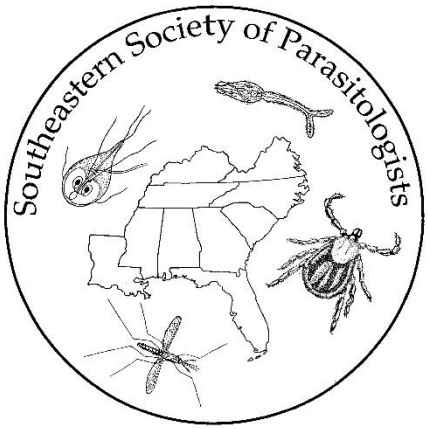
SOUTHEASTERN SOCIETY OF PARASITOLOGISTS

(Affiliate of The American Society of Parasitologists)

PROGRAM & ABSTRACTS*



April 6-8, 2017

Hosted by:

University of Georgia Center for Tropical and Emerging Global Diseases
University of South Carolina-Upstate
University of South Carolina Baruch Marine Field Laboratory

Georgetown, SC

* Meeting dedicated to Dr. Linda Pote.

Dr. Linda Pote, at the far right, in character, with her lab group in 2009.

Dr. Linda Pote (1953-2016). Linda was a parasitologist, mentor, colleague and friend to many of us. Born in Lovettsville, VA, she received her B.S. in journalism from the University of Central Arkansas. After spending two years in Belize with the Peace Corps, she went on to complete a M.S. in Animal Nutrition at Oregon State University, and then a Ph.D. in Parasitology from the University of Arkansas. She arrived at Mississippi State University College of Veterinary Medicine as a post-doctoral scientist in 1985, was hired there as an instructor, and ultimately worked her way up the ranks. She was promoted to full professor in 2000 in the Department of Basic Sciences, where she also served as interim head from 2004-2007. She retired from MSU in 2015. Linda was a parasitologist in all respects, working with protozoa and helminths in wildlife and domestic species, as well as production animals, especially catfish. She tested the efficacy of parasiticides and even dabbled with ectoparasites. Her extensive publication and funding record pale in comparison to her level of passion and curiosity for parasitology, as well as science in general. Linda had a raw sense of humor and an opinion for everything. She mentored because she truly believed in you, and if she didn't agree with you, she wouldn't hide it. She taught because she genuinely wanted students to understand how interesting parasites were – and they learned and craved more. If you were too timid to speak out, she would effectively convince you that your voice mattered – against any odds. Her involvement in SSP was enduring and unwavering. Linda especially saw the importance of SSP in supporting budding parasitology students. She inspired many to become parasitologists and others to be better parasitologists. Her presence was strong and is greatly missed.

Things to do:

Georgetown is the 3rd oldest town in South Carolina, but it is a small town with limited activities. Myrtle Beach, only a few kilometers north, provides many opportunities for visitors to enjoy the South Carolina coast (see http://www.mbchamber.com).

Baruch Discovery Center: Provides an extended tour ("Behind the Scenes" from 1:30 – 4:30 on Thursday). See: http://hobcawbarony.org/visit/.

Register on your own. Note that reservations should be made ASAP due to the public school holiday that coincides with the SSP meeting.

Brookgreen Gardens: Provides numerous tour options.
See: http://www.brookgreen.org/visit.html.

Weather:

The weather is April is typically mild with averages highs of 75 and lows of 48 F. The long range forecast for April 6-8 2017 is around this average (highs 73-77 and lows 53-56 F).

Emergency Contact Information: Telephone (813) 394-6193

Directions:

From Charleston International Airport:

Coming out of the Airport you will be going EAST on INTERNATIONAL BLVD toward AIR CARGO LN (2.0 miles). Merge onto I-526 E via the ramp on the LEFT toward MT PLEASANT / I-26 (11.3 miles). Take the LONG POINT ROAD exit- EXIT 28 (0.2 miles). Turn LEFT onto LONG POINT RD (3.1 miles). Turn LEFT onto N US-17 / US-17 N / US-701 N. Continue to follow US-17 N / US-701 N to Georgetown (50.2 miles). Once in Georgetown, you will pass over the Sampitt River and go through four traffic lights. STAY IN THE RIGHTHAND LANE AND FOLLOW SIGNS TO THE BEACHES -- 17 NORTH WILL VEER TO THE RIGHT. As you leave Georgetown you will cross two rivers. After crossing the second bridge (crosses Waccamaw River and AIWW), watch for the entrance to Hobcaw Barony approximately one mile on the right. The Baruch Marine Field Laboratory is located on Hobcaw Barony.

From Myrtle Beach, SC:

Follow Highway 17 South (Bypass 17 is recommended). About eight miles south of the traffic light in Pawley's Island, begin looking for DeBordieu Colony on the left. After passing the DeBordieu turnoff you will find the Baruch Marine Field Laboratory (located on Hobcaw Barony) turn off approximately 0.3 mile on the left. Look for the "Hobcaw Barony" sign.

From Savannah, GA:

Take I-95 N into South Carolina (36.9 miles from Savannah, GA.). Merge onto US-17 N via EXIT 33 toward CHARLESTON / BEAUFORT (61.7 miles). Turn SLIGHT LEFT onto US-17 N / CROSSTOWN. Continue to follow US-17 N (1.2 miles). Merge onto US-17 N via EXIT 220B toward MT PLEASANT / GEORGETOWN (59.2 miles). Once in Georgetown, you will pass over the Sampitt River and go through four traffic lights. STAY IN THE RIGHT-HAND LANE AND FOLLOW SIGNS TO THE BEACHES -- 17 NORTH WILL VEER TO THE RIGHT. As you leave

Georgetown you will cross two rivers. After crossing the second bridge (crosses Waccamaw River and AIWW), watch for the entrance to Hobcaw Barony approximately one mile on the right. The Baruch Marine Field Laboratory is located on Hobcaw Barony.

From Charlotte, NC:

Take I-77 S toward COLUMBIA (Crossing into SOUTH CAROLINA -100 miles). Merge onto I-26 E via the exit on the LEFT toward CHARLESTON (96.9 miles). Take the I-526 exit- EXIT 212B-C- toward SAVANNAH / MT PLEASANT. Merge onto I-526 E via EXIT 212C on the LEFT toward MT PLEASANT (12.2 miles). Take the US-17 N exit- EXIT 29- toward GEORGETOWN (0.7 miles). Turn LEFT onto N US-17 / US-17 N / US-701 N. Continue to follow US-17 N / US-701 N (52.6 miles). Once in Georgetown, you will pass over the Sampitt River and go through four traffic lights. STAY IN THE RIGHT-HAND LANE AND FOLLOW SIGNS TO THE BEACHES -- 17 NORTH WILL VEER TO THE RIGHT. As you leave Georgetown you will cross two rivers. After crossing the second bridge (crosses Waccamaw River and AIWW), watch for the entrance to Hobcaw Barony approximately one mile on the right. The Baruch Marine Field Laboratory is located on Hobcaw Barony.

From Asheville, NC:

Take I-26 E (yes – it goes south!) toward HENDERSONVILLE / SPARTANBURG. Cross into SOUTH CAROLINA and continue towards Columbia and then Charleston (212 miles). Take the I-526 exit- EXIT 212B-C- toward SAVANNAH / MT PLEASANT. Merge onto I-526 E via EXIT 212C on the LEFT toward MT PLEASANT (12.2 miles). Take the US-17 N exit- EXIT 29- toward GEORGETOWN (0.7 miles). Turn LEFT onto N US-17 / US-17 N / US-701 N. Continue to follow US-17 N / US-701 N (52.6 miles). Once in Georgetown, you will pass over the Sampitt River and go through four traffic lights. STAY IN THE RIGHT-HAND LANE AND FOLLOW SIGNS TO THE BEACHES -- 17 NORTH WILL VEER TO THE RIGHT. As you leave Georgetown you will cross two rivers. After crossing the second bridge (crosses Waccamaw River and AIWW), watch for the entrance to Hobcaw Barony approximately one mile on the right. The Baruch Marine Field Laboratory is located on Hobcaw Barony.

From Atlanta, GA:

Take I-20 E toward AUGUSTA (Crossing into SOUTH CAROLINA - 204.7 miles). Merge onto US-378 E / SUNSET BLVD via EXIT 61 toward WEST COLUMBIA (2.4 miles). Merge onto I-26 E via the exit on the LEFT. (102.6 miles). Take the I-526 exit- EXIT 212B-C- toward SAVANNAH / MT PLEASANT (193 miles). Merge onto I-526 E via EXIT 212C on the LEFT toward MT PLEASANT (12.2 miles). Take the US-17 N exit- EXIT 29- toward GEORGETOWN (0.7 miles). Turn LEFT onto N US-17 / US-17 N / US-701 N. Continue to follow US-17 N / US-701 N (52.6 miles). Once in Georgetown, you will pass over the Sampitt River and go through four traffic lights. STAY IN THE RIGHT-HAND LANE AND FOLLOW SIGNS TO THE BEACHES -- 17 NORTH WILL VEER TO THE RIGHT. As you leave Georgetown you will cross two rivers. After crossing the second bridge (crosses Waccamaw River and AIWW), watch for the entrance to Hobcaw Barony approximately one mile on the right. The Baruch Marine Field Laboratory is located on Hobcaw Barony.

SOUTHEASTERN SOCIETY OF PARASITOLOGISTS

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Southeastern Society of Parasitologists

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2013 Frank W. Soveg
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1978 Kenneth S. Saladin
1979 Dean S. Cunningham
1980 Gregory F. Mathis
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1993 Rebecca A. Cole & Chrystal L. Mars
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1995 Julia S. Jackson
1996 Vina R. Diderrich
1997 Derek A. Zelmer
1998 Chris A. Hall
1999 Kelly Still
2000 Michael Barger & Allison K. Witherow
2001 Megan R. Collins
2002 Deborah M. Lai
2003 Alyssa Kunz
2004 Michael J. Yabsley
2005 Francisco Palomeque
2006 Tiffany G. Baker
2007 Andrew McElwain
2008 Heather Stockdale
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2010 Rick Gerhold
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2012 Elizabeth Gleim
2013 Alice E. Houk
2014 Adonis McQueen & Brigette Brinton
2015 Skylar Hopkins
2016 Raphael Orelis-Ribeiro

2017 Meeting
Southeastern Society of Parasitologists
April 6-8, 2017

PROGRAM SUMMARY

All activities, except where noted, occur in KIMBEL LODGE.

Thursday, April 6

Check-in/Late Registration	4:00 p.m. – 7:00 p.m.
SSP Executive Committee (Chacon's, Georgetown)	4:00 p.m. – 5:30 p.m.
SSP Welcome Reception	7:00 p.m. – 9:30 p.m.

Friday, April 7

Breakfast	7:00 a.m. – 8:00 a.m.
Paper Session I	8:00 a.m. – 10:15 a.m.
Break	10:15 a.m. – 10:30 a.m.
Paper Session II	10:30 a.m. – 12:30 p.m.
Lunch	12:30 p.m. – 1:30 p.m.
Paper Session III	1:30 p.m. – 3:45 p.m.
Break	3:45 p.m. – 4:00 p.m.
Presidential Symposium	4:00 p.m. – 5:30 p.m.
Dinner	6:30 p.m. – 8:00 p.m.

Saturday, April 8

Breakfast	7:15 a.m. – 8:15 a.m.
Paper Session IV	8:30 a.m. – 10:00 a.m.
Break	10:00 a.m. – 10:15 a.m.
Paper Session V	10:15 a.m. – 11:15 a.m.
SSP Business Meeting & Lunch	11:30 a.m. – 1:00 p.m.

SSP WELCOME RECEPTION

Thursday, April 6 **7:00 p.m. – 9:30 p.m.**
Location: Kimbel Lodge

7:00 **DENNIS KYLE**, Center for Tropical and Emerging Diseases, University of Georgia, Athens, GA. Welcome remarks and orientation.

7:10 **REGINALD BLAYLOCK**, Division of Coastal Sciences, University of Southern Mississippi, Ocean Springs, MS. Meeting announcements.

Information for speakers: Please upload your presentation files in ADVANCE of the session. There is time at REGISTRATION, in the EVENINGS, MORNINGS, and during BREAKS.

PAPER SESSION I

Friday, April 7 **8:00 a.m. – 10:15 a.m.**
Location: Kimbel Lodge
Moderators: Jackson Roberts and Kayla Garrett
* Presenting Author
† Ciordia-Stewart-Porter Undergraduate Paper Competitor
‡ Byrd-Dunn Graduate Student Paper Competitor

7:00 – 8:00 Breakfast

7:00 Load presentation files

8:00 1† **HORNING, MEGAN*, ZAHAVA C. WILSTEIN, AND HENRY WINSOR**. Department of Biology, Berry College, Rome GA. **The spread of *Toxoplasma gondii* in feral and semi-feral cats: a mathematical model.**

8:15 2† **CHERON, SAMANTHA[1,2]*, DEVIN LEVY[1], ALBERT E. RUSSELL[2], ROBERTA M. TROY[1], AND DANIEL A. ABUGRI[1, 2,3].** [1]Department of Biology, [2]Department of Chemistry, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, College of Arts and Sciences, Tuskegee University, Tuskegee AL. ***In Vitro* Activity of Propyl gallate, Tannic Acid and Hydroquinone alone and in Combination against *Toxoplasma gondii*.**

8:30 3† **HAYWOOD, CARLY*, AND AGUSTIN JIMENEZ.** Department of Zoology, Southern Illinois University, Carbondale IL. **Evolutionary relationships of members of Vianaiidae.**

8:45 4† **WOODSON, ANDERSON*, NISHI JINDAL, MIRANDA DAUGHTRY, KIMBERLY WORLEY, JASMINE WILLIAMS, CAROLINA PEREZ-HEYDRICH, AND MARIA PICKERING-VILLA.** Department of Biological Sciences, Meredith College, Raleigh NC. **Environmental surveillance of zoonotic pathogens.**

9:00 5† **FARROW, ABIGAIL F.*, AND GABRIEL J. LANGFORD.** Department of Biology, Florida Southern College, Lakeland FL. **Aspects of the lifecycle of *Apharyngostrigea pipientis* (Trematoda: Strigeidae) from a central Florida wetland.**

9:15 6† **SHOUP, MARY V. *, AND CHRISTOPHER A. HALL.** Department of Biology, Center for One Health, Berry College, Mt. Berry GA. ***In vitro T. cruzi* inhibition by naphthalene-based compounds confirms i*n silico* modeling predictions.**

9:30 7† **SMITH, CATHERINE L.[1]*, KATIE J. GRAHAM[1], JOHN V. STOKES[1], CARLA HUSTON[2], AND ANDREA S. VARELA-STOKES[1].** [1]Department of Basic Sciences, College of Veterinary Medicine, Mississippi State University, Mississippi State, MS. [2]Department of Pathobiology and Population Medicine, College of Veterinary Medicine, Mississippi State University, Mississippi State MS. **Detection of Panola Mountain *Ehrlichia* in ticks and exposure to *Ehrlichia* spp. in Mississippi cattle.**

9:45 8† **SWANEPOEL, LIANDRIE[1]*, CHRISTOPHER A. CLEVELAND[1,2], COLLEEN OLFENBUTTEL[3], CASEY A. GRAY[4], DALTON BROWN[5], AND MICHAEL J. YABSLEY[1,2].** [1]Southeastern Cooperative Wildlife Disease Study, University of Georgia (UGA), Athens GA. [2]Warnell School of Forestry and Natural Resources (UGA). [3]NC Wildlife Resources Commission, Pittsboro NC. [4]NC Wildlife Resources Commission, Durham NC. [5]USDA APHIS Wildlife Services, Columbia SC. **Prevalence and genetic characterization of *Dirofilaria lutrae* from North American river otters (*Lutra canadensis*) from the Southeastern United States.**

10:00 9† **SOAFER, KELLIE E.[1]*, WILLIAM NICHOLSON[2], AND CHRISTOPHER A. HALL[1].** [1]Department of Biology, Berry College One Health Center, Mt. Berry GA. [2]National Center for Emerging Zoonotic Infectious Diseases, Center of Disease Control, Atlanta GA. **Prevalence of *Trypanosoma cruzi* in rodent populations on Berry College campus.**

10:15 Break

PAPER SESSION II

Friday, April 7 **10:30 a.m. – 12:30 p.m.**

Location: Kimbel Lodge
Moderators: Carlos Ruiz and Elliot Zieman
* Presenting Author
† Ciordia-Stewart-Porter Undergraduate Paper Competitor
‡ Byrd-Dunn Graduate Student Paper Competitor

10:30 10† **CRAWFORD, JENNIFER*, AND GABRIEL J. LANGFORD.** Department of Biology, Florida Southern College, Lakeland FL. **Impacts of the oligochaete *Allodero hylae* on its tree frog host: Is this a parasitic relationship?**

10:45 11† **RODGERS, ASHLEY[2]*, ALBERT E. RUSSELL[1], ROBERTA M. TROY[2], AND DANIEL A. ABUGRI[1,2, 3].** [1]Department of Chemistry, [2]Department of Biology, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, Tuskegee University, Tuskegee AL. ***In Vitro* Activity of Herbal Teas alone and in Combination with Anti-Toxoplasmosis Drugs.**

11:00 12‡ **GARRETT, KAYLA B.[1,2]*, RENEE SCHOTT[3], LEA PESHOCK[4], AND MICHAEL J. YABSLEY[1,2].** [1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. [2]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, University of Georgia, Athens GA. [3]Wildlife Rehabilitation Center of Minnesota,

Roseville, MN. [4]Greenwood Wildlife Rehabilitation Center, Longmont CO. **Multiple *Babesia* infections in young raccoons and splenomegaly associated with *Babesia sensu stricto* infections.**

11:15 13‡ **ROBERTS, JACKSON R.[1*], COVA R. ARIAS[2], BRIAN FOLT[3], JEFFREY M. GOESSLING[3], AND STEPHEN A. BULLARD[1].** [1]Aquatic Parasitology Laboratory, School of Fisheries, Aquaculture, and Aquatic Sciences, College of Agriculture, Auburn University, Auburn AL. [2]Aquatic Microbiology Laboratory, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University, Auburn, AL. [3]Department of Biological Sciences, Auburn University, Auburn AL. **Turtle blood flukes (Digenea: Schistosomatoidea: *Hapalorhynchus* spp.) infecting Southeastern musk turtles (Testudines: Kinosternidae).**

11:30 14‡ **PANYI, APRYLE J.[1]*, STEPHEN S. CURRAN[1], ROBIN M. OVERSTREET[1], CAROL CARSON[2], AND ROBERT PRESCOTT[3].** [1]University of Southern Mississippi, Division of Coastal Sciences, Ocean Springs MS. [2]New England Coastal Wildlife Alliance, North Carver MA. [3]Sanctuary Director, Mass Audubon/Wellfleet Bay Wildlife Sanctuary, South Wellfleet MA. **Trematode fauna from opportunistically collected juvenile Kemp's ridley sea turtles (*Lepidochelys kempii*) and loggerhead sea turtles (*Caretta caretta*) from Massachusetts.**

11:45 15‡ **YABSLEY, MICHAEL J.[1,2], AND SARAH G. H. SAPP[1,3]*.** [1]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, University of Georgia, Athens GA. [2]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. [3]Department of Infectious Diseases, College of Veterinary Medicine, University of Georgia, Athens GA. **Prevalence of raccoon roundworm (*Baylisascaris procyonis*) eggs in canine fecal exams in the United States, 2013-2016.**

12:00 16‡ **CLEVELAND, CHRISTOPHER A.[1,2]*, MARK L. EBERHARD[3], ALEC T. THOMPSON[4], STEPHEN J. SMITH[1,2], HUBERT ZIRIMWABAGABO[5], ROBERT BRINGOLF[2], AND MICHAEL J. YABSLEY[*,1,2].** [1]Southeastern Cooperative Wildlife Disease Study, University of Georgia, Athens GA. [2] Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. [3]Centers for Disease Control and Prevention, Atlanta GA.[4]University of Oklahoma, Norman OK.[5]The Carter Center, Atlanta GA. **The potential of fish to act as transport hosts for *Dracunculus medinensis* and *D. insignis* larvae.**

12:15 17‡ **MAYS, AMBRIA N.*, VINA FAULKNER, AND CHARLES FAULKNER.** Lincoln Memorial University College of Veterinary Medicine, Harrogate TN. **Prevalence of zoonotic gastrointestinal parasites of shelter dogs and cats in the Cumberland Gap region of Kentucky, Tennessee, and Virginia.**

12:30 – 1:30 Lunch

PAPER SESSION III

Friday, April 7 **1:30 p.m. – 3:45 p.m.**

Location: Kimbel Lodge

Moderators: Christopher Cleveland and Morgan Siebka

* Presenting Author

† Ciordia-Stewart-Porter Undergraduate Paper Competitor

‡ Byrd-Dunn Graduate Student Paper Competitor

1:30 18‡ **ZIEMAN, ELLIOTT A.[1,2]*, CLAYTON K. NIELSEN[2,3], AND F. AGUSTÍN JIMÉNEZ[1].** [1]Department of Zoology, Southern Illinois University Carbondale IL. [2]Cooperative Wildlife Research Laboratory, Southern Illinois University, Carbondale IL. [3]Department of Forestry and Center for Ecology, Southern Illinois University, Carbondale IL. **Chronic *Cytauxzoon felis* infections in wild caught bobcats (*Lynx rufus*).**

1:45 19‡ **CLAXTON, ANDREW T.*, APRYLE PANYI, AND ROBIN OVERSTREET.** Gulf Coast Research Laboratory, University of Southern Mississippi, Ocean Springs MS. **Is the parasite assemblage of Pinfish (*Lagodon rhomboides*) a good host-parasite system to monitor environmental health in the northern Gulf of Mexico?**

2:00 20‡ **HUEBNER, HAILEY*, DAWN SPANGLER, AND CHARLES FAULKNER.** Lincoln Memorial University, College of Veterinary Medicine, Harrogate TN. **Estimation of heartworm prevalence in dogs in the Cumberland Gap region of Tennessee, Kentucky, and Virginia.**

2:15 21‡ **PFAFF, MADELEINE A.[1,2]*, MICHAEL J. YABSLEY[1,2], AND JOSEPH L. CORN[2].** [1]Warnell School of Forestry and Natural Resources, The University of Georgia, Athens GA. [2]Southeastern Cooperative Wildlife Disease Study. **Ticks and tick-borne pathogens in the southeastern United States: proposal and preliminary results.**

2:30 22‡ **WARREN, MICAH, B.[1]*, RYAN P. KOENIGS[2], JACKSON R. ROBERTS[1], COVA R. ARIAS[1], AND STEPHEN A. BULLARD[1].** [1]Southeastern Cooperative Fish Parasite and Disease Laboratory, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University, Auburn AL. [2]Wisconsin Department of Natural Resources, Oshkosh WI. **Morphological and molecular study of North American species of *Acipensericola* (Digenea: Aporocotylidae).**

2:45 23‡ **COLON, BEATRICE L.[1]*, CHRISTOPHER A. RICE[2], ABDELBASSET A. FARAHAT[3], DAVID W. BOYKIN[3], R. KIPLIN GUY[4], AND DENNIS E. KYLE[2].** [1]Morsani College of Medicine, University of South Florida, Tampa FL. [2]College of Public Health, University of South Florida, Tampa FL. [3]Department of Chemistry, Georgia State University, Atlanta GA. [4]St. Jude Children's Research Hospital, Memphis TN. **Discovery and evaluation of new drugs for the treatment of primary amoebic meningoencephalitis.**

3:00 24‡ **NIEDRINGHAUS, KEVIN D.[1]*, JUSTIN BROWN[2], MARK TERNANT[2], SARAH PELTIER[1,3], AND MICHAEL YABSLEY[1,3].** [1]Southeastern Cooperative Wildlife Disease Study, Wildlife Health Building, Department of Population Health, College of Veterinary Medicine, The University of Georgia, Athens GA. [2]Pennsylvania Game Commission, University Park PA. [3]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. **Environmental Survival of *Sarcoptes scabiei* mites from skin samples of black bears (*Ursus americanus*).**

3:15 25‡ **RUIZ, CARLOS F.[1]*, WILLIAM B. DRIGGERS III[2], COVA R. ARIAS[3], AND STEPHEN A. BULLARD[1].** [1]Aquatic Parasitology Laboratory, School of Fisheries, Aquaculture, & Aquatic Sciences, Auburn University, Auburn AL. [2]National Marine Fisheries Service, Southeast Fisheries Science Center, Mississippi Laboratories, Pascagoula/Stennis MS. [3]Aquatic Microbiology Laboratory, School of Fisheries, Aquaculture, & Aquatic Sciences, Auburn University, Auburn AL. ***Neoalbionella* sp. (Copepoda: Siphonostomatoida: Lernaeopodidae) from skin of deepwater gulper sharks, *Centrophorus granulosus* (Squaliformes: Centrophoridae), in the northeastern Gulf of Mexico.**

3:30 26‡ **RICHARDS, JESSIE*, MANASI BALACHANDRAN, RICHARD GERHOLD, AND STEPHEN KANIA.** Comparative and Experimental Medicine, College of Veterinary Medicine, University of Tennessee, Knoxville TN. **Serological diagnosis of *Parelaphostrongylus tenuis* Infection.**

3:45 – 4:00 Break

SSP PRESIDENTIAL SYMPOSIUM

Friday, April 7 **4:00 p.m. – 5:30 p.m.**
Location: Kimbel Lodge
Moderator: Reg Blaylock

4:00 27 **TAL BEN-HORIN.** Department of Fisheries, Animal and Veterinary Science, College of the Environment and Life Science, University of Rhode Island, Kingston RI. **Managing abalone fisheries impacted by withering syndrome.**

4:45 28 **RACHEL BREYTA[1,2,3].** [1]Department of Microbiology, Oregon State University, Corvallis OR. [2]Western Fisheries Research Center, Seattle WA. [3]School of Aquatic and Fisheries Sciences, University of Washington, Seattle WA. **Insights and mysteries: how infectious diseases impact their host populations.**

6:30 – 8:00 Dinner

PAPER SESSION IV

Saturday, April 8 **8:30 a.m. – 10:00 a.m.**
Location: Kimbel Lodge
Moderators: Andrew Claxton and Kaitlin Brittain
* Presenting Author

7:15 a.m. – 8:15 a.m. Breakfast

8:00 Load Presentations

8:30 29 **HEINS, DAVID C.*** Department of Ecology and Evolutionary Biology, Tulane University, New Orleans LA. **Castrators and nutrient thieves: evidence of parasite strategies of iconic diphyllobothriidean cestodes in fish hosts.**

8:45 30 **ABUGRI, DANIEL A.[1,2,3]*, ALBERT E. RUSSELL[1], AND ROBERTA M. TROY[2].** [1]Department of Chemistry, [2]Department of Biology, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, Tuskegee University, Tuskegee AL. **Synergistic interaction of synthetic DA-1Ap, and DA-2p-CA combination with pyrimethamine against *Toxoplasma gondii.***

9:00 31 **JAMISON, MAGGIE[1]*, AARON M. WATSON[1], ISAURE DE BURON[2], PETER R. KINGSLEY-SMITH[1], AND STEPHEN A. ARNOTT [1].** [1] SCDNR Marine Resource Research Institute, Charleston SC. [2] Department of Biology, College of Charleston, Charleston SC. **Detection of an invasive parasite, *Anguillicoloides crassus*, of American eels using qPCR.**

9:15 32 **GLEIM, ELIZABETH R. [1,2,3]*, L. MIKE CONNER[2], GALINA E. ZEMTSOVA[4], MICHAEL L. LEVIN[4], PAMELA WONG[3], AND MICHAEL J. YABSLEY[1].** [1]Southeastern Cooperative Wildlife Disease Study (SCWDS), Warnell School of Forestry & Natural Resources, University of Georgia, Athens GA. [2]Joseph W. Jones Ecological Research Center at Ichauway, Newton GA. [3]Oxford College of Emory University, Oxford GA. [4]Centers for Disease Control and Prevention, Atlanta GA. **Rickettsiales in ticks removed from outdoor workers in southwest Georgia and northwest Florida.**

9:30 33 **ZELMER, DEREK A.[1]*, CARLOS RUIZ[2], AND STEPHEN A. BULLARD[2].** [1]Department of Biology and Geology, University of South Carolina Aiken, Aiken SC. [2]Department of Fisheries, Auburn University, Auburn AL. **Does the use of operational taxonomic units influence the type I error rate for permutational analysis of variance?**

9:45 34 **CARLETON, RENEE' E.*** Berry College, Department of Biology, Mount Berry GA. **Preliminary results: distribution of ectoparasites on resident passerine birds of Bermuda.**

10:00 – 10:15 Break

PAPER SESSION V

Saturday, April 8 **10:15 a.m. – 11:15 a.m.**

Location: Kimbel Lodge

Moderators: Sarah Sapp and Hailey Huebner

* Presenting author

10:15 35 **YABSLEY, MICHAEL J.[1,2]*, CHRISTINE SMITH[3], RICHARD SMITH[3], HEATHER FENTON[2], AND CHRISTOPHER A. CLEVELAND[1,2].** [1]Warnell School of Forestry and Natural Resources, The University of Georgia, Athens GA. [2]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, The University of Georgia,

Athens GA. [3]Smith Veterinary Services, CA. **Verminous dermatitis in a domestic ferret: what's your diagnosis?**

10:30 36 **LEVY, DEVIN[1*], SAMANTHA CHERON[1,2], ROBERTA M. TROY[1], ALBERT E. RUSSELL[2], AND DANIEL A. ABUGRI[1,2,3].** [1]Department of Biology, [2]Department of Chemistry, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, College of Arts and Sciences, Tuskegee University, Tuskegee AL. ***In vitro* interaction of propyl gallate, 8-hydroxyquinoline, and 4-hydroxyquinoline alone and in combination against *Toxoplasma gondii* RH Strain.**

10:45 37 **RICE, CHRISTOPHER A.[1*], BEATRICE L. COLON[1], ABDELBASSET AHMED[3], KAITLIN A. METTEL[2], KATI RÄSÄNEN[2], SANTANA A. L. THOMAS[4], BILL J. BAKER[4], BLAISE A. DARVEAUX[5], CEDRIC PEARCE[5], DAVID BOYKIN[3], AND DENNIS E. KYLE[1].** [1]Center for Tropical and Emerging Global Diseases, University of Georgia, Athens GA. [2]Department of Global Health, College of Public Health, University of South Florida, Tampa FL. [3]Department of Chemistry, Georgia State University, Atlanta GA. [4]Center for Drug Discovery and Innovation, University of South Florida, Tampa FL. [5]Mycosynthetix, Inc., Hillsborough NC. **High-throughput screening methods fuel discovery of new chemical structures active against pathogenic free-living amoeba.**

11:00 38 **GETTINGS, JENNA R.[1*], STELLA C. WATSON[1], YAN LIU[1], DWIGHT D. BOWMAN[2], ROBERT B. LUND[1], SHILA K. NORDONE[3], CHRISTOPHER S. MCMAHAN[1], AND MICHAEL J. YABSLEY[4,5].** [1]Department of Mathematical Sciences, Clemson University, Clemson SC. [2]College of Veterinary, Cornell University, Ithaca NY. [3]Department of Molecular and Biomedical Sciences, Comparative Medicine Institute, North Carolina State University, College of Veterinary Medicine, Raleigh NC. [4]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, University of Georgia, Athens GA. [5]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. **Forecasting canine vector-borne infections in the United States.**

SSP BUSINESS MEETING

Location: Kimbel Lodge
Presiding: Andrea Varela-Stokes

11:30 Business Meeting and Lunch

Thank you for supporting the Southeastern Society of Parasitologists!

Safe Travels!

INVITED SPEAKERS AND THEIR ABSTRACTS

Dr. Tal Ben-Horin is a fellow in the Department of Fisheries, Animal and Veterinary Science at the University of Rhode Island and a postdoctoral research associate at the Rutgers University Haskin Shellfish Research Laboratory. His research explores links between environmental change and disease, the evolution of disease resistance, and the management of disease-impacted fisheries. He received a BS from the University of Vermont and a MESM and PhD from the University of California Santa Barbara. For more information see http://hsrl.rutgers.edu/people/faculty/tbenhorin.htm

Managing abalone fisheries impacted by withering syndrome

Beginning in the 1980s, a new disease called withering syndrome (WS) devastated southern and central California's iconic abalone (*Haliotis* spp.) fisheries. In combination with decades of serial overexploitation, this disease led to the closure of fisheries targeting all five abalone species in southern California by 1996. The closure of southern California abalone fisheries, which stands to this day, was fortuitously met with the development of abalone aquaculture along the California coast, reducing demands for wild-harvested product. However, since the etiological agent of WS occurs naturally in aquaculture effluent, there remains uncertainty regarding the impacts of abalone aquaculture on wild abalone populations. Here I will discuss research to date integrating field surveys, laboratory experiments, and mathematical modeling to investigate the pathology of WS, spread of disease, and effects of fishing and aquaculture on disease-impacted populations. Withering syndrome continues to affect abalone populations throughout southern and central California, but promising signs of recovery in species tolerant to WS have invigorated conversations about the future of abalone fisheries in the region.

Dr. Rachel Breyta is a research scientist with joint appointments in the Microbiology department at Oregon State University in Corvallis OR and the School of Aquatic and Fisheries Sciences at University of Washington in Seattle WA, and an operating affiliation at the US Geological Survey Western Fisheries Research Center in Seattle WA. Her research focuses on the evolutionary mechanisms of pathogens and the ecological drivers of disease events like emergence, with particular focus on how these processes may be impacted by climate change. She earned her PhD in Public Health Virology from the Pathobiology program at the University of Washington.

Insights and mysteries: how infectious diseases impact their host populations

Pathogens are likely to have been ever-present companions to living organisms since their hosts first evolved. In 500 years of recorded human history, examples of a pathogen wiping out every infected host are so rare as to be unnatural. Instead the most virulent and catastrophic infectious diseases have case-fatality rates of 50-90%. Examples of this are common, and include the numerous waves of Black Death (widely believed to have been plague, caused by *Yersinia pestis,* introduced many times from the far east) in medieval western Europe to the recent epidemic of Ebola in western African countries. What are the long term impacts of these catastrophic disease events on the infected host population? What about the more common examples of low mortality infectious diseases- can morbidity leave detectable traces in the evolution of their host? Theory and case studies tell us that these are profoundly complex questions that nevertheless are becoming more tractable with the advance of molecular and genetic tools.

ABSTRACTS

1. **HORNING, MEGAN*, ZAHAVA C. WILSTEIN, AND HENRY WINSOR**. Department of Biology, Berry College, Rome GA. **The spread of *Toxoplasma gondii* in feral and semi-feral cats: a mathematical model.**

Toxoplasma gondii, the parasite that causes toxoplasmosis, is commonly found in cats and can spread to other animals through the soil and water systems. In this project, we explore how feed site locations and water systems affect the spread of *T. gondii* through the use of the agent-based modeling program NetLogo. Our model describes feral and semi-feral cat interactions with prey, feed sites, other cats, and the environment. There are several model parameters that can be manipulated to test different interventions and explore the dynamics of the parasite spread. We'll present simulations of the feral and semi-feral cats on Berry College's mountain campus.

2. **CHERON, SAMANTHA[1,2]*, DEVIN LEVY[1], ALBERT E. RUSSELL[2], ROBERTA M. TROY[1], AND DANIEL A. ABUGRI[1, 2,3].** [1]Department of Biology, [2]Department of Chemistry, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, College of Arts and Sciences, Tuskegee University, Tuskegee AL. ***In vitro* activity of propyl gallate, tannic acid and hydroquinone alone and in combination against *Toxoplasma gondii*.**

Toxoplasma gondii is a common unicellular, zoonotic protozoan parasite known to cause a disease called toxoplasmosis. This parasite is estimated to cause about 30% to 60% human toxoplasmosis, and 1% to 100% seroprevalence in animals globally. They are few combination drugs that have been developed for the treatment of toxoplasmosis. However, these drugs have clinical limitations such as toxicity, hypersensitivity and drug-parasite resistance. Hence, there is a need for discovery of new combination therapy for the treatment of human and animal toxoplasmosis. Here, we investigated the interaction between propyl gallate, tannic acid and hydroquinone alone with parasites and their combination. Experimentally, all compounds showed promising anti-*Toxoplasma gondii* activity in *in vitro*. The combination therapy was effective than the single compounds. The IC_{50}s obtained for parasites were not cytotoxic to human foreskin fibroblast (HFF) cell lines at 48 hours. Further studies are required to evaluate these compounds efficacy at individual and in combination forms in *in vivo* for possible drugs design for the treatment of toxoplasmosis.

3. **HAYWOOD, CARLY*, AND AGUSTIN JIMENEZ.** Department of Zoology, Southern Illinois University, Carbondale IL. **Evolutionary relationships of members of Vianaiidae.**

Parasitism is a long lasting interaction among organisms that are consolidated through evolutionary time. Several groups of parasites are known to be transmitted in an ancestor-descendant fashion, which results in the reciprocal evolutionary changes in both associates, hosts and parasites. However, episodic events affecting the landscape may result in the isolation between groups of parasites and their hosts. In a particular case, extant marsupials residing in Australia, New Guinea, and the Americas share a common ancestor. These organisms are infected by trychostrongyles of the families Herpetostrongylidae and Vianaiidae, which based on morphological similarities are considered closely related. Because marsupials share a common ancestor that predates the break up of Gondwana, it is likely that their parasites may also have a common ancestor that predates this split. While marsupials radiated into different species, their parasites may have followed an evolutionary path that paralleled that

of their host. In this experiment, I plan to test the relationships among members of Herpetostrongylidae and Vianaiidae based on molecular data from the 26/28S region of the large subunit ribosomal RNA (LSUrRNA). Based on previous assumptions of the relatedness of Viannaidae using morphological data (Durette-Desset 1985), I expect to find members of Vaianaiidae to be in close relation to those of Herpetostrongilidae.

4. **WOODSON, ANDERSON*, NISHI JINDAL, MIRANDA DAUGHTRY, KIMBERLY WORLEY, JASMINE WILLIAMS, CAROLINA PEREZ-HEYDRICH, AND MARIA PICKERING-VILLA.** Department of Biological Sciences, Meredith College, Raleigh NC. **Environmental surveillance of zoonotic pathogens.**

The objective of this research is to estimate the prevalence of zoonotic pathogens in the environment surrounding Wake County, NC. We focused specifically on the roundworms, *Baylisascaris procyonis* and *Toxocara* spp. Humans are not natural parts of the life cycle of these parasites, therefore, if infective eggs are accidentally ingested via environmental contamination, the larval worms can cause significant damage to their human host. Here we present initial findings of our prevalence survey from public parks in Wake County, NC. Soil and fecal samples were collected and processed using a zinc sulfate solution to isolate and count the number of infective eggs present in each sample. We found a relatively low overall prevalence of target parasite eggs (6.8% *B. procyonis*, 10% *Toxocara* spp.); however, further sample collection efforts are still underway. We also observed a large number of unidentified free-living nematodes in each sample. In the future, we hope to expand our project to include molecular identification of these worms and correlate pathogen-specific prevalence data with the socio-demographic composition of populations surrounding sample locations in order to identify areas and populations that are at high risk of exposure.

5. **FARROW, ABIGAIL F.*, AND GABRIEL J. LANGFORD.** Department of Biology, Florida Southern College, Lakeland FL. **Aspects of the lifecycle of *Apharyngostrigea pipientis* (Trematoda: Strigeidae) from a central Florida wetland.**

Apharyngostrigea pipientis is known to form metacercariae around the pericardium of anuran tadpoles in Michigan and other northern locations. Definitive hosts are thought to be wading birds, while the intermediate host is a freshwater snail. *Apharyngostrigea pipientis* is not commonly reported from Florida, yet we have found several populations of snails (*Biopholaria havaensis*) and tadpoles, primarily the Cuban treefrog (*Osteopilus septentrionalis*) to host this trematode. We used experimental infections to elucidate the transmission dynamics and development of *A. pipientis* inside the tadpole host. Surprisingly, we found two types (species?) of cercariae being shed from *B. havaensis* that enter Cuban tree frog tadpoles to form seemingly identical metacercariae. Further, both of these develop into metaceracariae inside the tadpoles over 5-7 days after wondering inside the host's body cavity as mesocercariae, and metacercariae are commonly concentrated around the pericardium cavity. However, they differ in entry mode, with one being ingested, whereas the other penetrates the skin. Current research has aimed to further identify the second, unknown cercariae. Along with analysis of the lifecycle and identification using morphological structures, molecular data is being collected to confirm the identity of the unknown cercariae.

6. **SHOUP, MARY V.*, AND CHRISTOPHER A. HALL.** Department of Biology, Center for One Health, Berry College, Mt. Berry GA. ***In vitro T. cruzi* inhibition by naphthalene-based compounds confirms *in silico* modeling predictions.**

In silico modeling of the pharmokinetic interactions between pathogen proteins and potential therapeutic inhibitors may offer a cost-effective method to select those with the greatest promise for testing. *In silico* modeling predicts that naphthalene-based compounds (NBCs) would bind with high affinity to the ATP-binding site of the REL-1 subunit of the kinetoplast editosome complex. Previously we demonstrated the ability of V4, an NBC, to inhibit the proliferation of *Trypanosoma cruzi*, the etiologic agent of Chagas disease. Here we test whether V3, an NBC analog, has a reduced ability to inhibit T. cruzi proliferation as predicted by the *in silico* model. Co-cultures of V3 with DH-82 cells infected with the Brazil strain of *T. cruzi* were performed as with V4. Inhibition of *T. cruzi* proliferation was monitored through hemocytometer counting of emerging blood stream form trypomastigotes at 24-hour intervals. As predicted, V3, although capable of suppressing BSF proliferation, was less effective than V4 under similar conditions. The results also confirmed that, like V4, mammalian DH-82 cell proliferation was not negatively affected by the presence of the NBC in the media. The experimentally confirmed differences in the inhibitory effects between V3 and V4 are consistent with *in silico* predictions, supporting the *in silico* predictions, as well as the specificity of NBCs for the REL-1 ATP binding site.

7. **SMITH, CATHERINE L.[1]*, KATIE J. GRAHAM[1], JOHN V. STOKES[1], CARLA HUSTON[2], AND ANDREA S. VARELA-STOKES[1].** [1]Department of Basic Sciences, College of Veterinary Medicine, Mississippi State University, Mississippi State MS. [2]Department of Pathobiology and Population Medicine, College of Veterinary Medicine, Mississippi State University, Mississippi State MS. **Detection of panola mountain *Ehrlichia* in ticks and exposure to *Ehrlichia* spp. in Mississippi cattle.**

Panola Mountain *Ehrlichia* (PME) was first reported 11 years ago in a goat exposed to *Amblyomma americanum* ticks. PME can cause disease in goats and humans, and is found in other *Amblyomma* spp., including *Amblyomma maculatum*. However, the extent it is transmitted to other vertebrates is unclear. *Amblyomma maculatum* is common in cattle and a known vector for other pathogens. In this study, we hypothesized that Mississippi cattle would be exposed to *Ehrlichia* species but PME infection rates in cattle and *A. maculatum* would be low. To test this, we evaluated 66 tick and 226 cattle samples collected between 2015 and 2016. We used immunofluorescent antibody assays to detect antibodies to *Ehrlichia* species. DNA extracts from whole blood and tick samples were subjected to quantitative PCR (QPCR) using a PME probe. Of 292 serum samples, 58 (20%) initially tested positive for *Ehrlichia* antibodies, when screened at dilutions of 1:32 and 1:64 (1:64 considered seropositive). Seropositive samples were serially diluted to determine titers and 47/292 (16%) samples were confirmed seropositive, with the majority having a titer of 64; 13 had a titer of 128 and one sample has a titer of 256. No cattle or tick extracts were positive for PME DNA. Seropositive cattle indicate exposure to *Ehrlichia* spp., which may include *E. chaffeensis* and *E. ewingii*, transmitted by *A. americanum*. However, *A. maculatum* were the only tick species recovered. Further studies to monitor infection rates of PME in Mississippi and continue to evaluate cattle for this tick-borne pathogen are warranted.

8. **SWANEPOEL, LIANDRIE[1]*, CHRISTOPHER A. CLEVELAND[1,2], COLLEEN OLFENBUTTEL[3], CASEY A. GRAY[4], DALTON BROWN[5], AND MICHAEL J. YABSLEY[1,2].** [1]Southeastern Cooperative Wildlife Disease Study, University of Georgia (UGA), Athens GA. [2]Warnell School of Forestry and Natural Resources (UGA). [3]NC Wildlife Resources Commission, Pittsboro, NC. [4]NC Wildlife Resources Commission, Durham, NC. [5]USDA APHIS Wildlife Services, Columbia SC. **Prevalence and genetic characterization of**

***Dirofilaria lutrae* from North American river otters (*Lutra canadensis*) from the southeastern United States.**

Dirofilaria lutrae is an unstudied subcutaneous nematode of North American river otters, *Lutra canadensis.* During the initial description from 1965, adult parasites were detected in otters from Louisiana and Florida. This species is unique among the subcutaneous-dwelling *Dirofilaria* spp. in that it lacks longitudinal cuticular ridges. *D. lutrae* is not known to cause disease, but it must be distinguished from *Dirofilaria immitis* (heartworm), which can be an important pathogen of otters. Our goal was to determine the prevalence of this parasite in otters from North and South Carolina, and to sequence a portion of the cytochrome oxidase I (COI) gene to investigate the phylogenetic relationship of *D. lutrae* with other *Dirofilaria* spp. Subcutaneous worms were found in 12/31 (39%) otters trapped in North Carolina (n=30) and South Carolina (n=1). They were morphologically identified as *D. lutrae*. A portion of the COI gene was amplified and sequenced from 10 worms from an otter from South Carolina. The sequences (705bp) were identical and most similar (91.8%) to *Dirofilaria repens*, a parasite of carnivores and other hosts in Africa, Asia and Europe. Our data contribute to the knowledge of this parasite by extending the confirmed range into North and South Carolina and provide the first sequences for this species. Although *Dirofilaria* is a specious genus and the COI gene is now commonly used in many phylogenetic studies of nematodes, there are only two other species with sequences in Genbank so additional sampling is needed to better understand the phylogenetics of filarial worms.

9. **SOAFER, KELLIE E.[1]*, WILLIAM NICHOLSON[2], AND CHRISTOPHER A. HALL[1].** [1]Department of Biology, Berry College One Health Center, Mt. Berry GA. [2]National Center for Emerging Zoonotic Infectious Diseases, Center of Disease Control, Atlanta GA.
Prevalence of *Trypanosoma cruzi* in rodent populations on Berry College campus.

An estimated 8 million people are infected with *Trypanosoma cruzi*, the causative agent of Chagas disease. Although largely associated with Latin America, *T. cruzi* is enzootic throughout the southern tier of North America. Unfortunately, little is known of this pathogens distribution in natural mammalian reservoir populations in the southeastern United States. As part of a larger survey, rodents were trapped on the Berry College campus. DNA was extracted from spleen tissue and subjected to PCR analysis using the *T. cruzi* specific S35-36 primers. The results showed that 75 of 102 (73.5%) Cotton mice (*Peromyscus gossypinus*) and 28 of 64 (43.8%) of Cotton rats (*Sigmodon hispidus*) tested positive for the presence of *T. cruzi* DNA. In addition, 2 of 9 (22.2%) shrews tested positive, as did the single specimen of chipmunk (*Tamias striatus*) and a flying squirrel (*Glaucomys volans*). This resulted in an overall prevalence of 60.8% among those specimens tested. DNA from 177 rodents was subjected to PCR using the D71-72 primers to determine the strain type of *T. cruzi*. These results showed that all those tested harbored the Type-1 strain of *T. cruzi*, the one most associated with human infections in the U.S. This highlights the broad distribution of *T. cruzi* among rodent populations in the southeastern United States.

10. **CRAWFORD, JENNIFER*, AND GABRIEL J. LANGFORD.** Department of Biology, Florida Southern College, Lakeland FL. **Impacts of the oligochaete *Allodero hylae* on its tree frog host: Is this a parasitic relationship?**

Given their ubiquitous nature, it is surprising that more oligochaete annelid worms (Annelida: Clitellata) have not adopted an endoparasitic lifestyle. The genus *Dero* (*Allodero*) that parasitize

the ureters of tree frogs and toads are one of the few exceptions. Previous research has found a direct route of transmission of these worms, however the study also noted that the worms apparently killed young tree frogs and caused dilation of the frog's ureter. This study focuses on the host's response to infection with these worms using two separate studies. The first study used experimental infections to determine the survival rates of juvenile Cuban tree frogs of varying ages exposed to *A. hylae*. The results of this study showed that only recently metamorphosed froglets were at risk of dying from a ruptured ureter, whereas older frogs were able to host worms without obvious risks. The second study used a microtome to create 14 µm sections of the ureter and kidney in adult frogs with subsequent staining to review infected and uninfected frogs for inflammation, dilation, and other immune responses. The results suggest that the presence of *A. hylae* did cause obvious dilation of the ureter; however, there was not enough evidence to show that inflammation was occurring in our samples. Overall, our study suggest a parasitic relationship for *A. hylae* and their tree frog hosts, yet the worms do not appear to cause substantial harm to tree frogs, outside of young froglets.

11. RODGERS, ASHLEY[2]*, ALBERT E. RUSSELL[1], ROBERTA M. TROY[2], AND DANIEL A. ABUGRI[1,2, 3]. [1]Department of Chemistry, [2]Department of Biology, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, Tuskegee University, Tuskegee AL. ***In vitro* activity of herbal teas alone and in combination with anti-toxoplasmosis drugs.**

Herbal teas and herbal products have been used by different ethnic groups all over the world to overcome infectious diseases, especially Toxoplasmosis and Malaria. Current drugs used in the treatment of parasitic diseases belonging to the apicomplexan family of parasites have been reported to have limited clinical outcomes. Hence, there is a need for alternative drug formulation. Here, we tested 7 herbal tea formulations with 4 anti-toxoplasmosis drugs currently used in the treatment of Toxoplasmosis and Malaria using colorimetric assays. We observed effective anti-parasitic activity with all teas extracts and their combinations with the drugs. The extracts were not cytotoxic to human foreskin fibroblast cells at the doses that inhibited 50% of *T. gondii* parasites. Further studies are ongoing to test extracts and drugs effects on parasites using microscopy and will be shared during the conference.

12. GARRETT, KAYLA B.[1,2]*, RENEE SCHOTT[3], LEA PESHOCK[4], AND MICHAEL J. YABSLEY[1,2]. [1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. [2]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, University of Georgia, Athens GA. [3]Wildlife Rehabilitation Center of Minnesota, Roseville MN. [4]Greenwood Wildlife Rehabilitation Center, Longmont CO. **Multiple *Babesia* infections in young raccoons and splenomegaly associated with *Babesia sensu stricto* infections.**

Babesia are intraerythrocytic parasites that are often transmitted by ixodid ticks, but vertical transmission is an alternative route for some species. In the United States, raccoons (*Procyon lotor*) are hosts for two species, a *Babesia microti*-like sp. and *Babesia lotori* (in *Babesia* sensu stricto group). To better understand the natural history of *Babesia* in raccoons, we tested young raccoons from Minnesota and Colorado for *Babesia* spp., examined them for ticks, and calculated a spleen weight:body weight ratio. Raccoons from both states were infected with *B. microti*-like sp. and *Babesia* sensu stricto spp. Infections of *B. microti*-like were common, even in 1-week-old raccoons, suggesting vertical transmission. *Babesia* senstu stricto infections were more common in older raccoons. Raccoons infected with *Babesia* sensu stricto had significantly higher spleen:body weight ratios compared to uninfected or *B. microti*-like sp.-infected raccoons. Ticks were only found on raccoons from Minnesota. The most common and abundant tick was *Ixodes texanus* but *I. scapularis* and *Dermacentor variabilis* were also found on

raccoons. We report *Babesia* infections in very young raccoons as well as early infestations with several species of ticks. Young raccoons infected with *Babesia* sensu stricto group spp. had higher spleen:body weight ratios suggesting a disease risk.

13. ROBERTS, JACKSON R.[1]*, COVA R. ARIAS[2], BRIAN FOLT[3], JEFFREY M. GOESSLING[3], AND STEPHEN A. BULLARD[1]. [1]Aquatic Parasitology Laboratory, School of Fisheries, Aquaculture, and Aquatic Sciences, College of Agriculture, Auburn University, Auburn AL. [2]Aquatic Microbiology Laboratory, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University, Auburn AL. [3]Department of Biological Sciences, Auburn University, Auburn AL. **Turtle blood flukes (Digenea: Schistosomatoidea: *Hapalorhynchus* spp.) infecting southeastern musk turtles (Testudines: Kinosternidae).**

As part of an ongoing survey of freshwater turtle blood flukes (TBFs), we sampled four musk turtle (Testudines: Kinosternidae) species from rivers in Alabama and Florida: the loggerhead musk turtle (*Sternotherus minor*), the Eastern musk turtle (*Sternotherus odoratus*), the stripe-necked musk turtle (*Sternotherus peltifer*), and an unidentified loggerhead musk turtle (*Sternotherus* cf. *minor*). We found infections by *Hapalorhynchus reelfooti* (ex. *S. minor*, *S. peltifer*, *S.* cf. *minor* [all comprising new host and locality records], *S. odoratus* [new locality records]), *Hapalorhynchus* cf. *stunkardi* (ex. *S. minor*, *S. odoratus*), and a new species of *Hapalorhynchus* (ex. *S.* cf. *minor*). *Hapalorhynchus* cf. *stunkardi* differs from *Hapalorhynchus stunkardi* by having a longer forebody, shorter ceca, and smaller testes. The new species closely resembles *H. stunkardi* but can be differentiated by having a smaller ventral sucker/anterior sucker ratio, a cirrus sac not abutting the dextral cecum, a longer external seminal vesicle, and a uterus dorsal to the ovary and anterior testis. Comprising donated material and examinations of 19 turtle species (13 never-before-reported TBF hosts) from rivers in Alabama (no previous TBF records), Florida, Mississippi, Malaysia, Vietnam, and Peru (first TBF records from South America), the ongoing TBF survey has resulted in the identification and collection of 28 TBF species (~14 new species) assigned to *Spirorchis*, *Hapalorhynchus*, *Vasotrema*, *Coeuritrema*, and *Baracktrema*.

14. PANYI, APRYLE J.[1]*, STEPHEN S. CURRAN[1], ROBIN M. OVERSTREET[1], CAROL CARSON[2], AND ROBERT PRESCOTT[3]. [1]University of Southern Mississippi, Division of Coastal Sciences, Ocean Springs MS. [2]New England Coastal Wildlife Alliance, North Carver MA. [3]Sanctuary Director, Mass Audubon/Wellfleet Bay Wildlife Sanctuary, South Wellfleet MA. **Trematode fauna from opportunistically collected juvenile Kemp's ridley sea turtles (*Lepidochelys kempii*) and loggerhead sea turtles (*Caretta caretta*) from Massachusetts.**

Loggerhead turtles (*Caretta caretta*) have a cosmopolitan distribution in the world's tropical and temperate seas, whereas Kemp's ridley turtles (*Lepidochelys kempii*) range throughout the tropical and temperate western Atlantic Ocean. Both species are considered endangered, the former by International Union for the Conservation of Nature, and both according to the United States Endangered Species Act of 1973. We collected fourteen morbid or dead stranded sea turtles (11 *L*. *kempii* and 3 *C*. *caretta*) from Massachussetts during the winters of 2015-6 and 2016-7. We froze the dead sea turtles and later collected parasites opportunistically during necropsies; consequently, we did not assess parasite assemblage data. The plagiorchiid *Enodiotrema megachondrus* (Looss, 1899) Looss, 1901 and the telorchiid *Orchidasma amphiorchis* (Braun, 1899) Braun, 1901 infected the small intestine of *L*. *kempii*. The pachypsolid *Pachypsolus irroratus* (Rudolphi, 1819) Looss, 1902 infected the stomach of *C*. *caretta*, and the monotypic gorgoderid *Plesiochorus cymbiformis* (Rudolphi, 1819) Looss, 1901 infected the urinary bladder of *C*. *caretta*. The phylogenetic affinities of *P*. *irroratus* and *P*.

cymbiformis have been established, but we provide those of *E*. *megachondrus* and *O*. *amphiorchis* among the Xiphidiata for the first time. Partial 28S ribosomal DNA sequences are aligned with available comparable xiphidiatan sequences and subjected to Bayesian Inference analysis. Results of the analysis and identification of a nematode and cestode are pending.

15. YABSLEY, MICHAEL J.[1,2] AND SARAH G. H. SAPP[1,3]*. [1]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, University of Georgia, Athens GA. [2]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. [3]Department of Infectious Diseases, College of Veterinary Medicine, University of Georgia, Athens GA. **Prevalence of raccoon roundworm (*Baylisascaris procyonis*) eggs in canine fecal exams in the United States, 2013-2016.**

Dogs are both intermediate and alternative definitive hosts for *Baylisascaris procyonis*, the raccoon roundworm. However, broad-scale prevalence of patent infections and distribution of canine cases are unknown. Fecal float data from domestic dogs were acquired from reference laboratories across the United States. *Baylisascaris* spp. eggs were detected in 504 of 9,486,672 (0.005%) fecal samples. While many of the positive dog samples originated in areas of known high *B. procyonis* prevalence in raccoons, positives were also detected in 9 states, including Alaska, Connecticut, Delaware, Maine, Montana, North Dakota, New Hampshire, Rhode Island, and South Carolina, where the parasite has not been reported in raccoons. Prevalence in the Western region was significantly greater ($p<0.0001$) and prevalence in the Southern and Central regions ($p<0.0001$) compared with the Northeastern referent category. A significantly higher prevalence was noted in young dog and large breeds. Although the overall prevalence was low, and some infections may be spurious (i.e., acquired by coprophagy), these results demonstrate that dogs may shed *Baylisascaris* into domestic environments. Routine parasitic testing, appropriate preventive use, and restrictions on coprophagy should be encouraged to reduce risk of human or animal exposure to infectious eggs.

16. CLEVELAND, CHRISTOPHER A.[1,2]*, MARK L. EBERHARD[3], ALEC T. THOMPSON[4], STEPHEN J. SMITH[1,2], HUBERT ZIRIMWABAGABO[5], ROBERT BRINGOLF[2], AND MICHAEL J. YABSLEY[1,2]. [1]Southeastern Cooperative Wildlife Disease Study, University of Georgia, Athens GA. [2] Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. [3]Centers for Disease Control and Prevention, Atlanta, GA.[4]University of Oklahoma, Norman OK.[5]The Carter Center, Atlanta GA. **The potential of fish to act as transport hosts for *Dracunculus medinensis* and *D. insignis* larvae.**

The pattern of dog infections in Chad with *Dracunculus medinensis* (Guinea worm) suggests a paratenic host may be involved. Previous work on fish suggested that they are either resistant to infection or have variable species susceptibility. Our objective was to evaluate the potential role of fish to serve as transport hosts of *D. medinensis* and *D. insignis* by exposing fish to *Dracunculus*-infected copepods and then feeding them to domestic ferrets. Two of three ferrets fed fish that had ingested *D. insignis*-infected copepods became infected. Transmission of *D. medinensis* also occurred when a ferret ingested fish that had ingested infected copepods. The infection of ferrets with both *Dracunculus* spp. after consumption of fish illustrates a novel experimental transmission route, highlighting the importance of current recommendations to cook fish thoroughly, bury entrails, and prevent dogs from consuming fish and fish entrails in an effort to decrease the potential transmission of guinea worm.

17. MAYS, AMBRIA N.*, VINA FAULKNER, AND CHARLES FAULKNER. Lincoln Memorial University College of Veterinary Medicine, Harrogate TN. **Prevalence of zoonotic**

gastrointestinal parasites of shelter dogs and cats in the Cumberland Gap region of Kentucky, Tennessee, and Virginia.

Healthy animals adopted from shelters are screened for behavioral suitability, vaccinated, and spayed or neutered. However, due to limited resources, not all are screened for parasitic infections or receive anthelminthic treatment prior to adoption. This poses a significant health risk to anyone in contact with these animals, especially new owners uninformed about potential zoonotic parasite transmission to their families. The purpose of this study was to determine the prevalence of zoonotic parasites in shelter animals. Fecal samples of 68 dogs and 30 cats (98 total) were collected from August through October 2016. Animal health was assessed using the 1-9 Purina Body Condition Score system (BCS), age was estimated by dental examination, and animal relinquishment noted as either stray or owner surrendered. Fecal samples were analyzed using centrifugal flotation in Fecasol. Parasite prevalence in dogs was 86.7% and 46.7% in cats, with an overall prevalence of 74.5% in both. In dogs, *Ancylostoma caninum* was the most prevalent zoonotic parasite at 73.5% and 13.2% were positive for *Toxocara canis*. In cats, *Toxocara cati* was the most prevalent at 23.3%. Kittens (<6 months) were more likely to be positive (p=0.02), however there was no association seen in puppies (<6 months). For all animals assessed, there was no statistical associations between positivity and BCS or relinquishment. The One Health concept of beneficial human-animal bond is compromised if pet ownership results in risk to human health. Therefore, the results of this ongoing study show the need for community-aimed recommendations to seek veterinary care of re-homed animals.

18. ZIEMAN, ELLIOTT A.[1,2]*, CLAYTON K. NIELSEN[2,3], AND F. AGUSTÍN JIMÉNEZ[1]. [1]Department of Zoology, Southern Illinois University, Carbondale IL. [2]Cooperative Wildlife Research Laboratory, Southern Illinois University, Carbondale IL. [3]Department of Forestry and Center for Ecology, Southern Illinois University, Carbondale IL. **Chronic *Cytauxzoon felis* infections in wild caught bobcats (*Lynx rufus*).**

Cytauxzoon felis is an intraerythrocytic apicomplexan of felids native to the United States. Infection in domestic cats (*Felis catus*) can result in the highly fatal disease cytauxzoonosis. The lone star tick (*Amblyomma americanum*) and the American dog tick (*Dermacentor variabilis*) are competent vectors of *C. felis*. Bobcats (*Lynx rufus*) are the natural wild animal reservoir of *C. felis*. Domestic cats and bobcats that become infected with *C. felis* and survive initial infection are thought to remain subclinically infected for the remainder of their lives. There is, however, no conclusive evidence that this occurs in wild bobcats, as this would require capture of live bobcats and subsequent recapture of the same individuals. In this study we live-trapped bobcats over a period of 3 years (2015, 2016, and 2017). During this study we recaptured 4 bobcats for 2 consecutive years and 1 bobcat for 3 consecutive years. This is a unique, multi-year collection of samples from wild caught bobcats and allowed us to test the hypothesis that bobcats can remain infected with *C. felis* indefinitely. These bobcats were all infected with *C. felis* at the initial capture and at the subsequent recapture(s). Theses bobcats were both polymerase chain reaction (PCR) positive and had positive identification of piroplasms on blood films. This represents the first evidence of multi-year infection of *C. felis* in wild bobcats. These data show that bobcats can sustain *C. felis* infection for years with important implications for the epizootiology of this emerging feline disease.

19. CLAXTON, ANDREW T.*, APRYLE PANYI, AND ROBIN OVERSTREET. Gulf Coast Research Laboratory, University of Southern Mississippi, Ocean Springs MS. **Is the**

parasite assemblage of Pinfish (*Lagodon rhomboides*) a good host-parasite system to monitor environmental health in the northern Gulf of Mexico?

Parasites of the pinfish (*Lagodon rhomboides*), considered a seagrass specialist, may be an appropriate host-parasite system to monitor environmental changes because it possesses adequate species richness, diverse life history strategies, and relatively small, easily collected hosts. The effectiveness of this system as a biomonitor may change over time or when hosts occupy different habitats. To examine the effect of habitat type and seasonality on the potential use of parasites in pinfish as biomonitors, we necropsied 218 fish from Spring, Summer, and Autumn of 2016 as well as Winter 2017 from Pensacola, Florida, where the seagrasses *Thalassia testudinum* and *Halodule wrightii* occurred in salinity ranging from 18 to 31 ppt. In the fall of 2016, we necropsied 24 from Back Bay of Biloxi, Mississippi, where American eelgrass (*Vallisneria americana*) occurred in approximately 6 ppt, and 32 from nearby Weeks Bayou, Mississippi, with no submerged aquatic vegetation with salinities of approximately 13 ppt. In Autumn 2016, mean species richness was 3.7 ± 0.2 from the habitat containing *T*. *testudinum* and *H*. *wrightii* compared with 1.1 ± 0.1 and 0.5 ± 0.1 from Back Bay of Biloxi and Weeks Bayou, respectively. Seasonally, mean species richness peaked in Summer 2016 with 4.7 ± 0.3 compared with 3.0 ± 0.2, 2.9 ± 0.2, 3.7 ± 0.2 in Winter, Spring, and Autumn, respectively. Parasite-species richness, which may correlate with better host-parasite systems as biomonitors, peaked during Summer and in seagrass beds of Pensacola, Florida.

20. HUEBNER, HAILEY*, DAWN SPANGLER, AND CHARLES FAULKNER. Lincoln Memorial University, College of Veterinary Medicine, Harrogate TN. **Estimation of heartworm prevalence in dogs in the Cumberland Gap region of Tennessee, Kentucky, and Virginia.**

Infection with canine heartworm *Dirofilaria immitis* is a significant veterinary health issue in companion animal practice. Cases of heartworm infection continue to increase and spread into new geographic areas each year in spite of the availability of effective prophylactic drugs and awareness of the insidious nature of the disease. In 2015, 1.4% (30/2,160) pet dogs in the Cumberland Gap Region (CGR) tested positive for antigen of adult heartworm. Intuitively, these data underrepresent the true prevalence of infection based on recent serologic assay indicating 3.6% of canines from regional animal shelters and rescues were positive. Analysis of the data from which the pet dog heartworm prevalence was calculated suggest it is representative of 11% of resident pets in the CGR. Owner household income has been implicated as a risk factor for heartworm infection because of the influential role it may play on the discretionary purchase of heartworm prophylaxis. Pet dogs from households with income less than $30K were 1.8 times less likely to be on monthly prophylaxis. Median household income for the 3 contiguous counties in the CGR is $33K (Claiborne TN), $23.5K (Bell, KY), and $25K (Lee, VA) with a combined pet dog population estimated at 19,190. It is reasonable to infer that approximately ½ of the resident pet dogs are at risk or infected with canine heartworm given the lower likelihood of prophylaxis use. Our research continues to refine estimates of canine heartworm prevalence in the CGR by survey of shelter/rescue and pet canines for adult heartworm antigen.

21. PFAFF, MADELEINE A.[1,2]*, MICHAEL J. YABSLEY[1,2], AND JOSEPH L. CORN[2]. [1]Warnell School of Forestry and Natural Resources, The University of Georgia, Athens GA. [2]Southeastern Cooperative Wildlife Disease Study. **Ticks and tick-borne pathogens in the southeastern United States: proposal and preliminary results.**

Due to the medical and veterinary importance of ticks in the southeastern United States, active surveillance for ticks and their associated pathogens can be an important tool for assessing

distribution and life history traits of ticks. Tick species distribution varies between regions and habitats. The main objective of this project is to determine the phenology and potential suitable habitats for southeastern tick species. Sites in four physiographic regions (Mountain, Lower Coastal, Upper Coastal and Piedmont) were identified as potential tick habitat, and three replicated habitats were selected within each region. Data collection is conducted once during each season beginning in July 2015. Ticks are collected using a drag cloth method and then identified to species and life stage, which will provide information about life history of these ticks in the southeast. Seasonal habitat, climate and microclimate data are also collected at each site. These data will contribute to knowledge of tick species distribution in the southeast and describe habitat variables that are most likely related to habitat suitability for each tick species. Finally, ticks will be tested for pathogens of medical importance. The goal of the study is to provide information that can be used in models for a wider application in predicting tick distribution and habitat in the southeast.

22. WARREN, MICAH, B.[1]*, RYAN P. KOENIGS[2], JACKSON R. ROBERTS[1], COVA R. ARIAS[1], AND STEPHEN A. BULLARD[1]. [1]Southeastern Cooperative Fish Parasite and Disease Laboratory, School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University, Auburn AL. [2]Wisconsin Department of Natural Resources, Oshkosh WI. **Morphological and molecular study of North American species of *Acipensericola* (Digenea: Aporocotylidae).**

The monophyletic fish blood flukes (Aporocotylidae) comprise ~148 species of 36 genera infecting freshwater, marine, and estuarine fishes. Freshwater fish blood flukes are little studied compared to marine species, but those of North America's inland fishes have been ignored since the 1950's and 1980's. Collectively, 8 species of *Sanguinicola* infect basses (Centrarchidae), minnows (Cyprinidae), trouts (Salmonidae), and perches (Percidae). A*cipensericola petersoni* infects the heart of American paddlefish, *Polyodon spathula*, and is the only named aporocotylid to infect a paddlefish or sturgeon (Acipenseriformes) anywhere. We opportunistically sampled the heart of >150 lake sturgeon (*Acipenser fulvescens*) harvested during the annual recreational ice spearfishery in the Lake Winnebago System during Feb 2001, 2008, 2014, and 2017. A few adults and numerous juveniles of a blood fluke were collected and assigned to *Acipensericola* based on the presence of spike-like tegumental body spines arranged in ventrolateral rows, a large bowl-shaped anterior sucker, inverse U-shaped ceca, a column of intercecal testes, and an intertesticular ovary. Light and scanning electron microscopy of these specimens plus sequence data from the large subunit ribosomal DNA (28S) were pending at abstract submission. However, specimens of *Acipensericola* sp. are strikingly similar to those of *A. petersoni*. Given their hosts' geographic (Mississippi River vs. Great Lakes) and phylogenetic (Polyodontidae vs. Acipenseridae) separation, the level of morphological and molecular divergence between their blood flukes is of interest regarding natural history, biogeography, and biodiversity of North American freshwater fish parasites.

23. COLON, BEATRICE L.[1]*, CHRISTOPHER A. RICE[2], ABDELBASSET A. FARAHAT[3], DAVID W. BOYKIN[3], R. KIPLIN GUY[4], AND DENNIS E. KYLE[2]. [1]Morsani College of Medicine, University of South Florida, Tampa FL. [2]College of Public Health, University of South Florida, Tampa FL. [3]Department of Chemistry, Georgia State University, Atlanta GA. [4]St. Jude Children's Research Hospital, Memphis TN. **Discovery and evaluation of new drugs for the treatment of primary amoebic meningoencephalitis.**

Primary amoebic meningoencephalitis is a disease with a 97% fatality rate that is caused by the free-living amoeba, *Naegleria fowleri*. Disease occurs when the amoebae enter the nasal cavity and make their way to the frontal lobes of the brain where they cause significant pathology. New

drugs are urgently needed to treat this fatal infection; we established high-throughput assays to identify compounds that inhibit *N. fowleri* within 72 hours. We screened diverse libraries of compounds to identify new leads or drugs that could be repurposed. These included a library of >3000 bioactive compounds and FDA-approved drugs in addition to the 400 diverse compounds in the MMV Pathogen Box. We screened in single point assays at 5 uM and then derived quantitative dose-response data to validate hits. We identified multiple compounds that produce IC_{50}s $\leq$ 1 uM. Interestingly, posaconazole was a potent hit in both compound collections. We validated new methods to assess the rate of action of the hits and to determine if their activity was static or cidal. The rate of action assay demonstrated multiple amidino derivatives that significantly inhibit growth inhibition within 8-12 hours of drug exposure; remarkably, this was approximately 48 hours faster than the current treatments. Additionally, we found posaconazole to be cidal within 24 hours and roxithromycin and ketoconazole to be cidal after 48 and 72 hours of drug exposure, respectively. These data demonstrate potential for new drugs optimized from amidino scaffolds and that drug repurposing may be possible for this fatal, neglected tropical disease.

24. NIEDRINGHAUS, KEVIN D.[1]*, JUSTIN BROWN[2], MARK TERNANT[2], SARAH PELTIER[1,3], AND MICHAEL YABSLEY[1,3]. [1]Southeastern Cooperative Wildlife Disease Study, Wildlife Health Building, Department of Population Health, College of Veterinary Medicine, The University of Georgia, Athens GA. [2]Pennsylvania Game Commission, University Park PA. [3]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA.
Environmental survival of *Sarcoptes scabiei* mites from skin samples of black bears (*Ursus americanus*).

For two decades, the incidence of sarcoptic mange in American black bears (*Ursus americanus*) in Pennsylvania has increased. The causative agent, *Sarcoptes scabiei,* can be directly or indirectly transmitted; therefore data on persistence in the environment is important for management decisions (i.e., transmission within dens, trap sites, areas where feeding occurs, or around bear carcasses). The objective of this study was to determine the survival of *S. scabiei* at different temperatures. Full-section skin samples and skin scrapes were collected from bears immediately after they were euthanized due to severe mange. Samples were placed in petri dishes at 0, 4, 18, or 30°C, and the percentage of mites alive, by life stage, was recorded at 4, 8 and 24 hours, and each day thereafter until all mites were dead for at least two time periods. Mites survived the shortest amount of time at 0°C (≤ 4 hours) and the longest at 4°C (up to 14 days at which point experiment was ended). No mites survived beyond 7 days at 18°C or 3 days at 30°C. For all temperatures, mites from skin sections survived longer than those from skin scrapes. Also, at all temperatures, adult mites typically survived longer than nymphs and larvae. These data indicate that at lower temperatures (i.e., spring or fall temperatures), *S. scabiei* can survive for multiple days, especially if on/near host skin. The environment should be considered in any management effort to mitigate the risk of *S. scabiei* transmission.

25. RUIZ, CARLOS F.[1]*, WILLIAM B. DRIGGERS III[2], COVA R. ARIAS[3], and STEPHEN A. BULLARD[1]. [1]Aquatic Parasitology Laboratory, School of Fisheries, Aquaculture, & Aquatic Sciences, Auburn University, Auburn AL. [2]National Marine Fisheries Service, Southeast Fisheries Science Center, Mississippi Laboratories, Pascagoula/Stennis MS. [3]Aquatic Microbiology Laboratory, School of Fisheries, Aquaculture, & Aquatic Sciences, Auburn University, Auburn AL.
***Neoalbionella* sp. (Copepoda: Siphonostomatoida: Lernaeopodidae) from skin of deepwater gulper sharks, *Centrophorus granulosus* (Squaliformes: Centrophoridae), in the northeastern Gulf of Mexico.**

Little is known about population genetics and taxonomy of the geographically widespread deepwater gulper sharks (Centrophoridae: *Centrophorus*) and their parasite component communities. *Neoalbionella* (Lernaeopodidae) comprises 7 nominal species that infect skin and gill of sharks (Elasmobranchii) representing 2 orders, 4 families, 6 genera, and 8 species. Each species of *Neoalbionella* is highly host specific, infecting a single host, except *Neoalbionella longicaudata*, which infects 3 species of gulper sharks: leafscale gulper shark (*Centrophorus squamosus*; type host; North Atlantic Ocean off Iceland); common gulper shark (*C. granulosus*) and dwarf gulper shark (*C. atromarginatus*) (both Pacific Ocean off Japan). In March 2015, we collected 44 female and 18 male lernaeopodids that resemble *N. longicaudata* from skin of 10 of 11 (90.1% prevalence; 6.2 mean intensity) common gulper sharks captured by longline gear in the northeastern Gulf of Mexico (GOM) off Florida. Although the original description of *N. longicaudata* was incomplete and a redescription based on its type materials is needed, several features of the newly-collected lernaeopodids were distinctive from the description of *N. longicaudata*. Females had a first antenna with 6 setae, second antenna with an endopod terminal segment with a dorsal hook, a medial spine, a bifid tubercle, one ventral process, and one reduced spinulated pad, and the mandibular formula P1, S1, P1, S1, P1, S1, B5. Males of *Neoalbionella* sp. had a conspicuous mediative process. This is the first report of a species of *Neoalbionella* from the GOM and contributes to our knowledge of parasites that infect seldom-examined deepwater gulper sharks.

26. RICHARDS, JESSIE*, MANASI BALACHANDRAN, RICHARD GERHOLD, AND STEPHEN KANIA. Comparative and Experimental Medicine, College of Veterinary Medicine, University of Tennessee, Knoxville TN. **Serological diagnosis of *Parelaphostrongylus tenuis* Infection.**

Parelaphostrongylus tenuis is a parasitic nematode which utilizes white-tailed deer as the definitive host. The parasites invade the central nervous system (CNS) of aberrant hosts causing both mechanical and inflammatory damage. Techniques currently available for diagnosis include necropsy to detect nematodes or eggs in the brain and/or spinal cord, PCR of CNS tissue, or examining the cytology of cerebral spinal fluid. The goal of the present research was to develop an assay to accurately and rapidly diagnose *P. tenuis* infection antemortem or from banked serum. A gene encoding a *P. tenuis* aspartyl protease inhibitor, Pt-API-1, was inserted into an expression plasmid and propagated in *E. coli.* The recombinant protein was affinity purified, separated on SDS-PAGE gels and transferred to nitrocellulose. Western blots were utilized to identify anti-*P. tenuis* antibody present in blood, serum and CSF using sera from known positive and negative animals. Enzyme conjugated anti-cervid antibody produced in chickens was used to detect serologically positive elk, moose and deer. After Western blots were confirmed to be effective diagnostics, enzyme-linked immunosorbent assays (ELISAs) were used to test overlapping 10-mer synthetic peptides for the development of a more cost effective, less labor intensive test. However, due to inconsistent results and cross reactivity with other similar organisms, we have moved our attention to a full genomic analysis of *P. tenuis* to further distinguish a more definitive antigen. This effort is ongoing but is expected to identify epitopes that are unique to *P. tenuis* and serve as a useful diagnostic assay.

29. HEINS, DAVID C. Department of Ecology and Evolutionary Biology, Tulane University, New Orleans LA. **Castrators and nutrient thieves: evidence of parasite strategies of iconic diphyllobothriidean cestodes in fish hosts.**

Parasites manifest two different strategies relative to the effects on host energy budgets, direct manipulation of host energy allocation by “castrators” and simple nutrient theft by “consumers”, which are expected to cause demonstrably different effects on host reproductive function and

thus allow insight into the parasite's strategy. This talk will present a review of the two strategies and investigations into the host-parasite relationships of three model systems revealing these strategies.

30. ABUGRI, DANIEL A.[1,2,3]*, ALBERT E. RUSSELL[1], AND ROBERTA M. TROY[2]. [1]Department of Chemistry, [2]Department of Biology, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, Tuskegee University, Tuskegee AL. **Synergistic interaction of synthetic DA-1Ap, and DA-2p-CA combination with pyrimethamine against *Toxoplasma gondii.***

Toxoplasma gondii is one of the most neglected zoonotic, intracellular apicomplexan protozoan that causes huge public health, veterinary and socio-economic burden globally. The current standard drugs used for treatment of acute toxoplasmosis are pyrimethamine, sulfadiazine, clindamycin and their combination. These drugs have been identified to have clinical drawbacks such as toxicity and ineffective against chronic infections and importantly the encysted stage (bradyzoites) in host cells. Hence, there is a need for new drugs development to treat *T.gondii* infections globally. Here, an *in vitro* anti-*Toxoplasma gondii* activities of synthetic DA-AP, DA-pCA, and dihydrofolate inhibitor (pyrimethamine) alone and in combination with a fixed concentration of pyrimethamine were investigated against *T.gondii* RH strain. Anti-parasitic testing was carried out by inoculating the parasites on to human foreskin fibroblast (HFF) cells grown in Dulbecco's modified Eagle's medium with high glucose and determine the compounds or drug-parasite interaction after 48 h incubation at 37 ^{o}C with 5% CO_2 using a colorimetric assay. DA-1Ap and pyrimethamine showed the highest anti-*T. gondii* activity with EC_{50P} of 0.41µg/ml and 0.64 µg/ml at $p < 0.05$ respectively. However, in combination with pyrimethamine, DA-1Ap and DA-p-CA were highly effective against tachyzoites *in vitro* with synergistic interactions respectively. The EC_{50p} ranges obtained for the individual and combination of DA-1Ap or DA-2p-CA with pyrimethamine inhibition of parasite growth were not cytotoxic to the HFF cell lines used.

31. JAMISON, MAGGIE[1]*, AARON M. WATSON[1], ISAURE DE BURON[2], PETER R. KINGSLEY-SMITH[1], AND STEPHEN A. ARNOTT [1]. [1] SCDNR Marine Resource Research Institute, Charleston SC. [2] Department of Biology, College of Charleston, Charleston SC. **Detection of an invasive parasite, *Anguillicoloides crassus*, of American eels using qPCR.**

Anguillicoloides crassus is a nematode parasite of Asian origin that infects the swim bladder of its native host, the Japanese eel *Anguilla japonica*. The parasite was unintentionally introduced to the U.S. and Europe, with the earliest detections of the species in U.S. waters occurring during the mid-1990s. In the introduced range, *A. crassus* now infects both the American eel, *Anguilla rostrata,* and the European eel, *Anguilla anguilla*. The parasite may be associated with declining populations of both eel species because it causes more extensive host pathology and mortality compared with infected native Japanese eels. Methods of preventing introductions and/or the spread of such invasive species are a priority in the early detection and rapid response to aquatic invasions. The ultimate goal of this project is to develop a molecular tool that will accurately detect and quantify *A. crassus*. To achieve this, *A. crassus*-specific regions of the *Cox I* gene were identified and used to develop and optimize species-specific primer and probes appropriate for qPCR. The primers were tested against closely related nematode species and *A. rostrata* DNA to verify their specificity. To establish limits of detection, gravid *A. crassus* worms were removed from infected eels to obtain eggs harboring L_2 larvae and L3 larvae were cultured in the lab. The tool was applied to the field for validation and protocol development for future collections.

32. GLEIM, ELIZABETH R. [1,2,3]*, L. MIKE CONNER[2], GALINA E. ZEMTSOVA[4], MICHAEL L. LEVIN[4], PAMELA WONG[3], AND MICHAEL J. YABSLEY[1]. [1]Southeastern Cooperative Wildlife Disease Study (SCWDS), Warnell School of Forestry & Natural Resources, University of Georgia, Athens GA. [2]Joseph W. Jones Ecological Research Center at Ichauway, Newton GA. [3]Oxford College of Emory University, Oxford GA. [4]Centers for Disease Control and Prevention, Atlanta GA. **Rickettsiales in ticks removed from outdoor workers in southwest Georgia and northwest Florida.**

There are a number of tick species in the southeastern United States (US) capable of vectoring human tick-borne disease. Individuals with occupations that require them to be outside on a regular basis such as forestry workers are at a greater risk for obtaining a tick-borne disease. However, while numerous studies have been performed regarding outdoor workers' risk for tick-borne diseases in Europe, few studies have been performed in the US. The objective of this study was to determine the tick bite risk and tick-borne disease risk to outdoor workers in Southwest Georgia and Northwest Florida. Outdoor workers from this region were allowed to submit ticks found crawling on or attached to them for identification and pathogen testing. A total of 361 ticks were submitted by 53 individuals whom were primarily forestry students and workers. Twenty-four individuals submitted ticks more than once, submitting an average of 0.08 – 6.5 ticks per month with an overall average submission rate of 1.1 tick per month. Thus, outdoor workers were found to encounter ticks on a regular basis with peak encounter rates reflecting previously reported tick seasonality trends. Several unique findings emerged from this study. *A. tuberculatum* larvae were submitted on multiple occasions, a tick that has rarely been reported on humans previously. While pathogen prevalences were generally low, *Ehrlichia chaffeensis* was detected in an *Amblyomma maculatum* and Panola Mountain *Ehrlichia* sp. in two *A. maculatum* and one *D. variabilis*. Thus, further research regarding these tick species as potential vectors of these pathogens is warranted.

33. ZELMER, DEREK A.[1]*, CARLOS RUIZ[2], AND STEPHEN A. BULLARD[2]. [1]Department of Biology and Geology, University of South Carolina Aiken, Aiken SC. [2]Department of Fisheries, Auburn University, Auburn AL. **Does the use of operational taxonomic units influence the type I error rate for permutational analysis of variance?**

Permutational analysis of variance (PERMANOVA) is a robust means of comparing patterns of community structure. Investigations of patterns of parasite community structure and their determinants often make use of operational taxonomic units (OTUs), either intentionally because of high abundances within certain taxa, or unintentionally where cryptic species are part of the parasite community. In order to examine whether the use of OTUs has the potential to influence the results of PERMANOVA, simulations were developed to create parasite communities with a known degree of similarity. Specifically, 3 communities were generated in each of 2 separate localities in a hypothetical landscape characterized by orthogonal environmental gradients that each influenced the abundances of 25%, 50%, or 75% of the parasite species. Taxa within those communities were subsequently pooled either randomly or within taxa influenced by the simulated environmental gradients, and the results of PERMANOVA compared between the original communities, and those classified using OTUs. To control for the smaller number of taxa in communities characterized using OTUs, comparisons were also made to the original communities with the appropriate number of taxa removed at random. Preliminary results indicate that the denominator of the variance ratio utilized as a test statistic for PERMANOVA tends to be reduced by the use of OTUs, while the numerator is little affected, increasing the probability for type I errors to occur. This effect

appears to be reduced when the species pooled into OTUs are influenced by the same environmental gradients.

34. CARLETON, RENEE' E.* Berry College, Department of Biology, Mount Berry GA. **Preliminary results: distribution of ectoparasites on resident passerine birds of Bermuda.**

The islands of Bermuda are home to 17 permanent resident bird species. Seven are considered native and one, the Bermudian White-eyed Vireo, is a recognized sub-species of the North American species. The remaining non-native residents were introduced, in some cases by humans, within the last 50 to 600 years. Many of these birds are either threatened or declining in numbers due to habitat loss and competition from other introduced species. To date, study of symbiont diversity associated with the resident passerine birds of Bermuda is very limited and no genetic characterizations of these organisms has been attempted. Distributions of ectoparasites collected from 7 passerine species during 2016 are discussed, along with plans for genetic comparisons between those collected on Bermuda and those collected from the same passerine species resident to the continental U.S.

35. YABSLEY, MICHAEL J.[1,2]*, CHRISTINE SMITH[3], RICHARD SMITH[3], HEATHER FENTON[2], AND CHRISTOPHER A. CLEVELAND[1,2]. [1]Warnell School of Forestry and Natural Resources, The University of Georgia, Athens GA. [2]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, The University of Georgia, Athens GA. [3]Smith Veterinary Services CA. **Verminous dermatitis in a domestic ferret: what's your diagnosis?**

In August 2016 an adult male neutered domestic ferret was found in the woods near Fresno, California. He presented bright, alert and responsive but had an enlarged prescapular lymph node and alopecia (hair loss) on the rump and tail tip with mostly bilateral evenly spaced puncture wounds consistent with a carnivore bite. He was treated with a variety of antibiotics for presumed infection of the bite sites; however, cultures and Gram-stained smears of the lesions were negative for bacteria. As the presenting wounds healed, the surrounding areas developed into 'creeping eruption' lesions and pustules which would usually rupture within 12-48 hrs and ooze red fluid. After 3-5 wks, nearby lesions consolidated into ~20-40 mm sized red scabs which would heal but new lesions continually appeared, ruptured and healed. A fine-needle aspirate of a cutaneous lesion was performed and larval nematodes were observed on the Giemsa-stained smear by cytology. A whole blood sample tested positive for *Dirofilaria immitis* antigen using a commercial test. Microscopic examination of a biopsy revealed edema, hemorrhage, pyogranulomatous and eosinophilic dermatitis associated with numerous larvated eggs. This talk will include differentials for the parasite involved as well as results of additional diagnostic tests, diagnosis and case management. Supportive care and treatment are ongoing in this case, but as of early March 2017, the ferret's condition is improving.

36. LEVY, DEVIN[1]*, SAMANTHA CHERON[1,2], ROBERTA M. TROY[1], ALBERT E. RUSSELL[2], AND DANIEL A. ABUGRI[1,2,3]. [1]Department of Biology, [2]Department of Chemistry, [3]Laboratory of Ethnomedicine, Parasitology and Drug Discovery, College of Arts and Sciences, Tuskegee University, Tuskegee AL. ***In vitro* interaction of propyl gallate, 8-hydroxyquinoline, and 4-hydroxyquinoline alone and in combination against *Toxoplasma gondii* RH strain.**

Toxoplasmosis is a zoonotic parasitic disease that affects most immunocompromised individuals and known to cause serious public health and socio-economic concerns globally. Pyrimethamine and sulfadiazine have been the most effective combination for the treatment of

toxoplasmosis. However, because of the high incidence of clinical immunocompromised individuals' emergence globally couple with drug-parasite resistance. There is an overwhelming urgency to developing new drugs combination that will augment the current combination used for the treatment of toxoplasmosis. Here, we evaluated the anti-*Toxoplasma gondii* activity and cytotoxic effects of propyl gallate (PG), 8-hydroxyquinoline (8HQ), and 4-hydroxyquineline (4HQ) alone and their combination *in vitro* using colorimetric assay. Uniquely, the combination between PG and 8HQ, PG and 4HQ, and 4HQ and 8HQ were effective against the rapidly proliferating *T. gondii* RH strain with less cytotoxic effects on human foreskin fibroblast cell lines. Further studies are ongoing to evaluate their combinations with other quino-based derivatives and their mechanism of action.

37. RICE, CHRISTOPHER A.[1]*, BEATRICE L. COLON[1], ABDELBASSET AHMED[3], KAITLIN A. METTEL[2], KATI RÄSÄNEN[2], SANTANA A. L. THOMAS[4], BILL J. BAKER[4], BLAISE A. DARVEAUX[5], CEDRIC PEARCE[5], DAVID BOYKIN[3], AND DENNIS E. KYLE[1]. [1]Center for Tropical and Emerging Global Diseases, University of Georgia, Athens GA. [2]Department of Global Health, College of Public Health, University of South Florida, Tampa FL. [3]Department of Chemistry, Georgia State University, Atlanta GA. [4]Center for Drug Discovery and Innovation, University of South Florida, Tampa FL. [5]Mycosynthetix, Inc., Hillsborough NC.
High-throughput screening methods fuel discovery of new chemical structures active against pathogenic free-living amoeba.

Primary Amoebic Meningoencephalitis (PAM) caused by *Naegleria fowleri* and Granulomatous Amoebic Encephalitis caused by *Acanthamoeba* spp. are both neglected diseases caused by pathogenic free-living amoeba. Although PAM and GAE in the U.S. account for around 145 and 200 cases respectfully they are almost always fatal with a 97% and 90% mortality rate. *Acanthamoeba* spp. has also been found to cause Amoebic Keratitis (AK), in association with poor contact lens hygiene, which may result in blindness. PAM and AK have been found to infect immunocompetent individuals where GAE is generally found in immunocompromised patients. The current drug regimens were not originally discovered for these amoebic infections. The high mortality shows that these regimens are not the best indicative treatment for the patients. New, fast acting and specifically developed drugs for these diseases need to be discovered, developed and implemented into the current drug regimens. Herein, using high-throughput screening methods we have screened over 36,000 natural products produced as secondary metabolites by slow growing filamentous fungi with a hit rate of 197(0.56%) for greater than 67% inhibition and 484(1.61%) for 33-67% inhibition for *Naegleria fowleri* at 5 µg/ml concentration. At 5 µg/ml concentration the *Acanthamoeba* hit rates were 114(0.32%) for greater than 67% inhibition and 279(0.78%) for 33-67% inhibition. We are in the process of discovering the new active chemical structures. Through another project we have developed a high throughput mature cyst drug susceptibility screening assay. Through this we have discovered several compounds that have cysticidal properties against *Acanthamoeba* clinical isolates.

38. GETTINGS, JENNA R.[1]*, STELLA C. WATSON[1], YAN LIU[1], DWIGHT D. BOWMAN[2], ROBERT B. LUND[1], SHILA K. NORDONE[3], CHRISTOPHER S. MCMAHAN[1], AND MICHAEL J. YABSLEY[4,5]. [1]Department of Mathematical Sciences, Clemson University, Clemson SC. [2]College of Veterinary, Cornell University, Ithaca NY. [3]Department of Molecular and Biomedical Sciences, Comparative Medicine Institute, North Carolina State University, College of Veterinary Medicine, Raleigh NC. [4]Southeastern Cooperative Wildlife Disease Study, Department of Population Health, College of Veterinary Medicine, University

of Georgia, Athens GA. [5]Warnell School of Forestry and Natural Resources, University of Georgia, Athens GA. **Forecasting canine vector-borne infections in the United States.**

The distribution and prevalence of vector-borne diseases are ever-changing through climate change, anthropogenic influences on the landscape, and local and regional changes in diversity and density of hosts and vectors. *Dirofilaria immitis, Borrelia burgdorferi, Ehrlichia* spp., and *Anaplasma* spp. are mosquito- or tick-borne pathogens which can cause a variety of clinical diseases in dogs and possibly other hosts. Recommended annual screening protocols in veterinary medicine provide data for evaluating the prevalence of these pathogens within the tested canine populations. From nearly 12 million test results and data of known risk factors, annual forecasts of the distributions and prevalence for each pathogen were predicted for the contiguous United States. Spatio-temporal conditional autoregressive models that account for the spatial and temporal dependencies inherent to these data are used to first fit the current data and putative explanatory variables, and second to extrapolate the predictions to the following year. Relevant explanatory variables that added to the prediction of disease prevalence were used to forecast expected infection prevalence one year in advance. Significance of explanatory variables varied between the different pathogens, but the final models for all four had at least a weight correlation of 0.940 between the observed county-level prevalence and that predicted by the model. Annual predictions of canine vector-borne pathogens can be made accurately and efficiently using these data which are readily and continuously (weekly) available. These predictions will inform pet owners, veterinary medicine and public health professionals, and researchers on the current and future trends of for these diseases.

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