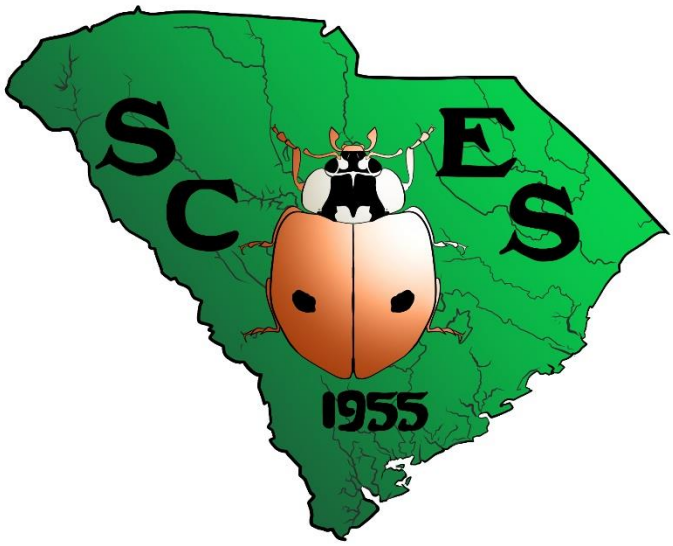
The 67th Annual (Virtual) Meeting of the

SOUTH CAROLINA ENTOMOLOGICAL SOCIETY



[Brief note on *Adalia bipunctata* (L) the two-spotted lady beetle. During 1975 Vernon Kirk proposed that *A. bipunctata* be incorporated into the society logo because it was a beneficial species that was common throughout South Carolina. Today, the species appears to be extirpated from South Carolina. An informal search revealed no records after 1980. – MLF]

8 October 2021

www.scentsoc.org

SOUTH CAROLINA ENTOMOLOGICAL SOCIETY

Executive Director. David Jenkins, South Carolina Forestry Commission, 5500 Broad River Rd., Columbia, SC, 29212; 803-896-8838; djenkins@scfc.gov

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Historian. Gerry Carner, Plant and Environmental Sciences, 318 Long Hall, Clemson University, Clemson, SC, 29634-0310; gcarner@clemson.edu

COMMITTEE CHAIRS

Auditing. Merle Shepard, Coastal REC, Clemson University, 2700 Savannah Hwy, Charleston, SC, 29414; mshprd@clemson.edu

Honors and Awards. Eric Benson, Plant and Environmental Sciences, 266 P&AS Building, Clemson, SC 29634-0310; ebenson@clemson.edu

Local Arrangements. *NA*

Membership. David Jenkins, SC Forestry Commission, 5500 Broad River Road, Columbia, SC, 29212; djenkins@scfc.gov

Nominations. Jess Hartshorn, Forestry and Environmental Conservation, 272F Lehotsky, Clemson University, Clemson, SC 29634; jhartsh@clemson.edu

Program. Michael L. Ferro, Clemson University Arthropod Museum, 309 Long Hall, Clemson University, Clemson, SC, 29634-0310; spongymesophyll@gmail.com

Publicity.

Resolutions. Cynthia Tant, Biology Department, Winthrop University, Rock Hill, SC, 29733; cjtant@gmail.com

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1956 James H. Cochran
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1963 William Carl Nettles
1964 Wendell Tiller
1965 Vernon M. Kirk
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1967 Julian E. Keil
1968 Charles S. Creighton
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1994 B. Merle Shepard
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1996 Michael J. Sullivan
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2001 Paula Levin Mitchell
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2007 Eric P. Benson
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2011 Bob Bellinger
2012 Brian Scholtens
2013 Pat Zungoli
2014 Laurie Reid
2015 Dwight Williams
2016 Rizana Mahroof
2017 David Jenkins
2018 Livy Williams
2019 Alvin M. Simmons
2020 Jess Hartshorn
2021 Michael L. Ferro

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1999 Peter H. Adler
2002 James A. Reinart and Alfred G. Wheeler
2005 John C. Morse
2008 B. Merle Shepard
2011 Sam Turnipseed
2014 Gerry Carner
2017 D. Michael Jackson
2020 Paula Levin Mitchell

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1972 Keith Griffin
1973 Roy Sutton
1974 Frank Davis
1975 Frank Davis
1976 Wayne Gardner
1977 Gayle Holman
1978 Jay Chapin
1979 Ed Quattlebaum
1980 Glenn Lee
1981 N/A
1982 Robert Kelly
1983 Jerome Grant
1984 Steven Hamilton
1985 N/A
1986 Eric Benson
1987 Mike Chambers
1988 Kevin Hoffman
1989 Charles Watson
1990 Marianne Willey
1991 Stuart Reitz
1992 N/A
1993 Michael Floyd
1994 N/A
1995 Jeffery Tomberlin
1996 Jennifer Zettle
1997 Kristen van den Meiracker
1998 Mohammed Kahn
1999 Will Reeves
2000 Michelle Colacicco
2001 J. Powell Smith
2002 Janet Kintz-Early
2003 Ozlem Kalkar
2004 Eric Paysen
2005 Donald Oswalt
2006 Mark Nelder
2007 Ian Stocks
2008 Dustin Swanson
2009 Holly Tuten
2010 Kevin R. Hinson
2011 Margie Lehnert
2012 Nicholas Seiter
2013 Ernesto Robayo-Camacho
2014 Hamilton Allen
2015 Francesca Stubbins
2016 N/A
2017 Thomas Bilbo
2018 N/A
2019 N/A
2020 Jenna Crowder

FRIDAY, 8 OCTOBER 2021

8:00–8:30 SCES Executive Committee Meeting
[Committee Reports, New Business]

8:30–9:30 Welcome, Business Meeting,
Minutes: http://www.scentsoc.org/society-history.html
Elections: Vote here https://forms.gle/RhQ7AttCS6RYePuJ8

9:30–10:15 **Keynote Speaker**
Dr. Meredith Blackwell – **Alga, Worm, Fungus? A Mysterious Group of Insect Biotrophs.** Department of Biological Sciences, University of South Carolina, Columbia, SC 29208 USA. mblackwell@lsu.edu

10:30–11:00 **2020 Cochran Excellence in Entomology Award Acceptance Speech**

Dr. Paula Levin Mitchell **– From Herpetologist to Heteropterist (a.k.a. Lizard Vomit to Bug Spit).** Department of Biology, Winthrop University, Rock Hill, SC 29733. leptoglossus@yahoo.com

In the tradition of Cochran Award recipients, I summarize my research trajectory, acknowledge the mentors who provided support along the way, and present highlights of my research on true bug feeding and reproductive behavior, including the role of sexually dimorphic incrassate femora in coreid territorial defense and the development of electrical penetration graph techniques for studying feeding of phytophagous heteropterans.

11:00–11:10

Break!

POSTER SESSION

Posters available at: www.scentsoc.org/annual-meeting

NON-STUDENT

11:10–11:20 **Using Collaborative Jigsaw Strategy to Deliver Content and Concepts.** Suellen F. Pometto. Department of Plant and Environmental Sciences, Clemson University, Clemson, SC 29634-0310. spomett@clemson.edu

With 32 orders and over 1,000,000 species, the class Hexapoda is a very big subject! Teaching entomology demands that instructors whittle it down to manageable size. One strategy is to divide and conquer! A modified Jigsaw strategy maximizes content delivery while emphasizing concepts. Topics with numerous variations on a theme lend themselves to this strategy. I have used modified Jigsaw to teach arthropod-borne diseases, and global insect biodiversity. In this collaborative, student-active, constructivist strategy, each small group researches one topic and creates a summary artifact. They become the "experts," and they teach that topic to the rest of the class. Many examples are covered and students get practice with concepts, leading to mastery of lesson outcomes. Assessment questions allow students to answer using the topics with which they are most familiar, or by asking students to apply a concept to a new, provided example.

11:20–11:30 **Impact of Multiple Exposure of Sub-lethal Deltamethrin Treatments on Resistant Bed Bug Fecundity (*Cimex lectularius*) (Hemiptera: Cimicidae).** Jinbo Song, Eric P. Benson, and Brittany R. Ellis. Department of Plant and Environmental Sciences, Clemson University, Clemson, SC 29634-0310. sjinbo@g.clemson.edu

A variety of insecticides have been evaluated for bed bug control. Pyrethroid insecticides have commonly been used to control bed bug populations; however, some field strains of bed bugs have varying levels of resistance to pyrethroids including deltamethrin. Single exposure of sub-lethal levels of pyrethroid insecticides in previous studies have been shown to affect reproduction, fecundity, development time, and hatch rate of female bed bugs. The purpose of this study was to evaluate sub-lethal dose effect of multiple exposures to deltamethrin on the fecundity of resistant *C. lectularius*.

POSTER SESSION

STUDENT

11:30–11:40 ***Brachyponera chinensis* (Hymenoptera: Formicidae) Threatens Great Smoky Mountains National Park Ant Assemblages.** Andrew S. Kanes, Daniel A. Malagon, Simon Dunn, and Sharon Bewick. Department of Biological Sciences, Clemson University, Clemson, SC 29634. akanes@clemson.edu

The Asian Needle Ant, *Brachyponera chinensis* (Hymenoptera: Formicidae), is an invasive species from Japan, first introduced to the United States during 1932. It has spread throughout the southeastern US, generally at low elevations, and was recently observed in the foothills of Great Smoky Mountains National Park (GSMNP). The potential for *B. chinensis* to spread further into GSMNP is concerning due to its ability to decrease native ant diversity and disrupt ant-plant seed dispersal mutualisms. Disturbance, such as the 2016 GSMNP wildfires, may facilitate the dispersal of *B. chinensis*. To investigate the effects of disturbance on *B. chinensis* invasion, we sampled ants at various sites within GSMNP. Presence data from this sampling were combined with data from native and invasive ranges of *B. chinensis* to produce a MaxEnt Species Distribution Model. The model suggests high habitat suitability for *B. chinensis* across the Southeastern US, including high elevations in GSMNP. Populations have currently only been found at disturbed sites within the park and it is possible that these sites are serving as pathways into GSMNP.

11:40–11:50 **Characterization of Larval Lepidopteran Gut Stem Cell Markers.** Zilan Li[1], and Matt Turnbull[1,2]. [1]Department of Plant and Environmental Science. [2]Department of Biological Sciences, Clemson University, Clemson, SC 29634. zilanl@clemson.edu

The larval lepidopteran midgut is a complex system that shows significant structure-function relationships related to its roles in digestive and absorptive processes. Understanding the physiology of the midgut, including the stem cells which are responsible for its growth, development, and regeneration, may improve the sustainability of midgut-targeted control like crytoxins. Historically, midgut stem cells have been distinguished from mature cells by morphology, but this is unreliable due to significant morphological variation in both mature and stem populations, including during the differentiation processes of the latter. Thus, we are examining vital markers to distinguish larval lepidopteran midgut stem and mature cell types, as well as differentiation states of stem cells, such as esterase activity (Calcein AM), mitochondrial density (Mitotracker), and mitochondrial membrane potential (TMRM). Preliminary data showed that gut stem cells had lower mitochondrial mass and lower mitochondrial membrane potential. We are also characterizing the lepidopteran homolog of escargot (esg), an intestinal stem cell marker in the fly *Drosophila melanogaster*. A partial clone of esg has been isolated, and its expression pattern will be tested. Our results will be useful to characterize and modify physiological responses of lepidopteran gut cells to stimuli and stresses, and to better understand conservation and divergence of developmental processes.

11:50–12:00 **Thrips Lures and Species Diversity.** Dawn Sikora, and J. C. Chong. Department of Plant and Environmental Sciences, Pee Dee Research and Education Center, 2200 Pocket Road, Florence, SC 29506. Dsikora@g.clemson.edu

Thrips (Thysanoptera) are important agricultural pests. They are polyphagous and can be extremely destructive and difficult to manage. The use of lures combined with a trap crop may help to control and intercept populations of western flower thrips (WFT) (*Frankliniella occidentalis*) (Thysanoptera: Thripidae). Colored pan traps and flower samples provided a population snapshot of species attracted to the lures and trap crops. The lures mostly attracted WFTs, while the colored pan traps attracted a wide diversity of thrips species during the collection years.

PAPER PRESENTATION

STUDENT

12:00–12:15 **Effect of Bermudagrass Height on Mite Damage and Populations.** Matthew Brown. Department of Plant and Environmental Sciences, Pee Dee Research and Education Center, 2200 Pocket Road, Florence, SC 29506. msb5@clemson.edu

Bermudagrass mite (*Aceria cynodoniensis*) (Trombidiformes: Eriophyidae) is a challenging pest to manage in bermudagrass (*Cynodon dactylon*) (Poales: Poaceae) turf. Bermudagrass mite infestations cause distorted grass growth, reduced stolon and root development, and eventually kill the turf. Outbreaks are commonly managed with miticides. Identifying environmental factors and cultural practices that promote bermudagrass mite infestations can improve the development of an integrated management control program. For example, bermudagrass mite infestations are rare on grass that is mowed short, such as on golf course greens. The objective of this research was to determine the effect of mowing height on bermudagrass mite damage and populations. We mowed mite-infested bermudagrass pots at four heights (0.5, 1, 1.5, or 2 inches), counted the number of mite-infested shoots biweekly, and collected shoots for counting mite populations monthly. No consistent relationship between mowing height and mite damage or populations was found. This project provides important information for turf managers when making decisions about mowing heights on turf that is infested by bermudagrass mites.

12:15–12:30 **Molecular Phylogenetics and Taxonomy of the Wonderful Anilline Fauna of South Carolina (Coleoptera: Carabidae: Trechinae: Anillini).** Curt Harden, and Michael Caterino. Department of Plant and Environmental Science, Clemson University, Clemson, SC 29634-0310. c_har@fastmail.com

Anillines (Coleoptera: Carabidae: Trechinae: Anillini) are small, pale, eyeless carabid beetles that dwell deep within leaf litter and mineral soil layers. Current published literature reports seven species in two genera from South Carolina. Intensive collecting over the past five years has revealed that two previously reported species records are in error, three additional described species occur in the state, and there are at least 14 undescribed species, 10 of which will be described in an upcoming manuscript. The total of 21 species in two genera makes the anilline fauna of South Carolina the third most diverse by state, after North Carolina and Tennessee. Molecular phylogenetic analyses of four genes from 56 Appalachian anilline species places the SC fauna in eight clades. An overview of the morphology, natural history, diversity, and distribution is presented, with an emphasis on the unique aspects of South Carolina's rich anilline fauna.

Lunch!

(On your own. Eat healthy. Not too much salt. Have a piece of fruit.)
12:30–1:30

PAPER PRESENTATION

NON-STUDENT

1:30–1:45 **Whitefly Endosymbionts: How the Maternally Inherited Bacteria of a Phytophagous Insect can Affect its Success as an Agricultural Pest.** Sharon A. Andreason, and Alvin M. Simmons. USDA-ARS U.S. Vegetable Laboratory, 2700 Savannah Hwy, Charleston, SC 29414. Sharon.andreason@usda.gov

The global agricultural pest *Bemisia tabaci* (the sweetpotato whitefly; Hemiptera: Aleyrodidae) harbors diverse and dynamic compositions of maternally inherited symbiotic bacteria within its cryptic species complex. Among the many effects these bacteria have on their hosts, whitefly endosymbionts play roles in the success of the pest on different host plants, attack of the pest by parasitoids, and virus transmission by the insect vector. Sweetpotato whiteflies collected in South Carolina harbor at least three of these endosymbiotic bacteria. Studies to elucidate complex whitefly-endosymbiont-virus-plant interactions are underway.

1:45–2:00 **Resistance of Acylsugar-producing Tomato Lines Against Sweetpotato Whitefly and Twospotted Spider Mite.** Gunbharpur Gill[1], Juang Chong[2], Martha Mutschler-Chu[3], and Jason Schmidt[4]. [1]Iron Ox, Inc., 955 Terminal Way, San Carlos, CA 94070. [2]Clemson University, Pee Dee Research and Education Center, 2200 Pocket Road, Florence, SC 29506. [3]Cornell University, School of Integrative Plant Science, Plant Breeding and Genetic Section, 257 Emerson, Ithaca, NY 14853. [4]Department of Entomology, University of Georgia – Tifton Campus, 1100 Research Way, Tifton, GA 31793. juanghc@clemson.edu

2:00–2:15 **Whitefly Research Within USDA-ARS.** Alvin M. Simmons, Elizabeth Davidson-Lowe, and Sharon A. Andreason. USDA-ARS U.S. Vegetable Laboratory, 2700 Savannah Hwy, Charleston, SC 29414. alvin.simmons@usda.gov

2:15–2:30 **New Moth Records from South Carolina (Lepidoptera).** Brian Scholtens. Department of Biology, College of Charleston, Charleston, SC 29424. ScholtensB@cofc.edu

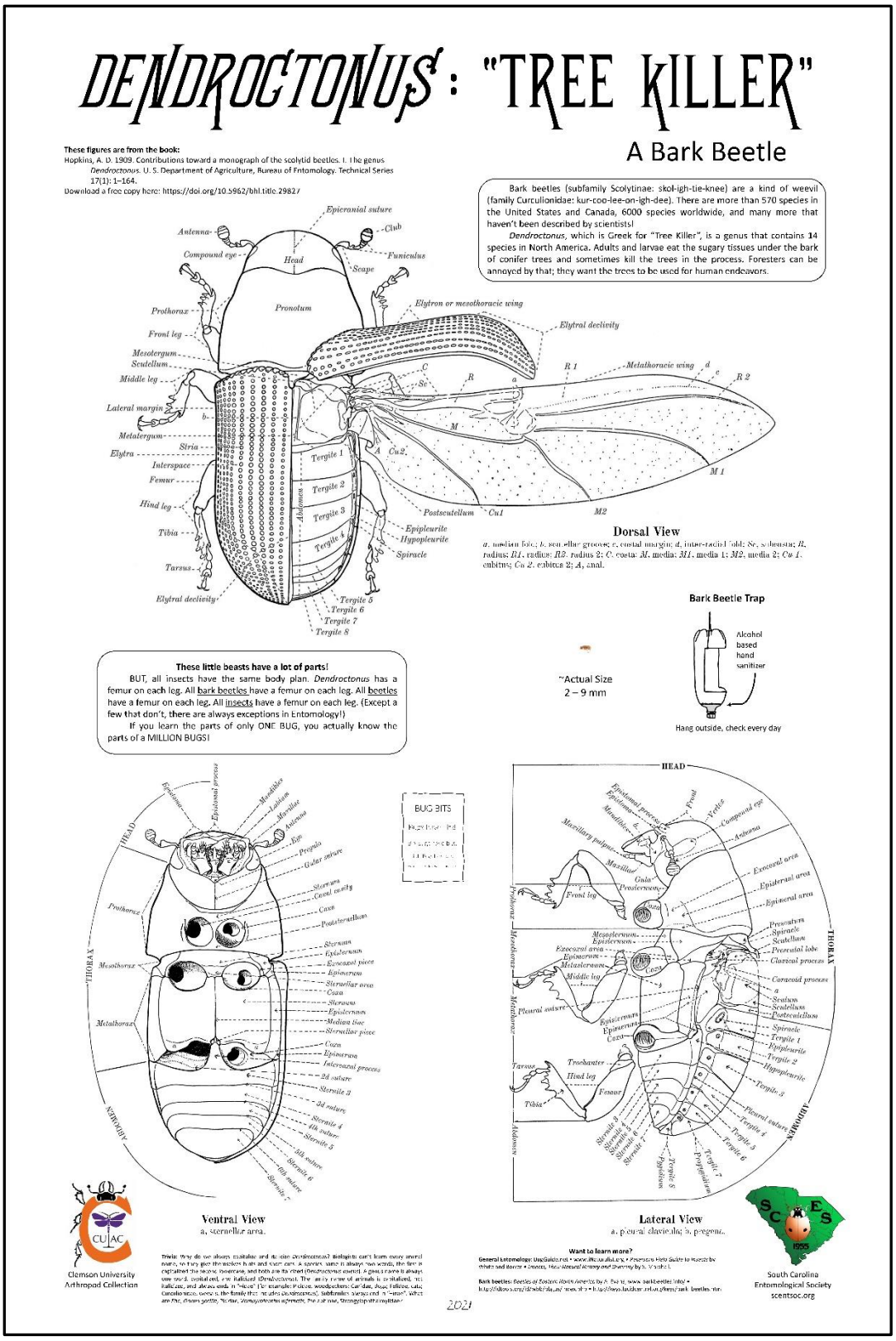
As a result of recent intensive sampling on Spring Island (Beaufort County, South Carolina) and many recent dissections of Gelechiidae (Lepidoptera), I report 61 new species records for the state. Fifty-six of these are Microlepidoptera, many that required dissection for identification. These new records add significantly to our knowledge of the Lepidoptera in the state and emphasize the need for more work on small moths (and certainly small insects in general).

2:30–2:45 **Plant-Herbivore Communication: Chemical Signaling in Agroecology.** Elizabeth Davidson-Lowe, Jared G. Ali, and Alvin Simmons. USDA-ARS U.S. Vegetable Laboratory, 2700 Savannah Hwy, Charleston, SC 29414. elizabeth.davidson-lowe@usda.gov

Chemical signaling plays a critical role in plant-herbivore interactions. Plants produce chemical compounds, such as secondary metabolites and plant volatiles, that herbivores can use to identify and select appropriate host-plants. Understanding the links between plant chemistry and herbivore responses can generate improved pest management practices. However, plants frequently interact with multiple organisms, both beneficial and detrimental, that can further alter plant chemistry and the outcomes of plant-herbivore relationships. In this study, we investigated how arbuscular mycorrhizal fungi, a beneficial soil microbe, can be managed by cover crops to facilitate resistance to herbivores in maize. Maize defense chemistry differed when it was grown after mycorrhizal and non-mycorrhizal cover crops. These changes subsequently affected fall armyworm (*Spodoptera frugiperda*) performance and behavior. Manipulating plant chemical ecology can have a major impact on agriculture. Future research will focus on disentangling the complex relationships between plants, herbivores, and other organisms, within agroecosystems to better predict herbivore responses and improve crop protection.

2:45–3:00 **Awards Ceremony!**
Poster
Graduate oral presentation

3:00–4:00 Adjourn and board meeting with new officers and committees



SCES educational poster for 2021 (distribution delayed until 2022).
What about next year?