.

Benjamin Fogle

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bfogle@clemson.edu

Department:
Plant and Environmental Sciences

Degree:
M.S. Plant and Environmental Sciences

Anticipated Graduation:
December 2020

Graduate Advisory Committee:
- Kendall Kirk (co-chair)
- Dan Anco (co-chair)
- Nathan Smith
- Josey Peele
- Michael Plumblee

Thesis title:
Yield Loss and Grade Effects of Peanut Combine Speed Settings

Research objectives:
On a peanut harvester, there are two main avenues for potential of peanut losses: losses as associated with the header (where vines enter) and losses associated with the cleanout (where the tailings exit). The objectives of this study were to quantify the yield and grade effects of the variables that the combine operator can adjust on-the-go, from the cab: ground speed, PTO speed, and header speed.

Bio:
Ben Fogle is from Neeses, South Carolina and began working at Edisto REC as the Precision Ag Core Technician in 2017. Some of his responsibilities include designing prototype equipment, wiring electrical components, installation of prototype research projects, and conducting field data collection. Ben also farms with his father in Neeses on their family farm of around 500 acres at HideAway Farms. Ben graduated from Clemson University in December of 2016 with a B.S. in Agricultural Mechanization and Business. As a student, Ben worked as an intern for Amadas Industries in Suffolk, VA for 3 years during the summer semesters. While there, his main responsibilities were working on and troubleshooting prototype peanut combines and technology being developed to help growers. Ben, in his free time, enjoys farming, going on motorcycle rides/trips, hiking, fishing, spending time with family and friends.

Brennan Teddy

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Department:
Plant and Environmental Sciences

Degree:
M.S. Plant and Environmental Sciences

Anticipated Graduation:
May 2020

Graduate Advisory Committee:
- Kendall Kirk (co-chair)
- John Mueller (co-chair)
- Michael Plumblee
- Michael Marshall

Thesis title:
Novel Methods for RGB Aerial Image Analysis

Research objectives:

I. Develop solutions for RGB aerial image analysis including classification of soil texture (sand, silt, and clay percentages) from both commercially-available satellite imagery and consumer-level UAV.

II. Develop machine learning and neural network models for crop and weed classification using RGB imagery.

Bio:
Brennan is from Shelby, North Carolina and began attending Clemson in the fall of 2014. He received his B.S. in Agricultural Mechanization and Business in May of 2018, and is currently working towards a M.S. in Plant and Environmental Science with a focus on image analysis. During the spring semesters, Brennan works as a Graduate Teaching Assistant in the Agricultural Mechanization and Business Program for the Precision Agriculture Technologies class. In Brennan's free time, he enjoys kayaking and working on vehicles. Brennan hopes that his research will aid in the development of technologies which are affordable and easy enough to be used by growers in the state.

Alexander Coleman

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Department:
Plant and Environmental Sciences

Degree:
M.S. Plant and Environmental Sciences

Anticipated Graduation:
May 2020

Graduate Advisory Committee:
- Kendall Kirk (co-chair)
- John Mueller (co-chair)
- Michael Plumblee
- Michael Vassalos

Thesis title:
Comparative Suitability of Spatial Data Sources for the Creation of Yield Management Zones

Research objectives:

I. Determine, using currently available precision agriculture technologies, the most suitable data sets for use in creating yield management zones across several crops. Suitability assessment is a function of maximizing yield differences between zones and minimizing yield differences within zones.

II. Evaluate methods for optimizing grid and zone management definitions to maximize profitability.

Bio:
Alex is from Saluda, South Carolina and began working for Clemson as the technician for the Corn, Soybean, and Small Grains program in 2016. His responsibilities in this position include assisting in the creation, maintenance, data collection, and analysis of research plots for corn, soybeans, sorghum, wheat, barley, canola, and oats. He interned with Monsanto in 2014 with responsibilities that included assisting in the creation, maintenance, and data collection of research plots for corn, soybeans, and cotton. In this position he also assisted with the planning and execution of various field days. He received his B.S. in Agricultural Mechanization and Business in 2015, and is currently working on a M.S. in Plant and Environmental Sciences with a focus on comparing the suitability of spatial data for the creation of yield management zones. In Alex's free time, he enjoys farming at home with his father and spending time family, friends, and fiancé.

Drew Ewing

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ewing4@clemson.edu

Department:
Environmental Engineering and Earth Sciences

Degree:
M.S. Biosystems Engineering

Anticipated Graduation:
August 2020

Graduate Advisory Committee:
- Tom Owino (chair)
- Jose Payero
- Dale Linvill
- Christophe Darnault

Thesis title:
Comparison of Methods to Measure Crop Water Use in South Carolina

Research objectives:
The objectives of this research proposal are two-fold. Firstly, to evaluate the accuracy of the Surface Renewal method to measure crop water use, compared to in-field weighing lysimeters. Secondly, to design, fabricate, and test a "Pressure-Differential Device" in its ability to measure crop water use in the soil column above it, compared to in-field weighing lysimeters. In testing these 3 methods, we expect to gain a better understanding of evapotranspiration for cotton in South Carolina and potentially validate a cheaper, less intensive method of measurement for farmers.

Bio:
Drew is a graduate student who grew up in Kansas and Oklahoma. He was involved with 4H growing up, participating with goats and woodworking among other activities. Before coming to Clemson, Drew has worked for others doing work with blackberries, cattle, horses, fencing, firewood, hay crews, pecan harvests and general land management. He obtained a B.S. in Industrial and Manufacturing Systems Engineering at Kansas State University. A brief stint working in Oklahoma exposed Drew to water treatment and reuse systems, and allowed him to spend time helping out family on the land on weekends. These opportunities led him to Clemson University to study Biosystems Engineering, focusing on the exchange of agriculture and water.

Tyler Soignier

Contact:
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Department:
Plant and Environmental Sciences

Degree:
M.S. Plant and Environmental Sciences

Anticipated Graduation:
May 2021

Graduate Advisory Committee:
- Michael Plumblee (chair)
- John Mueller
- Kendall Kirk
- Jeremy Greene

Thesis title:
Effects of Planter Downforce and Sprayer Application Technologies on Soybean and Cotton Production and Management in South Carolina

Research objectives:
I. To determine if planter downforce has an effect on soybean emergence in South Carolina.
II. To determine the optimum downforce planter setting for various tillage practices and soil textures in South Carolina.
III. To determine the return on investment and payback period for downforce technology utilized in soybean production in South Carolina.

Bio:
Tyler is from Raymond, Mississippi and began working towards a Master of Science degree at Clemson University in Plant and Environmental Sciences in May 2019. Tyler graduated with a B.S. in Agronomy at Mississippi State University in May 2019. Tyler's previous work history includes, working for Monsanto as a temporary worker where he assisted with pollinating corn and collecting research data at the Flora, MS research site. Tyler also worked in the Cotton Agronomy and Weed Science program at Mississippi State University, where he was heavily involved with small- and large-plot research, data collection, and cotton production while obtaining his B.S. degree. Tyler's current responsibilities include assisting with all aspects of the Extension and Research Precision Ag Program at Clemson Edisto REC. Extension aspects include participation at field days, workshops, seminars, and visiting growers to provide assistance. Research aspects include trial implementation, crop management, and data collection in soybean, corn, cotton, and peanut. Upon completion of Tyler's degree, he aims to have a full understanding of crop production in the Southeast, possess knowledge of how to use, implement, and make management decisions using precision agriculture technologies. In Tyler's free time, he enjoys hunting, fishing, and spending time with family and friends.

Daniel Greene

Contact:
adg2@clemson.edu

Department:
Plant and Environmental Sciences

Degree:
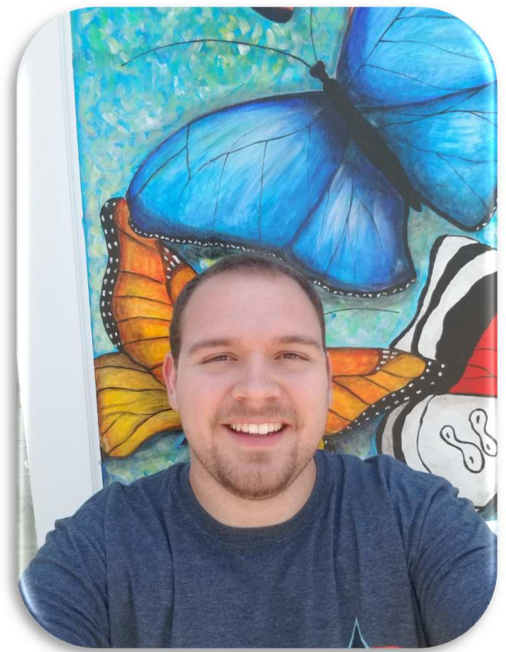Ph.D. Entomology

Anticipated Graduation:
December 2019

Graduate Advisory Committee:
- Jeremy Greene (co-chair)
- Francis Reay-Jones (co-chair)
- Kendall Kirk
- Brandon Peoples

Dissertation title:

Associating Site Factor and Plant Productivity Variables with Pestiferous and Beneficial Arthropod Distributions in Soybean

Research objectives:

I. Predict the abundance of pestiferous and predatory arthropod taxa in soybean using various site-level (within-field) factors

II. Determine if abundance prediction patterns exist for a) groupings of taxa for a given set of factors b) groupings of factors for a given set of taxa

Bio:
Hailing from Newport, Tennessee, Daniel began his postsecondary education studying wildlife and fisheries biology at Lincoln Memorial University in 2008. While there, Daniel was actively involved in various research activities including wildlife surveys, fluvial substrate and hydrological flow structure characterization, tick and mosquito collection and identification, and tick gene flow analyses. After completing his B.S., Daniel began his M.Sc. in Biology at the University of North Carolina at Greensboro (UNCG) in 2013. Daniel's main responsibility at UNCG centered around colony maintenance of biting flies (mosquitoes and sand flies), and his research was focused on understanding sand fly behavior in laboratory assays. After graduation from UNCG in 2015, Daniel began the Ph.D. program in Entomology at Clemson in the fall of the same year. At Clemson, Daniel assists with the collection and interpretation of cotton and soybean developmental and phenological data as well as arthropod collection and identification. Daniel's research interests center around understanding the factors involved in trophic interactions within a given habitat, and this area of interest is studied in an agricultural setting for his research at Clemson. After graduation, Daniel hopes to pursue a career in teaching at the postsecondary level. In his spare time, Daniel loves to hike, as well as play and watch soccer.

Misbah Munir

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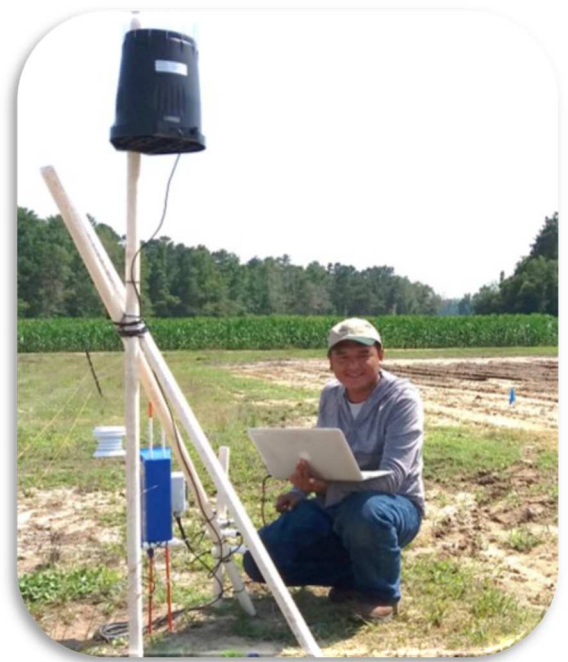
Department:
Plant and Environmental Sciences

Degree:
Ph.D. Plant and Environmental Sciences

Anticipated Graduation:
December 2020

Graduate Advisory Committee:
- Dan Anco (chair)
- Hehe Wang
- Guido Schnabel
- Paula Agudelo

Dissertation title:

Evaluation of Disease Control and Pathogen Dynamics to Improve Management of Late Leaf Spot and Southern Stem Rot in South Carolina Peanut

Research objectives:

I. Determine the occurrence of resistance to several fungicides among populations of *N. personata* (the causal agent of late leaf spot of peanut) in South Carolina.

II. Construct portable spore traps and Polymerase Chain Reaction (PCR)-based inoculum detection system to detect *N. personata* in peanut fields.

III. Determine whether southern stem rot severity differs by field characteristics.

IV. Investigate whether the occurrence or severity of late leaf spot can substantially alter plant microclimate and in turn affect the development of southern stem rot.

Bio:

Misbah was born in Salatiga, a small and beautiful city at the foot of the Merbabu mount, in central Java, Indonesia. He received his B.S. in Biology from Sebelas Maret University, Solo, Central Java in 2008. In the same year when he graduated from college, he moved to South Sumatera, home of the legendary sumatran tigers, to join Indonesian Rubber Research Institute (IRRI) and served as young researcher in the plant protection division. In IRRI, his responsibilities included conducting research on disease management of Hevea rubber and setting up IPM training for rubber growers. During his tenure in IRRI, he and his family stayed in a residential area in the middle of 10,000 acre of Hevea rubber plantation that belonged to IRRI. In 2013, he was awarded Fulbright scholarship to pursue MS graduate study in the US. He received his M.S. in plant pathology from University of Kentucky in 2015. As the chance came to him in 2016, he enthusiastically joined the peanut lab at Edisto REC, Clemson University as a graduate research assistant. He is currently working on a Ph.D. in Plant and Environmental Sciences under the guidance of Dr. Anco. In Misbah's free time, he enjoys watching and playing soccer with his son and making hot sauce with no vinegar.

Austin Herbert

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Herber4@clemson.edu

Department:
Plant and Environmental Sciences

Degree:
M.S. Plant and Environmental Sciences

Anticipated Graduation:
August 2021

Graduate Advisory Committee:
- Hehe Wang (chair)
- Guido Schnabel
- Christopher Saski

Thesis title:
Integrating Beneficial Microbes for Promoting Plant Growth and Managing White Mold and Late Leaf Spot in Peanut

Research objectives:
Research objectives are to evaluate the commercial beneficial microbial products for promoting peanut yield and controlling white mold and late leaf spot in the field, and to identify beneficial bacterial strains from the SC peanut fields for promoting plant growth and inducing disease resistance to white mold and late leaf spot.

Bio:
Austin is from Aiken, South Carolina where he graduated with a B.S. in Biology from the University of South Carolina Aiken in spring 2019. In May 2019 he started working as a part time lab tech at the EREC station for Dr. Wang. He has managed the peanut project all summer searching for new disease suppressive bacteria where he has collected soil samples, and screened soil derived bacterial isolates in the lab using in vitro techniques. He will be taking graduate courses on main campus in fall 2019 and spring 2020. Austin's interests lie in molecular genetics, the characterization of genetic mechanisms, and biochemistry.
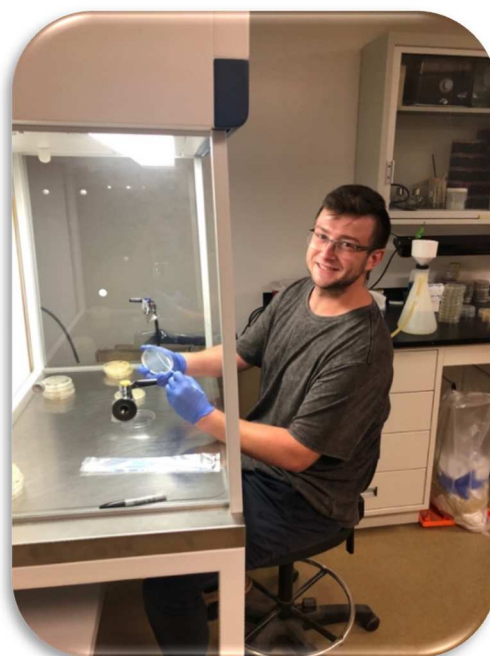
Hope Becton

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Department:
Plant and Environmental Sciences

Degree:
Ph.D. Plant and Environmental Sciences

Anticipated Graduation:
May 2023

Graduate Advisory Committee:
- Dan Anco (chair)
- Kendall Kirk

Disseration title:
Epidemiological approaches for practical solutions to pertinent peanut problems

Research topics:

I.   Post-harvest decomposition for reducing survival of late leaf spot (*Nothopassalora personata*) inoculum

II. Image analysis as a resource for portable peanut symptom identification

Bio:
Hope grew up in Milan, TN, a small town in the western region of the state. She received a B.S. in Agriculture with a concentration in Plant and Soil Sciences from the University of Tennessee at Martin in December of 2016. In January 2017, she moved to Starkville, MS to pursue a M.S. in Agricultural Life Sciences with a concentration in Plant Pathology from Mississippi State University. Her master's thesis was successfully defended in April 2019. Hope's aspirations to study integrated disease management and epidemiology in crop production lead her to join Dr. Anco's peanut lab at EREC in June 2019. In her free time, Hope enjoys hiking, camping, and cooking with her husband and dogs.

NOTES

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