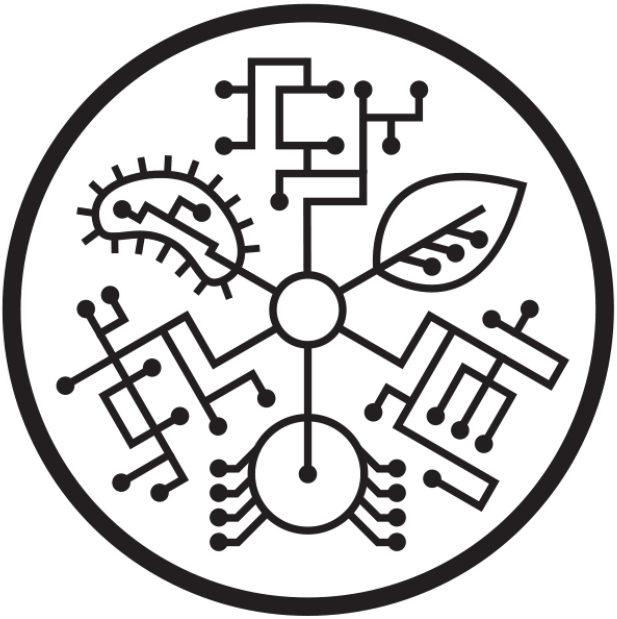
THE 73rd ANNUAL MIDWESTERN CONFERENCE OF PARASITOLOGISTS

Program and Information

Touch of Nature Education Center
Makanda, IL 62958
June 9-11, 2022



Papers and Posters by Students and Faculty

Symposium –Dr. Samniqueka Halsey, University of Missouri-Columbia

Banquet Address – Dr. Vjollca Konjufca, Southern Illinois University Carbondale

AMCOP 73
June 9-11, 2022
Touch of Nature Education Center
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Program Officer…… Dr. Agustín Jiménez
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ACKNOWLEDGEMENTS

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The 73nd Annual Midwestern Conference of Parasitologists provides 4 Continuing Education Credits (4 CE). Your registration confirmation is proof of your attendance.

SCHEDULE

THURSDAY, JUNE 9, 2022

3pm–5pm Registration Check-in is necessary for all attendees. Registration at the Front Desk of Little Grassy Lodge. The local host Agustín Jiménez (Tel # 618-453-5540) will be available at site for those who will arrive outside those hours in case of travel problems.

6pm–8pm Opening Mixer: Bar of the Giant City Lodge, 460 Giant City Lodge Rd, Makanda, IL 62958 (Giant City State Park)

FRIDAY, JUNE 10, 2022

Touch of Nature Outdoor Education Center
The Friends Room

8:00am Continental Breakfast (The Friends Room), Silent Auction set up (back of the Friends Room).

8:35am Opening Remarks and Welcome

- Dr. Agustín Jiménez, Program Officer
- Dr. Eric Brevik, Dean of the College of Agricultural, Life, and Physical Sciences
- Dr. Melissa Stuart, Presiding Officer

CONTRIBUTED PAPERS

(STUDENT COMPETITION PAPERS INDICATED BY *)

8:45 1. *Genetic and trait variability of *Gyrinicola batrachiensis* (Nematoda: Oxyurina) across North America with notes on current taxonomic placement. **MATTHEW A. WALKER (GS)** School of Biological Sciences, Southern Illinois University, Carbondale Illinois 62901-6501, MATTHEW G. BOLEK (MP) Department of Integrative Biology, Oklahoma State University, Stillwater 74078-3054, ELLIOTT A. ZIEMAN (MP) Department of Biological Sciences, Eastern Illinois University, Charleston 61920-3028, GABRIEL J. LANGFORD (MP)

Department of Biology, Florida Southern College, Lakeland 33801-58ND698, JASON L. BROWN (MP) and F. Agustín Jiménez (MP) School of Biological Sciences, Southern Illinois University, Carbondale Illinois 62901-6501

9:00 2. *How are parasite infracommunities affected by host tissue stochieometry in largemouth bass? **ADRIENNE STANEY** (GS), CHARLOTTE NARR (MP). Southern Illinois University in Carbondale, Carbondale, IL, 62901, USA

9:15 3. *The Role of *Didelphis virginiana* as potential hosts for vector-borne pathogens. **CASSANDRA STREHL (GS)** and ELLIOTT ZIEMAN (MP), Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920

9:30 4. *Cytokine profile analysis of domestic cats (*Felis catus*) infected with *Cytauxzoon felis*. **JUSTIN WOLZ (GS)** and ELLIOTT ZIEMAN (MP), Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920

9:45 5. *Periodicity and density-dependent dynamics of migratory bird pathogens. **HEATHER SKEEN[1,2] (GS),** GREG DWYER[3] (MP), JOHN NOVEMBRE[3] (MP). [1]Committee on Evolutionary Biology, University of Chicago, Chicago, IL 60037. [2]Negaunee Integrative Research Center, Field Museum of Natural History, Chicago, IL 60605. [3]Department of Ecology and Evolution, University of Chicago, Chicago, IL 60637

10:00 6. *Evaluating volatile organic compounds for contact-independent antagonism of *Pseudogymnoascus destructans*. **ASHLEY MCDONALD (GS)**[1], KYLE GABRIEL (PD)[2], CHRISTOPHER CORNELISON (MP)[2], [1]Department of Zoology, Southern Illinois University, Carbondale, IL 62901, [2]Department of

Molecular and Cellular Biology, Kennesaw State University, Kennesaw, GA 30144

10:15 BREAK & SILENT AUCTION BIDDING (GMS Keefe Gallery)

10:45 7. Fish invasions as natural experiments in eco-evolutionary dynamics of host-parasite associations. **VICTOR FRANKEL (PD).** Naos Marine Laboratory, Smithsonian Tropical Research Institute

11:00 8 Describing variation in the nutrient content of microparasite infrapopulations. **CHARLOTTE NARR (MP)**, ED HALL (MP). School of Biological Sciences, Southern Illinois University in Carbondale, Carbondale, IL, 62901-6501

11:15 9. DNA sequences and morphology reveal three cryptic(?) species of *Posthodiplostomum minimum* in four sympatric Illinois fishes. **SHAWN MEAGHER (MP)**, SAMANTHA MCCARREL (GS), SHANE MASON (GS), Department of Biological Sciences, Western Illinois University, Macomb, Illinois 61455.

11:30 10. Late Cenozoic history and the role of Beringia in assembling a holarctic cestode species complex. **KURT GALBREATH** (MP), Department of Biology, Northern Michigan University, Marquette, MI 49855

11:45 11. X-treme loss of sequence diversity linked to neo-X chromosomes in filarial nematodes. John Mattick[1], Silvia Libro[2], Robin Bromley[1], Wanpen Chaicumpa[3], Matthew Chung[1], Darren Cook[4], Mohammad Behram Khan[5], Nikhil Kumar[1], Yee-Ling Lau[5], Shailja Misra-Bhattacharya[6], Ramakrishna Rao[7], Lisa Sadzewicz[1], Atiporn Saeung[8], Mohd Shahab[6], Benjamin C Sparklin[1], Andrew Steven[4], Joseph D Turner[4], Luke J Tallon[1], Mark J Taylor[4], Andrew R Moorhead[9], **MICHELLE MICHALSKI (MP) [10]**, Jeremy M Foster[2], Julie C

Dunning Hotopp[1 11 12]; [1]Institute for Genome Science, University of Maryland, Baltimore, Maryland, USA, [2]New England Biolabs, Ipswich, Massachusetts, USA, [3]Department of Parasitology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand, [4]Centre for Neglected Tropical Diseases, Department of Tropical Disease Biology, Liverpool School of Tropical Medicine, Liverpool, UK, [5]Department of Parasitology, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia, [6]Division of Parasitology, CSIR-Central Drug Research Institute, Lucknow, India, [7]Division of Infectious Diseases, Washington University School of Medicine, St Louis, Missouri, USA, [8]Center of Insect Vector Study, Department of Parasitology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand, [9]Department of Infectious Diseases, College of Veterinary Medicine, University of Georgia, Athens, Georgia, USA,[10]University of Wisconsin Oshkosh, Oshkosh, Wisconsin, USA,[11]Department of Microbiology and Immunology, University of Maryland, Baltimore, Maryland, USA, [12]Greenebaum Cancer Center, University of Maryland, Baltimore, Maryland, USA.

12:00 LUNCH

THE AMCOP SYMPOSIUM

The Friends Room

Topic: Exploring host-tick associations to understand disease emergence patterns by combining long-term data sets and computational approaches

1:00 Dr. Samniqueka Halsey, School of Natural Resources, University of Missouri-Columbia

Panel Presentation and Discussion

2:00 Dr. Samniqueka Halsey, “The Importance of Peers and Mentoring in Both Recruitment and Retention in the Sciences”

Panel discussion: Dr. Samniqueka Halsey, Dr. Shelly Michalski, Dr. Agustín Jiménez

POSTER SESSION

Radio River Building

(Poster set-up can occur anytime on Friday)

3:15 – 4:50 pm

12. *Of Intestinal Helminths and *Mephitis mephitis*: The Importance of DNA Barcoding. **KAYLA GREY (UG),** KATELYN AMSPACHER (PhD), DR. CLAYTON NIELSEN (MP), AND DR. F. AGUSTÍN JIMÉNEZ (MP). Department of Zoology, Southern Illinois University – Carbondale, IL 62901

13. Parasite communities in populations of Greater and Lesser Scaup in Green Bay, WI. Nicole WAGNER (UG), GINA MAGRO (UG), KAO LEE THAO (UG), **SARAH A. ORLOFSKE (MP)** Department of Biology, University of Wisconsin – Stevens Point.

14. *The correlation of parasites between ducks and snails collected from Mead Wildlife Area. ELIZABETH VANDOMELEN (UG), **ROIYA MEYER (UG),** NICOLE WAGNER (UG), GINA MAGRO (UG), KAO LEE THAO (UG), ROBERT JADIN (MP), SARAH ORLOFSKE (MP) Department of Biology, University of Wisconsin - Stevens Point

15. *Revealing further diversity of the Diplostomidae (Digenea) parasitic in New World kingfishers. **ZOE S. VON HOLTEN1** (UG), TYLER J. ACHATZ1 (MP), ALAN FECCHIO2 (MP), LYNDA LAFOND3 (GS), and VASYL V. TKACH3 (MP).1 Department of Natural Sciences, Middle Georgia State University, Macon, GA 31206. 2Programa de Pós-Graduação em Ecologia e Conservação da Biodiversidade, Universidade Federal de Mato Grosso, Cuiabá, Mato Grosso, Brazil, 3Department of Biology, University of North Dakota, Grand Forks, ND 58202

16. *Together Forever: Parasite Diversity Tracks Host History in a Mammal/Tapeworm Assemblage. **CATIE GLODOWSKI (UG)** and KURT GALBREATH (MP), Department of Biology, Northern Michigan University, Marquette, MI 49855

17. *Re-evaluating the diversity of the strigeid genus *Nematostrigea* in North America. **BHARANI GUDLA[1] (UG)**, TYLER J. ACHATZ[1] (MP), SARAH A. ORLOFSKE[2] (MP) and VASYL V. TKACH[3] (MP), [1]Department of Natural Sciences, Middle Georgia State University, Macon, GA 31206, [2]Department of Biology, University of Wisconsin – Stevens Point, Stevens Point, WI 54481, [3]Department of Biology, University of North Dakota, Grand Forks, ND 58202

18. *A new genus of dicrocoeliids from bats in Ecuador. **DAWSON K. PACE[1] (UG)**, TYLER J. ACHATZ[1] (MP), CARLOS CARRIÓN BONILLA[2] (MP), THAYANE F. FERNANDES[3] (MP) and VASYL V. TKACH[4] (MP),[1]Department of Natural Sciences, Middle Georgia State University, Macon, GA 31206, [2]Zoological Museum, School of Biological Sciences, Universidad Católica del Ecuador, Quito, Ecuador, [3]Faculdade Facimp Wyden, Imperatriz, Brazil, [4]Department of Biology, University of North Dakota, Grand Forks, ND 58202

19. *Taxonomic confirmation and laboratory life history of *Ornithodoros tartakovskyi*. **PEDRO CACHU CUEVAS(GS),** MUHAMMAD DAR (UG), SEBASTIAN MUÑOZ(MP), VASYL TKACH(MP), and MICHELLE L. MICHALSKI(MP), Department of Biology, University of Wisconsin, Oshkosh, WI 54901

20. *Behind closed doors: Digitizing the Stephen J. Taft parasitology collection. LEE OSGOOD, **ROIYA MEYER (UG)**, JASON LEON, ITZEL CAYETANO, CONRAD GAUSMANN, and SARAH ORLOFSKE (MP), Department of Biology, University of Wisconsin, Stevens Point, WI 54481

21. *Molecular Investigation of Tick-Borne Pathogens in Feral Swine (*Sus scrofa*) From Seven States in USA. **SOFIANE AICHE (GS)**, ELLIOTT ZIEMAN (MP), Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920

22. *Passing Through Beringia: Enhanced Sampling Resolves the History of Intercontinental Dispersal. **ANNIKA DESAI (UG)** and KURT

GALBREATH (MP), Department of Biology, Northern Michigan University, Marquette, MI 49855

23. *Improving the Resolution of Intercontinental Colonization by Pikas Through Improved Geographic Sampling and Nuclear DNA Sequencing. **CORA SIUDA (UG)** and KURT GALBREATH (MP), Department of Biology, Northern Michigan University, Marquette, MI 49855

24. *Positive co-occurrence between two gastrointestinal parasites in white-footed mice (*Peromyscus leucopus*). **FABIAN PALLO (UG)** and Shawn Meagher (MP), Department of Biological Sciences, Western Illinois University, Macomb, IL 61455

25. *Domestication of the Nematomorph in a Laboratory Setting. **NICOLE OLINGER (UG)** and F. A. JIMÉNEZ (MP), Department Of Zoology, Southern Illinois University, Carbondale Illinois 62901-6501.

26. Predicting *in vivo* fecundity using *in vitro* fecundity of *B. pahangi*. ZACHARY HEIMARK (UG), SAMUEL ARENDT (UG), BRIE KEIDL (UG), OLIVIA NEDZA (UG), BRIANA HARTER (T), **TEAGAN JANNESS JORDING (T), KALI BELONGA (T),** STEVEN SCHAAR (T), ROBERT STELZER (MP), AND SHELLY MICHALSKI (MP)

BANQUET

The Friends Room

Cash Bar opens at 6:00 pm
Dinner 6:300 pm

KEYNOTE SPEAKER

Vjollca Konjufca Southern Illinois University Carbondale
"*Chlamydia* pathogenesis and vaccination approaches for inducing immunity in the female reproductive tract"

SATURDAY, JUNE 11, 2022.

7:00 Demonstration of a Field Necropsy and helminth fixation, preservation and archiving. Meet at the picnic tables between the Little Grassy Lodge and Cabins. Led by Drs. Vasyl Tkach, Kurt Galbreath, Tayler Achatz and Agustín Jiménez.

8:00 Continental Breakfast (The Friends Room),
Silent Auction bidding continues (Closet of the Friends Room).

10:00 Last chance for silent auction bidding

10:30 Business Meeting and Award Presentations.
Dr. Melissa Stuart, AMCOP Presiding Officer

Facilities check out following meeting.

ABSTRACTS

1. *Genetic and trait variability of *Gyrinicola batrachiensis* (Nematoda: Oxyurina) across North America with notes on current taxonomic placement. **MATTHEW A. WALKER (GS)** School of Biological Sciences, Southern Illinois University, Carbondale Illinois 62901-6501, MATTHEW G. BOLEK (MP) Department of Integrative Biology, Oklahoma State University, Stillwater 74078-3054, ELLIOTTA. ZIEMAN (MP) Department of Biological Sciences, Eastern Illinois University, Charleston 61920-3028, GABRIEL J. LANGFORD (MP) Department of Biology, Florida Southern College, Lakeland 33801-58ND698, JASON L. BROWN (MP) and F. Agustín Jiménez (MP) School of Biological Sciences, Southern Illinois University, Carbondale Illinois 62901-6501

Gyrinicola Yamaguti, 1938 includes six species of oxyurid mutualists found within the intestinal tract of numerous larval anuran species. The species include the sympatric *G. tba* (Dinnik, 1930) and *G. chabadamsoni* Brigitte et al., 2008 in Europe, *G. chabaudi* Araujo & Artigas, 1983 in Argentina and Brazil, *G. japonica* Yamaguti, 1938 in Japan, *G. dehradunensis* Maity, Rizvi, Bursey & Chandra, 2019 in India and *G. batrachiensis* (Walton, 1929) in North America. The systematic placement and hierarchical treatment of the genus has shifted since its discovery, having been considered as its own family (Gyrinicolidae), then considered as a genus of the Pharyngodonidae, then treated as a subfamily (Gyrinicolinae) of Cosmoceridae, and finally a recent proposal to resurrect Gyrinicolidae. Morphological variation of *G. batrachiensis* was analyzed in dioecious metapopulations from Oklahoma and dioecious/parthenogenetic metapopulations from Nebraska; results of these analyses yielded significant differences among worms from different host species. However, prior to this study no *G. batrachiensis* sequences were available, thus preventing comparisons using genetic markers. To examine diversity of *G. batrachiensis,* and the placement of the *Gyrinicola,* we sampled populations of these nematodes across North America and screened them for genetic diversity using nuclear markers 18S, 28S, ITS1, 5.8S and ITS2 and performed a morphological analysis of specimens. Phylogenies suggest at least three clades exist among the nematodes from North America and that these clades, alongside *G. japonica*, form a well-supported group within Oxyuroidea. Further representation of

Pharyngodonidae from other vertebrate classes may help clarify relations in this historical grouping.

2. * How are parasite infracommunities affected by host tissue stochieometry in largemouth bass? **ADRIENNE STANEY (GS)**, CHARLOTTE NARR (MP) Southern Illinois University in Carbondale, Carbondale, IL, 62901, USA

The stoichiometric method of simplifying organisms into chemical ratios of Carbon, Nitrogen, and Phosphorus has been useful in investigating parasite-host dynamics. Most research so far, however, has assumed little variation among different organs within and between host of the same species and their potential effects on parasite infracommunities infecting those hosts. To investigate the potential effects of tissue nutrient content, I used Largemouth Bass from the Mississippi river and the macro parasites infecting their digestive tract. Digestive organs were removed from the fish and dissected for parasites and separated into four distinct organs; liver, stomach, pyloric caeca, and intestines. The parasites were sorted into groups of trematodes, and two types of acanthocephalan, l*eptorhyncoides* and n*eoechinorhynchus*. Host tissues were analyzed for nutrient levels, while the number of parasites in each category were recorded for each tissue then compared to the phosphorus levels of the organ they were found in. Analysis thus far indicates the number of parasites in each digestive organ is correlated with percent nutrient content, although the nutrient or ratio of importance is not consistent. Parasite nutrient levels comparted to the tissue they were found showed marginal results in very small sample sizes, indicating more research may be warranted.

3. *The Role of *Didelphis virginiana* as Potential Hosts for Vector-Borne Pathogens. **CASSANDRA STREHL (GS**) and ELLIOTT ZIEMAN (MP), Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920

The threat of vector-borne pathogens (VBP) is increasing in the United States. Because of this emerging risk, wildlife reservoirs require further study to determine their role as hosts of VBP. *Didelphis virginiana* are an ideal species to study due to their synanthropic behavior, increasing their potential as serving as reservoirs and infection sources to humans for zoonotic diseases. The aim of this study is to survey Virginia opossums for a variety of apicomplexan parasites. A total of 44 Virginia opossums were trapped using wire cage traps, provided by pest control companies, or

collected as roadkill throughout Illinois and southwest Ohio. Blood samples were collected to test for the presence of pathogens. *Didelphis virginiana* were screened for *Toxoplasma gondii*, *Hepatozoon* spp., Babesia spp., *Theileria* spp., *Cytauxzoon felis*, and *Plasmodium* spp. In addition, these samples were tested for *Rickettsia* spp., and *Trypanosoma cruzi*, since Virginia opossums are known reservoir hosts to these zoonotic pathogens. The samples from Ohio show an 81% prevalence of apicomplexans. This study provides additional information regarding the sylvatic cycle of many VBPs.

4. *Cytokine profile analysis of domestic cats (*Felis catus*) infected with *Cytauxzoon felis*. **JUSTIN WOLZ (GS)** and ELLIOTT ZIEMAN (MP), Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920

Cytauxzoon felis is an apicomplexan parasite in the order Piroplasmida, family Theileriidae. *C. felis* is a vector-borne parasite primarily transmitted by the Lone star tick (*Amblyomma americanum)* and may also be transmitted by the American dog tick (*Dermacentor variabilis*). *C. felis* is the etiological agent of the disease cytauxzoonosis, an emerging tick-borne disease of domestic cats (*Felis catus*). Bobcats (*Lynx rufus*) serve as a natural animal reservoir for *C. felis*. *C. felis* has been enzootic in the South and Southeastern United States but has continuously expanded north and west in the United States with the expansion of the zoogeographic range of the Lone star tick. Cytauxzoonosis has been associated with high mortality rates in infected domestic cats, although emerging research has shown that domestic cats can have subclinical infections, acting as reservoir hosts for the parasite. There are relatively few studies present that analyze the immunological processes associated with feline infection. Studies that have focused on the feline immune response to cytauxzoonosis have shown there to be an upregulation of pro-inflammatory mediator molecules and cytokines following infection. In this study, we analyzed the cytokine profiles, comprised of Fas, IFNγ, IL-1β, IL-2, IL-4, IL-5, IL-8, IL-10, IL-12 and RANTES, of domestic cats infected with C. felis. We aim to expand upon current research on how the feline immune system is modulated in response to cytauxzoonosis. This can help to elucidate further understanding of the immune processes associated with this disease while identifying potential avenues for treatment.

5. *Periodicity and density-dependent dynamics of migratory bird pathogens. **HEATHER SKEEN[1,2] (GS),** GREG DWYER[3] (MP), JOHN NOVEMBRE[3] (MP). [1]Committee on Evolutionary Biology, University of Chicago, Chicago, IL 60037. [2]Negaunee Integrative Research Center, Field Museum of Natural History, Chicago, IL 60605. [3]Department of Ecology and Evolution, University of Chicago, Chicago, IL 60637

The ecological dynamics of host-pathogen systems often change over time, typified in many cases by systemic temporal variation in pathogen prevalence. Long term datasets are crucial to understanding the temporal dynamics of natural populations, allowing for a robust approach in identifying variability of prevalence and diversity over time. In this study, we use a novel data source of data, in the form of a long-term collection of salvaged birds housed at the Field Museum of Natural History in Chicago, Illinois, USA. We document temporal variation in the prevalence of three genera of avian haemosporidians (*Haemoproteus*, *Plasmodium*, and *Leucocytozoon*) in 4,306 individuals from four species of migratory Catharus thrushes collected during spring and fall migration over a 24-year time period (1996-2019). We use hierarchical Bayesian modeling to infer periodicity in pathogen prevalence, identifying cycling patterns unique to each host species-pathogen genus pairing. We complement this with a density-dependent model of migratory bird epizootics and identify parameter ranges inferred from the results of the identified cycles. We determined that avian haemosporidians exhibit distinct seasonality generally exhibiting higher prevalence in the fall than the spring, multi-year periodicity spans 8-19 years depending on the host-pathogen pair, and that factors relating to host population size, such as net fecundity, reasonably replicate the patterns observed in the statistical model, resulting in a plausible mechanism driving periodicity of avian haemosporidians.

6. *Evaluating Volatile Organic Compounds for Contact-Independent Antagonism of *Pseudogymnoascus destructans*. **ASHLEY MCDONALD (GS)**[1], KYLE GABRIEL (PD)[2], CHRISTOPHER CORNELISON (MP)[2], [1]Department of Zoology, Southern Illinois University, Carbondale, IL 62901, [2]Department of Molecular and Cellular Biology, Kennesaw State University, Kennesaw, GA 30144

White-nose syndrome (WNS), caused by the psychrophilic fungus *Pseudogymnoascus destructans*, has been implicated in the massive decline of hibernating bat populations across North America and has led to the listing of impacted species under the US Endangered Species Act. Due to the importance of bats to biodiversity and their ecosystem services in agricultural systems, researchers, in conjunction with wildlife management agencies, have been actively exploring disease control methods to mitigate the impact of WNS on susceptible bat species. A variety of control methods have been explored utilizing probiotics, volatile organic compounds, vaccines, polyethylene glycol, and UV light. Many of these studies have produced in vitro results suggesting their efficacy in inhibiting or killing *P. destructans*, but only a select few have progressed to field testing to determine their *in situ* efficacy in mitigating WNS-related bat mortality. The accessibility and ecology of bat hibernacula pose unique complications for application of disease management approaches, contributing to the need for improved application methods for these seemingly efficacious disease treatments. Volatile organic compounds have recently been proposed as a control option for many pathogenic fungi because of their strong antifungal activities documented in the literature. Many of these volatile organic compounds are ubiquitously found in nature, suggesting their safe use in wildlife disease management. This research aimed to evaluate the inhibitory activities of a select list of volatile organic compounds against *P. destructans* mycelial growth and conidia germination, for their potential field application in WNS management.

7. Fish invasions as natural experiments in eco-evolutionary dynamics of host-parasite associations.**VICTOR FRANKEL (PD)*** Naos Marine Laboratory, Smithsonian Tropical Research Institute

The invasion of the predatory fish can dramatically alter the abundance and diversity of free-living species in tropical lakes but the impact of this defaunation on the ecology and evolution of host-parasite interactions is less clear. On the one hand, the loss of free-living species is expected to reduce the diversity and abundance of parasites. On the other hand, fish invasions could facilitate the spread of parasites that infect them. This is the case with either 1) highly specialized parasites that share a common evolutionary history with their invasive host or 2) novel generalist parasites that can establish on a new host in an expanded geographic range. Here, we ask 1) to what extent does *Centrocestus formosanus*, an introduced trematode parasite native to Southeast Asia, infect novel fish hosts in the Isthmus of Panama and 2) to what extent does this “generalist” parasite

demonstrate host preference for a novel fish host in its expanded geographic range? To address the first question, field surveys across three field sites in Gatun Lake, Panama, revealed that the invasive peacock bass, *Cichla monoculus*, was more commonly infected by the introduced trematode parasite *Centrocestus formosanus* than were three other cichlid fishes. Laboratory infection experiments were conducted to determine whether parasitism might be driven by differential encounter/exposure to parasites or by differential infection susceptibility/preference across different host species. These experiments were performed by controlling for parasite exposure in single host (compatibility) experiments and in mixed host (preference) experiments. In all cases, the peacock bass exhibited higher infection rates with viable metacercariae relative to the other potential fish hosts. Our experiments thus support that an introduced generalist parasite shows apparent specialization on a specific novel host. Further studies are needed to determine whether these patterns of specialization are the result of local adaptation following invasion by the parasite.

8. Describing variation in the nutrient content of microparasite infrapopulations. **CHARLOTTE NARR (MP)**, ED HALL (MP). School of Biological Sciences, Southern Illinois University in Carbondale, Carbondale, IL, 62901-6501

Theoretical work suggests that ecological stoichiometry theory can inform our understanding of nutrient-parasite interactions, but empirical support for this theory is sparse. Two issues contribute to this paucity of data: 1) logistical issues associated with measuring the elemental composition of parasites, especially microparasites in vivo, and 2) our tendency to treat parasites in hosts as single individuals. While many parasites exist within hosts as infrapopulations, the few studies that have measured the stoichiometry of parasites report either a single value per infection/host or pooled values from multiple hosts. Our study addresses both of these issues and tests the hypothesis that individual parasites of the same species within a single host have different elemental compositions. We measured the elemental composition of individual microbial parasite spores in in vivo. To do so, we used energy dispersive spectroscopy, a method previously used to characterize the stoichiometry of free-living microbes, to generate stoichiometric trait distributions of the microsporidian Hamiltosporidium tvaerminnensis within individual Daphnia. Our results show that 1) this method effectively characterizes the C:N:P ratios of individual spores, and 2) there is substantial variation in the elemental compositions of individual microparasites in a single host. Within a single Daphnia, the C:N, C:P, and

N:P ratios of H. tvaerminnensis ranged from 3-10, 56-820, and 12-86, respectively. Reporting a single mean elemental composition for multiple parasitic individuals within a host may mask the ecological relationship between the host's diet and parasite dynamics within the host, limiting our ability to develop a mechanistic understanding of infection.

9. DNA sequences and morphology reveal three cryptic(?) species of *Posthodiplostomum minimum* in four sympatric Illinois fishes. **SHAWN MEAGHER (MP)**, SAMANTHA MCCARREL (GS), SHANE MASON (GS), Department of Biological Sciences, Western Illinois University, Macomb, Illinois 61455.

Posthodiplostomum minimum, or "white grub," is now recognized as a widespread and common trematode group that infects over 20 species of centrarchid fishes. We used genetic and morphological data to examine species diversity of P. minimum infecting four sympatric host species in a single Illinois lake: bluegill (*Lepomis macrochirus*), green sunfish (*L. cyanellus*), largemouth bass (*Micropterus salmoides*) and white crappie (*Pomoxis annularis*). We sequenced mtDNA COI and nuclear rDNA ITS for 95 worms. We found evidence for 3 genetically distinct types which corresponded to previously identified genetic "species", and displayed distinct patterns of host specificity. *Lepomis macrochirus*, *M. salmoides*, and *P. annularis* hosts were each infected by a single genetic type. Therefore, we tested for morphological differences among metacercariae from these hosts, and found significant univariate and multivariate differences. In general, metacercariae from L. macrochirus were the largest, and those from *P. annularis* were the smallest. Metacercaria from both *L. macrochirus* and *M. salmoides* were wider than those from *P. annularis*. Our molecular work supports the growing body of data that *P. minimum* is actually a group of species with different levels of host specificity. Our morphological results are the first to show that these species display consistent anatomical differences, and so may not be cryptic. More work is needed to accurately document species diversity in P. *minimum*, as well as to understand patterns host specificity, site specificity, and local abundance in this ecologically important group.

10. Cenozoic history and the role of Beringia in assembling a holarctic cestode species complex. **KURT GALBREATH (MP)**, Department of Biology, Northern Michigan University, Marquette, MI 49855

The dynamic climatic history that drove sea level fluctuation during past glacial periods mediated the movement of organisms between Asia and North America via the Bering Land Bridge. Investigations of the biogeographic histories of small mammals and their parasites demonstrate a complex history of geographic colonization and refugial isolation that structured diversity across the Holarctic. Here a large multi-locus nuclear DNA sequence dataset is used to robustly resolve relationships within the cestode genus A*rostrilepis* (Cyclophyllidea: Hymenolepididae), a widespread and diverse group of parasites of predominantly arvicoline rodents (voles, lemmings). This phylogeny and a molecular clock confirm that several Asian *Arostrilepis* lineages colonized North America during two or more distinct glacial periods. A previously inferred westward dispersal across the land bridge is rejected. These data also refine interpretations of past host colonization events, indicating a simpler history of colonization than has previously been inferred. Finally, *Arostrilepis* is shown to be paraphyletic with respect to *Hymenandrya thomomyis*, indicating that testis number is not a reliable generic-level diagnostic trait among hymenolepidids.

11. X-treme loss of sequence diversity linked to neo-X chromosomes in filarial nematodes JOHN MATTICK, SILVIA LIBRO, ROBIN BROMLEY, WANPEN CHAICUMPA, MATTHEW CHUNG, DARREN COOK, MOHAMMAD BEHRAM KHAN, NIKHIL KUMAR, YEE-LING LAU, SHAILJA MISRA-BHATTACHARYA, RAMAKRISHNA RAO, LISA SADZEWICZ, ATIPORN SAEUNG, MOHD SHAHAB, BENJAMIN C SPARKLIN, ANDREW STEVEN, JOSEPH D TURNER, LUKE J TALLON, MARK J TAYLOR, ANDREW R MOORHEAD, **MICHELLE MICHALSKI** (MP), JEREMY M FOSTER, JULIE C DUNNING HOTOPP

The sequence diversity of natural and laboratory populations of *Brugia pahangi* and *Brugia malayi* was assessed with Illumina resequencing followed by mapping in order to identify single nucleotide variants and insertions/deletions. In natural and laboratory *Brugia* populations, there is a lack of sequence diversity on chromosome X relative to the autosomes ($\pi X/\pi A = 0.2$), which is lower than the expected ($\pi X/\pi A = 0.75$). A reduction in diversity is also observed in other filarial nematodes with neo-X chromosome fusions in the genera *Onchocerca* and *Wuchereria*, but not those without neo-X chromosome fusions in the genera *Loa* and *Dirofilaria*. In the species with neo-X chromosome fusions, chromosome X

is abnormally large, containing a third of the genetic material such that a sizable portion of the genome is lacking sequence diversity. Such profound differences in genetic diversity can be consequential, having been associated with drug resistance and adaptability, with the potential to affect filarial eradication.

12. *Of Intestinal Helminths and *Mephitis mephitis*: The Importance of DNA Barcoding **KAYLA GREY (UG),** KATELYN AMSPACHER (PhD), DR. CLAYTON NIELSEN (MP), AND DR. F. AGUSTÍN JIMÉNEZ (MP) School of Biological Sciences, Southern Illinois University – Carbondale, IL 62901

This research aims at updating the helminthological (parasite) record for the striped skunk in Southern Illinois and producing DNA barcodes for these endoparasites. The generation of these barcodes are important because some of these helminths are often widespread with potential genetic variability among populations that still need to be documented. Further, changes in taxonomy or neglect of the process of species level identification may result in the assignation of different names for the same species. The generation of the sequences and their dissemination in public databases will assist other researchers to achieve a more precise identification of helminths encountered.

13. Parasite communities in populations of Greater and Lesser Scaup in Green Bay, WI. NICOLE WAGNER (UG), GINA MAGRO (UG), KAO LEE THAO (UG), **SARAH A. ORLOFSKE (MP)** Department of Biology, University of Wisconsin – Stevens Point.

Greater and Lesser Scaup populations in the U.S. have been declining since the 1980s. Our research goal is to survey parasites of scaup, including potentially pathogenic trematodes (flatworms), in Green Bay, WI area. We obtained waterfowl carcasses donated from hunters during the 2019-2021 seasons. Birds were dissected, separating their major organs and each organ was inspected for parasites using standardized protocols. Any parasites we found were separated, counted, and identified to the lowest taxonomic level possible using morphological traits. We found a diverse parasite community with cestodes (tapeworms) being the most abundant endoparasites. Specimens from 16 parasite genera were identified. Among the trematodes, we found all three of the pathogenic introduced genera. Monitoring parasites in scaup is important for waterfowl management to

better describe the distribution of pathogenic species as well as understand the species interactions with the native parasite community.

14. *The correlation of parasites between ducks and snails collected from Mead Wildlife Area. ELIZABETH VANDOMELEN (UG), **ROIYA MEYER (UG)**, NICOLE WAGNER (UG), GINA MAGRO (UG), KAO LEE THAO (UG), ROBERT JADIN (MP), SARAH ORLOFSKE (MP) Department of Biology, University of Wisconsin - Stevens Point

Trematodes, or flatworms, have complex life cycles involving snails, a variety of intermediate hosts, and vertebrate final hosts. These parasites infect their hosts through consumption, so infections can provide evidence of host diet and long-term evidence of host presence in the habitat. We compared parasite communities between 76 snails and 11 waterfowl samples collected from Mead State Wildlife Area. We observed 2-5 parasite morphotypes (prevalence 36-40%) in the snails. Waterfowl had 1-5 parasite morphotypes and all were infected with at least one species of flatworm. Our study revealed an overlap in the parasite communities. Echinostomes and *Ribeiroia* were found in both snails and waterfowl at two sites. The differences in parasite communities could be due to the presence of other final hosts at the site and waterfowl migration. Species level Identification of parasites will allow us to detect species that could be used as potential biological indicators of host communities.

15. *Revealing further diversity of the Diplostomidae (Digenea) parasitic in New World kingfishers. **ZOE S. VON HOLTEN[1] (UG),** TYLER J. ACHATZ[1] (MP), ALAN FECCHIO[2] (MP), LYNDA LAFOND[3] (GS), and VASYL V. TKACH[3] (MP).[1]Department of Natural Sciences, Middle Georgia State University, Macon, GA 31206 [2]Programa de Pós-Graduação em Ecologia e Conservação da Biodiversidade, Universidade Federal de Mato Grosso, Cuiabá, Mato Grosso, Brazil [3]Department of Biology, University of North Dakota, Grand Forks, ND 58202

Kingfishers (Aves: Alcedinidae) are definitive hosts to a diversity of digeneans that use fish second intermediate hosts. Many digeneans parasitic in kingfishers belong to the Diplostomidae; larvae of these diplostomids are well-known causes of fish health problems in North America. Until recently, only a limited number of diplostomid species were

known from kingfishers throughout North and South America. In the present study, we generated sequences of the large ribosomal subunit (28S) rDNA and cytochrome c oxidase 1 (cox1) mtDNA genes from several diplostomid taxa collected from kingfishers in North and South America. The newly generated and previously published DNA sequences were used for phylogenetic analyses to explore the interrelationships of these newly sequenced taxa. Based on phylogenetic inference and morphological study, the identities of these diplostomids revealed the presence of 2 new species of *Crassiphiala* spp. and a new genus with 2 new species from Pantanal, Brazil. In addition, we provide the additional DNA sequence data of previously described members of *Crassiphiala* and *Uvulifer* from North America. Detailed morphological study demonstrated the new genus and *Crassiphiala* to be remarkable similar but revealed some features suitable for generic differentiation. This study was funded in part by the National Science Foundation project numbers DEB 1120734, the Joe K. Neel Research award from the University of North Dakota, and the Willis A. Reid, Jr. Student Research Grant from the American Society of Parasitologists.

16. *Together Forever: Parasite Diversity Tracks Host History in a Mammal/Tapeworm Assemblage. **CATIE GLODOWSKI (UG)** and KURT GALBREATH (MP), Department of Biology, Northern Michigan University, Marquette, MI 49855

The southern red-backed vole (*Myodes gapperi*) is a definitive host for *Catenotaenia*, a genus of tapeworms that includes nineteen described species. Many terrestrial species, including *M. gapperi*, took refuge in the southern half of North America during Pleistocene glacial periods, expanding their distribution northward after glaciers receded. Due to the ecological linkage between host and parasite, understanding of host history can be enhanced by unveiling parasite biogeographic histories. There has been extensive research on the diversity and evolutionary history of Eurasian *Catenotaenia*, but little is known about *Catenotaenia* diversity within North America. To further understand the post-glacial colonization history of these tapeworms, we sought to: (i) determine how many major *Catenotaenia* lineages are present in North America, (ii) discover how lineages are geographically distributed, and (iii) discern their relation to the Eurasian lineages. We answered these questions by sequencing two gene regions of mitochondrial DNA from samples spanning North America, with additional data from Asia. We conducted phylogenetic analyses to infer relationships within the genus, and found that there are three distinct lineages of *Catenotaenia* in North America that are more closely related to

each other than to the Eurasian lineages. Two of these lineages are geographically widespread, coming into contact in central Canada. These findings are consistent with the distribution and phyletic structure of southern red-backed voles, suggesting concordant histories of isolation in shared glacial refugia. Future work should investigate the possibility of a contact zone between the host clades that coincides with that of the parasites.

17. *Re-evaluating the diversity of the strigeid genus *Nematostrigea* in North America. **BHARANI GUDLA[1] (UG)**, TYLER J. ACHATZ[1] (MP), SARAH A. ORLOFSKE[2] (MP) AND VASYL V. TKACH[3] (MP), [1]Department of Natural Sciences, Middle Georgia State University, Macon, GA 31206, [2]Department of Biology, University of Wisconsin – Stevens Point, Stevens Point, WI 54481, [3]Department of Biology, University of North Dakota, Grand Forks, ND 58202

Nematostrigea is a small genus of strigeid digeneans (Diplostomoidea: Strigeidae) parasitic in the intestines of ospreys (Aves: Pandionidae). The genus currently only contains 2 species; however, the type-species *Nematostrigea serpens* is separated into 2 subspecies, in part, based on whether the strigeids are found in the Old World (*N. s. serpens*) or the New World (*N. s. annulata*). DNA sequences of *Nematostrigea* spp. are limited, with sequences of *N. serpens* only available from the Old World. In the present study, we generated partial sequences of the large ribosomal subunit (28S) rDNA and cytochrome c oxidase 1 (cox1) mtDNA genes from *N. s. annulata* collected from an osprey in Wisconsin. Comparison of DNA sequences provided strong support that *N. s. annulata* should be considered a separate species. Morphological study of the type-specimens of *N. s. annulata* allowed redescription of the species and identification of morphological features suitable for species-level differentiation.

18. *A new genus of dicrocoeliids from bats in Ecuador. **DAWSON K. PACE[1] (UG)**, TYLER J. ACHATZ[1] (MP), CARLOS CARRIÓN BONILLA[2] (MP), THAYANE F. FERNANDES[3] (MP) and VASYL V. TKACH[4] (MP),[1]Department of Natural Sciences, Middle Georgia State University, Macon, GA 31206, [2]Zoological Museum, School of Biological Sciences, Universidad Católica del Ecuador, Quito, Ecuador, [3]Faculdade Facimp Wyden, Imperatriz,

Brazil, [4]Department of Biology, University of North Dakota, Grand Forks, ND 58202

The Dicrocoeliidae is a highly diverse and globally distributed family of digeneans that includes parasites of amniotic tetrapods, predominantly birds. Most dicrocoeliids parasitize the gallbladder and bile ducts of their definitive hosts. However, members of a few genera are known to parasitize the intestines of their definitive hosts. In the present study, we collected 2 members of a new genus which lack digestive organs and is parasitic in the intestines of Neotropical bats. Fragments of the nuclear large ribosomal subunit (28S) rDNA gene were sequenced for both species and used to study their phylogenetic position among other major lineages of the Dicrocoeliidae. Remarkably, the members of this new genus lack consistent morphological differences suitable for differentiation from *Aneneterotrema*, another genus of dicrocoeliids that lack digestive organs and is parasitic in the intestines of Neotropical bats. However, the molecular phylogeny revealed the members of the new genus to be positioned well-separated from *Anenterotrema* spp., including the type-species *Anenterotrema auritum*. Despite the lack of differences at the genus-level, the 2 members of the new genus are clearly new to science and demonstrate further unknown diversity of digeneans from Neotropical bats.

19. *Taxonomic confirmation and laboratory life history of *Ornithodoros tartakovskyi*. **PEDRO CACHU CUEVAS(GS),** MUHAMMAD DAR (UG), SEBASTIAN MUÑOZ(MP), VASYL TKACH(MP), and MICHELLE L. MICHALSKI(MP), Department of Biology, University of Wisconsin, Oshkosh, WI 54901

This poster describes the re-starting of an *Ornithodoros tartakovskyi* colony that had been dormant for 18 months. A total of 1,019 mixed stage ticks were fed defibrinated rabbit blood using a radiant-heated artificial membrane feeder in January 2021. Ticks were maintained on sterilized playground sand at 80% relative humidity at 27 Celsius and were fed monthly. Adults required only one feeding to begin produce egg clutches, and the resulting larvae were pooled with previously dormant larvae from other groups to promote colony expansion. Progression through the larval and four nymphal instars occurred monthly afterwards. Ongoing experiments preliminarily demonstrate that egg clutch size decreases after the first mating (to be reported). There was no difference in mortality rates between larval and nymphal stages (range of 2-67%). The larva of *O. tartakovskyi* was confirmed because of the following combination of morphological features: dorsum provided with 13 pairs of setae (seven

anterolateral, four posterolateral, two central), absence of dorsal plate, absence of posteromedian seta, and a short blunt hypostome, arising directly from the basis capitulum, with few denticles only in the anterior half (file one with 4 denticles, file two with 3 denticles).

20. *Behind closed doors: Digitizing the Stephen J. Taft parasitology collection. LEE OSGOOD, **ROIYA MEYER (UG)**, JASON LEON, ITZEL CAYETANO, CONRAD GAUSMANN, and SARAH ORLOFSKE (MP), Department of Biology, University of Wisconsin, Stevens Point, WI 54481

Museum collections have historically been used for research and education, although restricted to nearby locations as physical specimens are fragile and irreplaceable. With technology, it is possible to share information about museum specimens on an exceptional scale. Terrestrial Parasite Tracker (TPT) is an NSF-funded project aiming to increase access to parasitic and vector arthropod collections around the United States through digitization and assemblage to data aggregators, contributing to a large pool of data for researchers and educators to use. This allows researchers and educators to study specimens they would otherwise not have access to physically. The University of Wisconsin - Stevens Point's Stephen J. Taft parasitology collection in the Museum of Natural History was awarded a grant to contribute toward this project with a goal of digitizing 9280 records to the Symbiota Collections of Arthropods Network (SCAN). Students also can expand their skills in museum curation and data management. Our student team is faced with unique challenges and opportunities because our parasitology collection primarily comes from research and student specimens, much of which is dubiously standardized. We are over 80% of the way to our goal with most of the arthropod slides in the collection uploaded to SCAN. We are currently working on processing vials in our collection to meet our goals by September. In the future, the skills developed through this project will help us to digitize the rest of our collection.

21. *Molecular Investigation of Tick-Borne Pathogens in Feral Swine (*Sus scrofa*) From Seven States in USA. **SOFIANE AICHE (GS)**, ELLIOTT ZIEMAN (MP), Department of Biological Sciences, Eastern Illinois University, Charleston, IL 61920

Feral swine (*Sus scrofa*) have been proposed as components of the lifecycles of multiple tick-borne pathogens (TBP). It is vital to study feral

swine and TBP as a result of increased feral swine populations and increased tick populations and geographic ranges. Few surveys exist of the TBP relevant to human and veterinary health of feral swine in the US. The aim of this study is to investigate the prevalence of 10 TBP: *Borrelia* sp, *Cytauxzoon felis*, H*epatozoon* spp, *Babesia* spp, *Theileria* spp, *Mycoplasma* spp, *Trypanosoma cruzi*, *Toxoplasma gondii*, *Yersinia pestis,* and *Rickettsia* spp. A total of 90 feral swine blood samples were acquired from 29 counties in Alabama, California, Florida, Illinois, Kansas, Louisiana, and Oklahoma by the USDA Wildlife Services as part of feral swine control. Blood samples were screened via polymerase chain reaction for the detection of the aforementioned TBP DNA. The presence of *Babesia* spp was not detected in any of the feral swine samples. The presences of babesia in feral swine hasn't been reported in the United States. These initial results are the first on feral swine in these 7 states. Our investigation will continue to screen feral swine samples for additional TBP and investigate feral swine as a potential reservoir of TBP.

22. *Passing Through Beringia: Enhanced Sampling Resolves the History of Intercontinental Dispersal. **ANNIKA DESAI (UG)** and KURT GALBREATH (MP), Department of Biology, Northern Michigan University, Marquette, MI 49855

Terrestrial communities in North America were assembled through a history of climate-driven colonization across the Bering Land Bridge, which periodically connected Asia to North America during the Pleistocene. Taxa moving across the bridge carried their parasites and studying these parasites can inform our understanding of the host's intercontinental dispersal. For instance, the pika, a small lagomorph, carries a wide diversity of parasites that have recently indicated two different aspects of pika biogeographic history. Phylogenetic studies of *Schizorchis*, a genus of tapeworms that resides in pikas, demonstrated two episodes of North American colonization from Asia roughly 10 million and 4 million years ago. Separately, evidence from five lineages of pika parasites depicted a northward colonization from North America's Intermountain West to Northern Canada and Alaska. We tested these hypotheses using an extended dataset obtained from two subgenera of pinworms, *Labiostomum* (*Labiostomum)* and *Labiostomum* (*Eugenuris*). We sequenced three regions of DNA: two mitochondrial and one nuclear. We used these data to create phylogenetic trees that show the relationships between pinworms of different localities, which then depict the colonization history. Our results confirmed two episodes of eastward colonization; however, the south-to-north hypothesis was not supported. These findings imply distinct waves of

eastward colonization by pikas, but movement of host populations within North America was not resolved.

23. *Improving the Resolution of Intercontinental Colonization by Pikas Through Improved Geographic Sampling and Nuclear DNA Sequencing. **CORA SIUDA (UG)** and KURT GALBREATH (MP), Department of Biology, Northern Michigan University, Marquette, MI 49855

Pikas, small lagomorphs that live at high elevations across western North America and Central Asia, have a complex history of intercontinental exchange. Earlier work on the tapeworms (genus *Schizorchis)* of pikas suggested that there were two separate waves of colonization into North America from Asia. However, this previous study of pikas and their *Schizorchis* parasites lacked a complete sampling of *Schizorchis* diversity present in Asia. I subsequently acquired DNA sequences for three independent gene regions (loci) from previously unsampled Asian *Schizorchis* species. Phylogenetic analysis of these data supported the conclusion that there were two colonizations into North America from Asia, but the tree lacked phylogenetic resolution due to the limited number of sequenced loci. To address this, I created 22 new nuclear loci primer sets and screened them against multiple DNA samples representing different major *Schizorchis* lineages. Ten loci yielded clean sequencing results. I plan to sequence these 10 loci for all newly-acquired Asian *Schizorchis* and conduct a multi-locus phylogenetic analysis to give a more accurate understanding of where they lie in the phylogenetic tree. Results will either solidify the two-colonization hypothesis or suggest an alternative history (e.g., one colonization). This will give a more accurate insight into the assembly of pika and parasite communities in North America.

24. *Positive co-occurrence between two gastrointestinal parasites in white-footed mice (*Peromyscus leucopus*). **FABIAN PALLO (UG)** and Shawn Meagher (MP), Department of Biological Sciences, Western Illinois University, Macomb, IL 61455

Gut-inhabiting parasitic worms (helminths) infect and reduce the health of billions of people and all non-human mammalian species. Because gut parasitism is so widespread, it is critical to identify what determines gastrointestinal parasite loads. One possible determinant is interactions (negative or positive) between different gut-infecting species, but there have been no tests for interactions between most pairs of species. I

examined whether there are interactions between the roundworm, *Pterygodermatites peromysci*, and the tapeworm, *Hymenolepis folkertsi*, in the gastrointestinal tract of white-footed mice (*Peromyscus leucopus*). I collected mice from natural woodlots at the Kibbe Life Sciences Station, determined parasite counts through dissections, and combined my data with previously collected data (2014–2021). Parasite counts were not normally distributed (most were 0 or 1), so I performed a series of non-parametric statistical tests to determine whether infection by one worm affected infection by the other. I found a positive pattern of co-infection: both worms co-occurred in one host significantly more often than expected by chance. However, there was a negative correlation between number of individuals of the two species when singly infected mice were included in the analysis, but no correlation when the analysis was restricted to doubly infected mice. Finally, there was no difference in median parasite counts between the two species, nor between single-species infections and co-infections when considering each species separately. These results (positive co-occurrences and negative or no correlations between parasite counts) suggest that shared transmission routes, and not positive facilitation between the species, explain these patterns.

25. *Domestication of the Nematomorph in a Laboratory Setting. **NICOLE OLINGER (UG)** and F. A. JIMÉNEZ (MP), School of Biological Sciences, Southern Illinois University, Carbondale Illinois 62901-6501.

From October-May 2021-2022, Snails collected from water sources around Carbondale, IL have been screened for nematomorph cysts. Of the 28 snails screened 5 had confirmed nematomorph cysts and were frozen in cryotubes. In order to fully domesticate the nematomorphs in the laboratory, live nematomorphs from Still Water, OK were mailed to Carbondale, IL. Terrariums were set up that allowed for the hairworms to remain separated by sex. Females were kept in isolated containers while males were kept grouped together. Females were observed under a dissection microscope for signs of impregnation. When eggs were laid, they were removed from the female's container and washed in a bleach solution, and the progress of development was observed by taking a small sample of the egg string and observing through a microscope. From the week of March 30th to the week of April 19th egg strings were produced. It took approximately 14-16 days for the nematomorphs to start hatching into larvae. 46 aquatic snails were then acquired from Campus Lake in Carbondale, IL and set up into containers with autoclaved lettuce. The snails then ingest the hatched nematomorph larvae and start the process of

becoming encysted into the tissues of the snail. This allows the encysted nematomorphs to be frozen until preparations are made to continue the life cycle in a suitable terrestrial host once the species is confirmed.

26. Predicting *in vivo* fecundity using *in vitro* fecundity of *B. pahangi*. ZACHARY HEIMARK (UG), SAMUEL ARENDT (UG), BRIE KEIDL (UG), OLIVIA NEDZA (UG), BRIANA HARTER (T), **TEAGAN JANNESS JORDING (T), KALI BELONGA (T),** STEVEN SCHAAR (T), ROBERT STELZER (MP), AND SHELLY MICHALSKI (MP)

The experimental life cycle of *Brugia pahangi* is maintained UW Oshkosh as part of the NIAID Filariasis Research Reagent Resource Center. To propagate the *B. pahangi* life cycle, we require infected gerbils with high microfilaremias, however ~50% of our gerbils do not reach sufficient infection intensity for use. These experiments investigated the rate of microfilaria (mf) shedding from adult female worms in vitro and in vivo. Individual parasites were placed in culture for 72 hours, and the number of mf shed was quantified. Female worms were sorted into 'low' and 'high' mf production groups by using Student's-T test. Gerbils were surgically infected with groups of ten 'high' or ten 'low' producing female worms. Gravity-assisted peritoneal lavages were performed regularly to quantify in vivo microfilaria production. We have shown that gerbils infected with female worms pre-selected for high fecundity in vivo display infection intensities that meet our standards. This is the first study to qualify the use of the gravity-assisted peritoneal lavage as a quantitative metric for infection intensity.

KEYNOTE LECTURE

Chlamydia pathogenesis and vaccination approaches for inducing immunity in the female reproductive tract.

VJOLLCA KONJUFCA Southern Illinois University Carbondale

Chlamydia trachomatis is a bacterial pathogen that causes sexually transmitted disease and preventable blindness worldwide. In women, *C. trachomatis* may cause PID, ectopic pregnancy, chronic pelvic pain, and infertility. Chlamydia spp. are routinely found in the gastrointestinal (GI) tract of humans and animals. However, how *Chlamydia* spreads to the GI tract following the female reproductive tract (FRT) infection is just beginning to be unraveled. Recently it came to light that after FRT infection *Chlamydia* spreads to the GI tract internally in a stepwise manner,

by first infecting the FRT-draining iliac lymph nodes (ILNs), then the spleen and the GI tract. FRT dendritic cells mediate the first step: FRT to ILN *Chlamydia* spread, which relies on CCR7:CCL21/CCL19 signaling. *Chlamydia* spread from the ILN to spleen and the GI tract also relies on cell migration, and is dependent on sphingosine 1-phosphate signaling for at least first two weeks of infection. Moreover, per-oral immunization or infection with *Chlamydia* induces protective immunity against genital *Chlamydia* challenge, indicating that the GI tract lymphoid tissues play a role in regulating immunity in the FRT mucosa. Further understanding of the role of GI tract in regulating the immunity in the FRT will be important for the development of vaccines against *Chlamydia* and other sexually transmitted pathogens.

SUMMARY OF THE 72ND ANNUAL MIDWESTERN CONFERENCE OF PARASITOLOGISTS.

The 72nd Annual Midwestern Conference of Parasitologists was held on July 29–31, 2021, at St. Norbert college in De Pere, WI. Dr. Sarah Orlofske, served the Presiding Officer responsibilities during this meeting due to the unavailability of the nominated officer to fulfill those duties. Dr. Anindo Choudhury of St. Norbert College made local arrangements and served as Program Officer. Forty-five members registered and participated in the meeting.

The meeting was filled with interesting and informative presentations that consisted of 15 talks, and nine posters. Of these, 8 talks and 4 posters were entered in competition for the student presentation awards. Four awards were given to student members of AMCOP this year. The C. A. Herrick Award and $300 for the outstanding student poster was awarded to Carson Torhorst of University of Florida: Department of Wildlife Ecology and Conservation for his poster “Spatial Ecology of the Protozoan Parasite, "*Trypanosoma cruzi*", in the Native Mammalian Reservoir Hosts of North Florida: A Proposal.” This award was sponsored by Dr. Daniel Snyder, who was formerly with ELANCO Animal Health. The G. R. LaRue Award and $300 for outstanding student talk was awarded to Hina Durrani of University of Minnesota Medical School, Duluth Campus for her talk, “A global perspective on the evolutionary impetus of glycosomes in Kinetoplastea.” Taylor Chermak from University of North Dakota was awarded the R. M. Cable undergraduate award and $200 for his presentation “Jumping the continents and major host lineages: a curious case of the Cryptotropidae.” An Honorable Mention award and $100 was given to Matthew Walker, from Southern Illinois University, for his presentation titled “The genetic and trait variability of *Gyrinicola batrachiensis* (Nematoda: Oxyurina) across North America.” Additionally, to encourage our presenters to take their presentations to other meetings, all annual winners are invited to claim an additional $200 to support travel to a scientific meeting prior the next AMCOP meeting.

This year’s symposium included presentations and panel discussions by Agustin Jimenez, Sarah Orlofske, and Vasyl Tkach on the topic of

“Voucher Specimens in Parasitology: Importance and Best Practice” The presentations and discussions were moderated by Anindo Choudhury. The Keynote Address was presented by Dr. Jefferson Vaughan, of the University of North Dakota. His talk, titled “Microfilarial Mysteries” covered of several interesting topics tied to connections between microfilarial parasites and their vectors.

At the Business Meeting, reports were received from the various committees. The first of these was the Auditing Committee, composed of Agustín Jiménez and Thomas Platt. After review of financial statements, receipts, account registers, and tax documents, the committee found AMCOP’s financial records to be in order. Secretary/Treasurer Sorensen followed this report by presenting the Treasurer’s report for 2019 and the interim financial report for 2021. These reports were both approved by the membership.

The Meeting Sites Committee confirmed that AMCOP 73 would be held in 2022 at Southern Illinois University, in Carbondale, IL. Respective Program Officers for AMCOP 74–75 confirmed the availability of those meeting sites. The meeting site for AMCOP 76 was moved from Wilmington College to Eastern Illinois University. Lastly, the University of North Dakota was selected at the meeting site for AMCOP 77. The future meeting sites are:

> AMCOP 74—2023: University of Wisconsin-Stevens Point, Stevens Point, Wisconsin
>
> AMCOP 75—2024: University of Wisconsin-Oshkosh, Oshkosh, Wisconsin
>
> AMCOP 76—2025: Eastern Illinois University, Charleston, Illinois
>
> AMCOP 77—2026: University of North Dakota, Grand Forks, North Dakota

The Nominating Committee put forward the following nominations for AMCOP 73 leadership positions: Melissa Stuart, A.T. Still University (Presiding Officer), Agustín Jiménez, Southern Illinois University (Program Officer); Michelle Michalski, University of Wisconsin Oshkosh (Secretary/Treasurer, 2-year term). The nominated candidates were elected to their positions by the membership. John Chan, and Sara Zimmer volunteered to serve on

the Student Research Grant committee for a two-year term, replacing Jadin and Woodmansee.

The Resolutions Committee (Michelle Michalski, Matt Bolek) entertained the membership with their eloquently composed consideration for all involved in making AMCOP 72 a great success.

The AMCOP Student Research Grant Committee—Robert Jadin (Chair), Doug Woodmansee, Shelly Michalski, Kim Bates, and Dennis Minchella—reported that there were no proposals submitted for Student Research Grants.

The annual silent auction included the sale of 17 donated items raised $516.50 to support future AMCOP activities. Most of this was provided by the sale of beer glasses printed with images of parasites

Items brought forward for discussion during the Business Meeting included a discussion about changing the order to activities during Business Meeting. A motion was made and seconded to begin the Business Meeting with the presentation of student awards. A decision was also made to forego presenting a Best Overall Presentation Award, This award was historically accompanied with a $250 travel grant for the winner to use to attend the next annual ASP meeting. The decision to forego this award was related to ASP's decision to no longer reimburse local societies who give those awards. Secretary/Treasurer Sorensen reported that he was continuing to work on the paperwork 501(c)(3) tax-exempt status for AMCOP, but he was finding it difficult to understand the language of the required forms. The Secretary/Treasurer will continue to complete the necessary paperwork to satisfy all requirements. Discussion also involved an interest in having the Secretary/Treasurer incorporate diversity and inclusivity statements into all paperwork provided to the various committees at the meetings to ensure that diversity and inclusivity are considered when those communities undertake their assigned duties

Prepared May 25, 2022,
Robert Sorensen
Secretary/Treasurer (AMCOP 72)

REPORT OF THE 72ND RESOLUTIONS COMMITTEE

Shelly Michalski and Matt Bolek

The 72nd AMCOP met at the Gehl Mulva Science Center of St. Norbert College in De Pere, WI on July 29-31, 2022. We acknowledge with the upmost thanks the following:

Dr. Anindo Choudhury, Program Office, for his perseverance in hosting a post-COVID era meeting in a beautiful location with stellar food.

Dr. Robert Ja…..we mean Dr. Sarah Orlofske for Presiding Officer duties and strict attention to time.

Drs. Agustín Jimenéz, Sarah Orlofske, Vasyl Tkach, and Anindo Choudhury for an educational symposium on 'Importance and Best Practice for Voucher Specimens in Parasitology', in which we learned the importance of specimen preparation and the 900-year siege of Leningrad.

Dr. Jefferson Vaughan for shedding light on microfilarial mysteries in a lively banquet address.

Dr. Daniel Snyder for his support of the Herrick Award.

The membership of AMCOP for support of the LaRue and Cable Awards as well as Best Presentation Awards.

Dr. Tom Platt for generous donations from his personal library for the silent auction and Dr. Shelly Michalski for donating sales of parasite pint glasses and jewelry.

Whereas all homebound miniature ponies (yes we said ponies!) and chickens were medicated without incident,

Whereas chilly participants were generously supplied blankets by Dr. Choudhury,

Whereas students gathered to present their research in oral and poster platform,

Whereas interpretive dance and a rave-like atmosphere were experienced due to a seizure-inducing projector freakout,

Whereas the membership were surprised how useful the prison grade towels were for exfoliating,

We considered the 72nd AMCOP to be a sound success.

THE ANNUAL MIDWESTERN CONFERENCE OF PARASITOLOGISTS (AMCOP)

OBJECTIVES AND ORGANIZATION

A restatement to incorporate changes approved in 2018. Earlier statements have been approved in 1948, 1953, 1971, 1972, 1973, 1974, 1986, 1989, 2003 and 2004.

NAME

The organization shall be known as the ANNUAL MIDWESTERN CONFERENCE OF PARASITOLOGISTS (AMCOP), hereinafter referred to as the Conference, or as AMCOP.

AFFILIATION

AMCOP is an affiliate of the American Society of Parasitologists.

OBJECTIVES

The Conference is a gathering of parasitologists and students of parasitology for the purpose of informal discussion of research and teaching in parasitology, and the furthering of the best interests of the discipline of parasitology. AMCOP is organized exclusively for charitable scientific purposes under Section 501(c)(3) of the Internal Revenue Code, or corresponding section of any future federal tax code. Upon dissolution or termination of the existence of the Conference, all of its property and assets shall, after payment of the lawful debts of the Conference and the expenses of its dissolution or termination, be delivered, conveyed, and paid over to such organization or organizations at the time exempt under the provisions of Section 501(c)(3) of the Internal Revenue Code, as now or hereafter amended, as the Policy Committee shall determine; example organizations include the American Society of Parasitologists (ASP), or a similar organization with a mission to improve public health and prevention of infectious diseases.

MEMBERS

The Conference is open to all interested persons regardless of place of work, residence, or affiliation in other recognized societies. There are three categories of membership: Emeritus, Regular, and Student. When a member retires from industry, university or other professional occupation, that person shall be eligible for emeritus membership.

DUES

Annual dues are required for emeritus, regular and student membership. The amount of the annual dues are established by the Policy Committee and collected by the Secretary/Treasurer each year.

MEETINGS

The Conference is held in the general midwestern area during early to mid-June, unless otherwise specified by a majority vote of the previous Conference or a majority vote of those listed members replying by mail. A registration fee will be charged to fund annual meetings. A committee composed of the Presiding Officer, the Secretary/Treasurer, and the Program Officer, who is to serve as its chair, will decide the amount of this fee for each Conference in a manner that covers the reasonable cost of space rental, refreshments for the meeting, and annual operating costs for AMCOP. This committee will also approve reasonable costs negotiated by the Program Officer for lodging and an affordable banquet at the conference site. Registration, lodging, and banquet charges will be collected from AMCOP members before the annual conference.

BYLAWS

1) Simple majority vote of members in attendance at regularly scheduled meetings of the Conference shall determine the policies of the Conference.

2) The AMCOP officers are a Presiding Officer, whose term of office is one year or until a successor is elected (normally the term expires with adjournment of the annual Conference over which the person presides); a Secretary/Treasurer, whose term of office is two years or until a successor is elected; a Program Officer whose term of office is one year; and a Policy Committee composed of the last five available retired Presiding Officers plus, *ex officio* and without vote, the current Presiding Officer and Secretary/Treasurer. All terms of office of each full member of the Policy Committee is five years, or so long as the person is one of the five most recent, available Presiding Officers. The most recent past Presiding Officer available chairs the Policy Committee and is the Vice-President of the current Conference.

3) The Presiding Officer, the Secretary/Treasurer, and the Program Officer are elected by a majority vote of those members attending a regularly scheduled business meeting of the Conference or by a majority vote of those replying to a mail ballot of the membership.

4) The Presiding Officer shall preside at all meetings of the Conference and shall arrange for a banquet speaker. On the first day of a Conference the Presiding Officer shall appoint the following committees, which shall serve until they have reported on the last day of the annual Conference:

(a) Nominating Committee,
(b) Committee to Recommend Future Meeting Places,
(c) Committee to Suggest Program Possibilities for Future Meetings,
(d) Resolutions Committee,
(e) Awards Committee,
(f) Audit Committee,
(g) such other *ad hoc* committees as may be required.

5) The Presiding Officer shall appoint the Conference Representative to the Council of the American Society of Parasitologists for the year, who must be a member of that society. The current Presiding Officer serves as a member without vote of the Policy Committee.

6) The responsibilities of the Secretary/Treasurer shall include:

a) issue annual dues notices to members who submitted dues during the two preceding years
b) about four months prior to each Conference, inform the new Presiding and Program Officers concerning their duties and the members of the Policy Committee of their tenure
c) about two months prior to each Conference, issue a call for participants in the program for each Conference
d) within three weeks after the annual election, notify the Secretary of the American Society of Parasitology
e) serve as Secretary of the Policy Committee and as an non-voting *ex officio* member
f) annually submit all necessary tax or business forms
g) and supervise all funds of the Conference.

7) The Program Officer shall be responsible for the general format of the Conference and for arranging suitable facilities and funding. It shall also be this person's responsibility to chair the special committee to determine and collect the registration fee for the Conference. The format of the Conference may vary, but should include both a demonstration session and a session of contributed papers, both open to

all members. A symposium may also be included or may replace a session of contributed papers.

8) The Policy Committee shall determine by majority vote all matters of procedure and policy pertaining to the Conference upon which decision must be reached between consecutive Conferences, as well as all matters referred specifically to it by the membership. Such a vote may be requested by any member of the Conference but must be directed through the Secretary/Treasurer. The Chairperson of the Policy Committee shall request approval by the membership for all decisions of the Committee at the earliest subsequent business meeting of the Conference.

9) The Conference confers three major awards during its annual meeting to student participants. These are the Chester A. Herrick Award, sponsored by the ELANCO Animal Health., for the best poster/demonstration of parasitological research, the George A. LaRue Award for the best oral presentation of parasitological research, and the Raymond M. Cable Award for best presentation given by an undergraduate student. Honorable mention awards will be given to the second-place poster/demonstration and second place oral presentation at the discretion of the awards committee. All awards are supported by donations from AMCOP membership, unless other organizations, companies, or any other non-member entities provide sponsorship or donations.

    a) A 3-person Awards Committee, appointed at each annual meeting by the Presiding Officer, will select the winner of each award. The committee will establish the criteria for judgment each year.
    b) The size of the Herrick and LaRue awards shall traditionally be $300. The Cable undergraduate award shall traditionally be $200 and honorable mention awards shall traditionally be $100. Awards may vary according to funds available from contributors.
    c) No person may win the same award more than one time while in student status. Likewise, no student may win both awards at the same meeting. However, one person may win each award while a student in different years.

10) Symposium and Keynote speakers for the annual meeting may request travel reimbursement by contacting the Secretary/Treasurer and submitting any necessary forms in a timely manner.

11) While such funds are available, a mini-grant program of $1000 is being made available to promote research activities by student members of AMCOP. The general outline for the program is that:

a) At least two grants, one for undergraduate students and the other for graduate students, will be awarded each year, given there are sufficient high-quality grants. The maximum amount of any grant is $500 and it is up to the discretion of the Grant Committee, as to the amount and number of smaller awards. The intention is to provide equal funding to undergraduate and graduate students.
b) Awardees are to be members of AMCOP and are expected to present the results of their work at a future AMCOP.
c) A student may not receive more than two grants.
d) The program will be funded out of the surplus funds in AMCOP's general account beginning in 2012. The ability of AMCOP to fund this program in the upcoming year should be evaluated annually by its members during the business meeting at the annual conference.
e) A Student Research Committee, composed of 5 faculty AMCOP members with offset rotating 2-year terms, will evaluate submitted proposals. Committee members should be chosen to ensure coverage of a variety of areas of expertise in parasitology. Depending upon the year, 2 or 3 new committee members will be selected at each annual meeting.
f) When the annual "Call for Proposals" goes out in spring, it will be transmitted to the American Society of Parasitologists' Secretary-Treasurer, so that it can be advertised to the parent organization.

SUMMARY OF AMCOP MEETINGS 1949-PRESENT

Year	Meeting Site (Conference No.) Banquet Speaker & Title, PO=Program Officer, ST=Secy/Treas, H=Herrick Award, L=LaRue Award, HM=Honorable Mention, C=Cable Undergraduate Award; S=Symposium Title and Speakers	Presiding Officer
1949	Univ. Wisconsin, Madison, WI (AMCOP I) ..... J.C. Baer, ST=J. R. Lincicome	Harley J. VanCleave
1950	Univ. Michigan, Ann Arbor, MI (II) ..... W.W. Cort, Trends in Helminthological Research. PO/ST=R. J. Porter	R.V. Bangham
1951	Purdue University, Lafayete, IN (III) ..... J.E. Ackert, Some Observations on Hookworm Disease. ST=W. Balamuth	L.O. Nolf
1952	Univ. Illinois, Urbana, IL (IV) ..... A.C. Walton, ST=W. Balamuth	R.J. Porter
1953	Iowa State College, Ames IA (V) ..... R.M. Cable, Parasitological Experiences in Puerto Rico. ST=W.D. Lindquist	C.A. Herrick
1954	Michigan State Univ., East Lansing, MI (VI)..... G.F Otto, Mosquitos, Worms, Somoans and the Parasitologist in Somoa. ST=W.D. Lindquist	A.C. Walton
1955	Notre Dame Univ., IN (VII) ..... G.R. LaRue, Relationships in the Development of Digenetic Trematodes. ST=W.D. Lindquist	R.M. Cable
1956	Iowa State University, Ames, IA (VIII) ..... W.H. Headlee, ST=F.J. Krudenier	W.D. Lindquist
1957	Univ. of Michigan, Ann Arbor, MI (IX) ..... A.C. Chandler, ST=F.J. Krudenier	J.E. Ackert
1958	Kansas St. Univ., Manhattan, KS (X) ..... H.W. Manter, Trematodes of Many Waters. ST=F.J. Krudenier	G.R. LaRue
1959	Northwestern Univ., Evanston, IL (XI) ..... H. Van der Schalie, Contrasting Problems in Conrol of Schistosomiasis in Egypt and the Sudan. ST=D.T. Clark	G.F. Otto
1960	Purdue Univ., Lafayette, IN (XII) ..... P.P. Weinstein, Aspects of Growth and Differentiation of Parasitic Helminths *in vitro* and *in vivo*.	F.J. Krudenier

ST=D.T. Clark

1961 Ohio State Univ., Columbus, OH (XIII) ..... N.D. Levine
B. Schwartz, Parasitology Old and New.
ST=D.T. Clark

1962 Univ. of Nebraska, Lincoln, NE (XIV) G.W. Kelley, Jr
O.W. Olsen, The Life History of the Hookworm of Fur Seals.
ST=D.T. Clark

1963 Univ. of Minnesota, St. Paul, MN (XV) M.F. Hansen
F.G. Wallace, Observations on the Louisiana State University
Inter-American Program in Tropical Medicine
ST=D.T. Clark

1964 Univ. of Chicago, Chicago, IL (XVI) D.T. Clark
R.E. Kuntz, Paragonimiasis in Formosa.
ST=E. J. Hugghins

1965 Kellogg Biological Station, Gull Lake, MI (XVII) P.E. Thompson
L. Jacobs, Toxoplasmosis.
ST=E.J. Hugghins

1966 Univ. of Illinois, Urbana, IL (XVIII) M.J. Ulmer
D.L. De Guisti, The Acanthocephala.
ST=E.J. Hugghins

1967 Iowa State Univ., Ames, IA (XVIV) P.J. Silverman
N.D. Levine, Parasitology, Problems and Promise.
ST=E.J. Hugghins
H=P.M. Nollen [FIRST HERRICK AWARD]

1968 Univ. of Wisconsin, Madison, WI (XX) F.G. Wallace
D.R. Lincicome, The Goodness of Parasitism. (with APS & AIBS)
ST=J.H. Greve,
H=W.G. Barnes

1969 Univ. of Cincinnati, Cincinnati, OH (XXI) H.W. Manter
H.W. Stunkard, Life Histories and Systematics of Parasitic Flatworms.
ST=J.H. Greve,
H=B. Caverny, H=T.P. Bonner

1970 Loyola Univ., Chicago, IL (XXII) J.L. Crites
M.J. Ulmer, Helminths from Midwest to Mediterranean.
ST=J.H. Greve,
H=H. Blankespoor

1971 Univ. of Louisville, Louisville, KY (XXIII) F. Etges
H. Van der Schalie, Dam Large Rivers-Then What?
ST=J.H. Greve,
H=R. Campbell

1972 Southern Illinois Univ., Carbondale, IL (XXIV) B.J. Jaskowski
R.M. Cable, The Lighter Side of Parasitology.
PO=T.T. Dunagan, ST=J.H. Greve
H=E.M. Cornford

1973 Notre Dame Univ., Notre Dame, IN (XXV) R. Shumard
R.F. Rick, Babesiosis and the Development of *Babesia* in Ticks.
PO=R. Thorson, ST=J.H. Greve,

H=D. Danley

1974 Univ. of Michigan, Ann Arbor, MI (XXVI) D. Ameel
M.J. Ulmer, Snails, Swamps and Swimmer's Itch.
ST=J.H. Greve,
H=P.T. LaVerde and D. Prechel

1975 Iowa State Univ., Ames, IA (XXVII) W. Bemrick
P.M. Nollen, Studies on the Reproductive Systems of Parasitic Flatworms or All You Wanted to Know About Sex in Worms and Were Afraid to Ask.
ST=J.H. Greve,
H=D. Wittrock, L=V.M. Nelson [FIRST LARUE AWARD]

1976 Univ. of Nebraska, Lincoln, NE (XXVIII) J. Greve
A.C. Todd, A Redefinition of Subclinical Parasitism and its Impact on World Politics.
ST=W.H. Coil, PO=M.H. Pritchard,
H=W.L. Current,L=C.A. Klu

1977 Kansas State Univ., Manhattan, KA (XXIX) T.T. Dunagan
A.J. MacInnis, Snails, Dollars, DNA and Worms.
PO=W.D. Lindquist, ST=W.H. Coil,
H=M. Fletcher, L=L. Smurro, L=J. Ketchum

1978 Indiana Central Univ., Indianapolis, IN (XXX) E.J. Hugghins
J.P. Dubey, Recent Advances in Feline and Canine Coccidia and Related Organisms.
PO=M. Brandt, ST=W.H. Coil,
H=D. McNair, L=G.L. Hendrickson

1979 Loyola Univ., Chicago, IL (XXXI) D.E. Gilbertson
E. Foor, Basic Studies in Reproduction (in Nematodes).
PO=B.J. Jaskowski, ST=W.H. Coil,
H=G. Plorin, H=D. Minchella, L=M. Fletcher

1980 Eastern Michigan Univ., Ypsilanti, MI (XXXII) A.D. Johnson
J.R. Williams, Tropical Parasitiology at the Junction of the White and Blue Nile Rivers.
PO=E. Waffle, ST=G. Garoian,
H=C.L. Williams, L=M. Goldman, L=R. Gamble,
S=Functional Morphology of Acanthocephala

1981 Eastern Illinois Univ., Charleston, IL (XXXIII) D.M. Miller
G.D. Cain, Antigenic Variation: New Techniques Applied to Old Problems.
PO=B.T. Ridgeway, ST=G. Garoian,
H=J.M. Holy, L=B.N. Tuggle,
S=Immunity to Protozoan Parasites

1982 Western Illinois Univ., Macomb, IL (XXXIV) D.G. Myer
J.D. Briggs, Biological Control of Invertebrates in International Programs.
PO=P.M. Nollen, ST=G. Garoian,
H=D.E. Snyder, L=C.L. Williams,
S=Biological Control of Organisms

1983 Univ. of Illinois, Urbana, IL (XXXV) C.M. Vaughn

H.M. Moon, Speculations on the Pathogenesis of Cryptosporidiosis with Comparisons to Other Enteric Infections.
PO=K.S. Todd, Jr, ST=G. Garoian,
H=K.J. Hamann, L=K.W. Bafundo,
S=Intestinal Protozoa

1984 Univ. of Iowa, Iowa City, IA (XXXVI) W.H. Coil
J. Donelson, Genetic Rearrangement and the Basis of Antigenic Variation in African Trypanosomes.
PO=G.D. Cain, ST=G. Garoian,
H=K.F. Forton, L=D. Woodmansee,
S=Helminth Immunology

1985 Ohio State Univ., Columbus, OH (XXXVII) B.T. Ridgeway
K.D. Murrell, Epidemiology of Swine Trichinosis: Could Both Zenker and Leuckart be Right?,
PO=P.W. Pappas, ST=G. Garoian,
H=R.L. Lavy, L=H.K. Forton,
S=Physiological Ecology of Parasites

1986 Univ. of Missouri, Columbia, MO (XXXVIII)..... G.D. Cain
R.C. Tinsley, Correlation of Host Biology in Polystomatid Monogenea.
PO=L. Uhazy, ST=D.M. Miller
H=M.C. Lewis, H=I.G. Welsford, L=D.A. Leiby, ,
S=Gene Expression in Helminth Development

1987 Southern Illinois Univ., Edwardsville, IL (XXXIX) P.M. Nollen
K. Kazacos, *Baylisascaris* Nematodes-Their Biology and Role in Larva Migrans Disease.
PO=D. Myer, ST=D.M. Miller,
H=D.A. Leiby, L=V.A. Conners,
S=Modern Systematics in Parasitology

1988 Purdue University, West Lafayette, IN (XL) ..... G. Garoian
W.H. Coil, Forty Years of AMCOP, Laying a Foundation.
PO=K. Kazacos & D. Minchella, ST=D.M. Miller,
H=R.A. Bautz, L=R.R. Mitchler,
S=Host Parasite Genetics

1989 Miami Univ., Oxford, OH (XLI) ..... A.E. Duwe
G. Castro, A Physiological View of Host-parasite Interactions.
PO=R.A. Grassmick, ST=D.M. Miller,
H=S.R. Morris, S=Parasites in the Immune Suppressed

1990 Univ. Illinois, Urbana, IL (XLII) ..... J. H. Hubschman
G. Cross, Phosphatidylinositol Membrane Anchor and/or Transfection of Protozoa.
PO=G. McLaughlin, ST=D.M. Miller,
H=L.D. Morton, L=S.R. Morris,
S=Defining the Limits of Integrated Pest and Disease Management.

1991 University of South Dakota, Vermillion, SD, (XLIII) K. R. Kazacos
M. Dryden, What You Always Wanted to Know About Fleas on Fluffy and Fido but were Afraid to Ask.
PO=A. D. Johnson, ST=D.M Miller,

H=D. Royal, L=R. Clopton,
S= Host Specificity

1992 Univ. Wisconsin-Eau Claire, WI, (XLIV) ..... Omer Larson
PO=D. Wittrock, ST=D.M.Miller,
H=S. Storandt, L=D. K. Howe,
S=Teaching of Parasitology-New Methods

1993 St. Mary's, Notre Dame, IN, (XLV) ..... R. A. Grassmick
J. Crites, AMCOP Peragrare Anni, Homines, Exitus
PO=T.R Platt, ST=D.M.Miller,
H=M. S. Schoen, L=B. J. Davids,
S="Ain't Misbehavin'": Ethology, Phylogeny and Parasitology

1994 Murray State Univ. Murray, KY (XLVI) ..... Gary Uglem
E. Christiansen, Come out, come out, we know you are in there.
PO=L. Duobinis-Gray, ST=D. J. Minchella,
H=J. Rosinski,L=R. Garrison, S=Parasite Ecology: Population and Community Dynamics

1995 Univ. of Wisconsin-Milwaukee (XLVII) ..... Darwin Wittrock
E.S. Loker, Schistosomiasis in Kenya: a Copernican point of view
PO= J. Coggins, ST=D.J. Minchella;
H=J. Curtis; L=M. Dwinnell
S=Water-borne Diseases

1996 Northeast MO State Univ., Kirksville, MO (XLVIII) Daniel Snyder
PO=L. C. Twining, ST=D.J. Minchella,
H= V. G. Mehta, L=H. Yoder,
S=Immune Aspects of Protozoan Infections: Malaria and Amoebiasis

1997 Butler University, Indianapolis, IN, (XLIX) ..... Joe Camp
R. Hengst, Paleoparasitology,
PO=D. Daniell; ST=D.J. Minchella;
H=A. Bierberich, L=S. Kappe, S=Molecular Biology in Solving Problems in Parasitology

1998 Indiana State University, Terre Haute, IN (L) ..... Jim Coggins
W. Coil, J. Crites, & T. Dunagan, AMCOP 50 - Fifty Years Revisited;
PO=F. Monroy & D. Dusanic; ST=D. Wittrock;
H=M. Bolek; L=K. Page
S= Cytokines and Parasitic Diseases; Visit by ASP President John Oaks

1999 Wilmington College, Wilmington OH (LI) ..... Dennis Minchella
P. LoVerde, Molecular Biology of Schistosomes,
PO= D. Woodmansee,ST=D. Wittrock;
H= J.B.Green; L=J. Curtis;
S=Parasite Biochemistry by J.D. Bangs and C.F. Fioravanti.

2000 University of Notre Dame, Notre Dame, IN (LII) ... Peter Pappas
J.A. Oaks – Zen and the Art of Tapeworms
PO= J. H. Adams; ST= D. Wittrock;
H= A. Eppert; L= M. Bolek; HM= C. Dresden-Osborne & K. VanBuskirk
S=Life Style Choices of Parasitic Protozoans by T. Sinai and J. Lebowitz

2001 Eastern Illinois University, Charleston, IL (LIII) .... Lin Twining

R.D. Smith - Environmental contamination with *Cryptosporidium parvum* from a dairy herd.
PO= J. Laursen; ST= D. Wittrock;
H= B. Foulk; L= M. Michalski ; HM= M. Gillilland III; B. Balu and P. Blair
S= Use of Molecular Data in Parasite Systematics by M. Mort and M. Siddall

2002 Millikin University, Decatur, IL (LIV) ..... David Williams
P. Brindley – Mobile genetic elements in the schistosome genome
PO=Tom McQuistion; ST= D. Wittrock;
H= Stacy Pfluger; L= Greg Sandland;
HM= Kelly VanBuskirk and Michelle Steinauer
S= Parasite Transmission and Control in Domesticated Animals by M. McAllister and L. McDougald

2003 Michigan State University, East Lansing (LV)..... Tom Platt
Robert Pennock – Darwin and the Parasitic Wasp: Teaching Evolutionary Design;
PO= Pat Muzzall; ST= Darwin Wittrock;
H= Luis Gondim; L= Michelle Steinauer; HM= Shawna Cook and Ahmed Sayed; C= Katie Reif; S= Vector Borne Diseases of Michigan and Adjacent States by Ned Walker and Hans Klompen

2004 Minnesota State University, Mankato, MN (LVI).. Patrick Muzzall
Richard Clopton – Publishing with pain: The editor doesn't really hate you.
PO= Robert Sorensen, ST= Darwin Wittrock
H=Rebecca LaBorde; L= Maria Castillo;
HM= Angie Kuntz and Laura Duclos; C=Jenna Rodgers
S= Molecular phylogenetics of parasites by Vasyl Tkach and Ramon Carreno

2005 Wabash College, Crawfordsville, IN (LVII) .... Douglas Woodmansee
John Adams - In a changing world of malaria research, can an old dog learn new tricks?
PO= Eric Wetzel, ST= Darwin Wittrock
H= Amy McHenry; L= Laura Duclos;
HM= Jillian Detwiler and Julie Clennon; C= Kristin Giglietti;
S= Molecular Phylogenies in Nematoda by Virginia Ferris and Microbial Community Ecology of Tick-borne Human Pathogens by Keith Clay

2006 Winona State University, Winona, MN (LVIII)..... Thomas McQuistion
Matthew Bolek - Amphibian parasites: The cool, the bad and the ugly.
PO= Kim Bates; ST= Doug Woodmansee;
H= Andrew Claxton; L= Kristin Herrmann; C= Lindsey Stillson;
HM= Brenda Pracheil, Kristin Giglietti;
S= Parasites of Wildlife of the Midwest by Rebecca Cole and Darwin Wittrock

2007 University of Wisconsin-Oshkosh, Oshkosh, WI (LIX) Jason Curtis
David Williams – The Genomics Revolution in Parasitology.

PO= Shelly Michalski, ST= Doug Woodmansee;
H= Christine Hsiao; L= Shriveny Dangoudoubiyam
HM= Peter Ziniel, Nathan Peterson; C= Emily Doucette,
S= Tropical Disease by Gary Weil and Peter Fischer

2008 University of Illinois at Urbana-Champaign (LX)... Robert Sorensen
Dennis Minchella – P.C. (Post Cable) Parasitology at Purdue.
PO= Milton McAllister, ST= Doug Woodmansee;
H= Nathan Peterson; L= Erica Mize
HM= Apichat Vitta, Jillian Detweiler; C= Kyle Luth,
S= Parasitic Protists by Laura Knoll and Alexa Rosypal.

2009 Ohio Wesleyan University, Delaware, OH (LXI) Daniel Howe
Eugene Lyons - Hookworms (*Unicaria* spp.) in Pinnipeds with Notes on the Biology of Northern Fur Seals.
PO= Ramon Carreno, ST= Doug Woodmansee;
H= Sriveny Dangoudoubiyam; L= Elizabeth Thiele, HM= Matthew Brewer; C= Cailee Smith;
S= Ectoparasites by Susan C. Jones and Glen R. Needam

2010 Western Illinois University, Macomb, IL (LXII) Jeffrey Laursen
Tim Yoshino - Frankenflukes: Parasitic GMO's.
PO= Shawm Meagher, ST=Doug Woodmansee;
H=Kathryn Coyne; L=Philip Scheibel; HM= Kathy Johnson; C= Bryan Rolfsen;
S= Can Parasitic worms treat autoimmune disorders? by David Elliott and John O. Fleming.

2011 Saint Mary's College, Notre Dame IN (LXIII)..... Shelly Michalski
Bruce Christensen – Programmes for control of lymphatic filariasis: perspectives from a vector biologist.
PO= Tom Platt, ST= Doug Woodmansee;
H=Daniela Cortese; L=Ablesh Gautam HM= Jenica Abrudan, Elizabeth Warburton; C= Markah Frost, Sarah Johnson; S=Parasitonomics by Mary Ann McDowell and Mike Ferdig.

2012 Truman State University, Kirksville, MO (LXIV) . Shawn Meagher
Scott D. Snyder - Parasite Biodiversity: Reflections, Challenges and Opportunities.
PO=Lin Twining , ST= Doug Woodmansee
H= Utibe Bickham; L= Heather Stigge; C= Michael Lehrke; HM= Shelby Heistand;
S= The importance of the unimportant. & Understanding the histories of parasites of Galapagos birds.
by John Janovy and Patricia Parker.

2013 Purdue University, West Lafayette, IN (LXV)..... Kimberly Bates
Agustin Jimenez - Biodiversity in the New World: "What is it?", still a relevant question.
PO=Joe Camp , ST= Doug Woodmansee
H= Heather Stigge; L= Elizabeth Warburton HM= Ablesh Gautam and Bhagya Wijayawardena; C= David Cordie;

S=DNA Barcoding in Parasitology Research by Sean Locke and Mark Forbes

2014 The University of Kentucky, Lexington, KY (LXVI) Agustin Jimenez
Thomas Platt - A Life in Small Science (with Undergraduates).
PO=Daniel Howe, ST= Robert Sorensen
H= Alyssa Gleischner; L= Miranda White; HM= Leah Peng and ElizabethWarburton; C= Allison Young;
S= Parasite adaptation and anthelmintic resistance by Martin K. Nielsen and Craig R. Reinemeyer

2015 Lawrence University, Appleton, WI (LXVII) ..... Trudy Aebig
Shelly Michalski - *Acanthacheilonema viteae* as a research model and 'tick on tick' violence.
PO=Judith Humphries, ST= Robert Sorensen
H= Justin Wilcox; L= Elliot Zieman HM= Heather Toman, Evan Boone; C= Erik Rodriguez and John Lopez;
S= Wildlife Disease by Dr. Rebecca Cole and Dr. Shelly Dubay

2016 Southern Illinois University, Carbondale, IL (LXVIII) Kim Bates
Karl Reinhard - Archaeoparasitology 2015-2020: Transitions in Theory and Crises in Diagnosis.
PO=Agustín Jimenez, ST= Robert Sorensen
H= Sarah Marshall; L= Christina Anaya; HM= Tyler Achatz and Trevor Vanatta; C= Zachary Heimark;
S= Physiology of mosquitoes in the anti-pathogen response AND interactions among geohelminths and the human gut micorbiome by Dr. Julián Hillyer Vanderbilt University and Dr. Makedonka Mitreva Washington University in St. Louis

2017 Wilmington College, Wilmington, OH (LXIX)..... Matt Bolek
Sarah Orlofske - Dead ends are just the beginning: Predation on Parasites in Aquatic Ecosystems.
PO=Douglas Woodmansee, ST= Robert Sorensen
H= Christina Anaya ; L= Ryan Koch; HM= Ryan Shannon; C= Robyn Hauschner;
S= Parasitoid associations by Dr. Norman Johnson, Ohio State University, and Dr. Michael Sharkey, University of Kentucky.

2018 Eastern Illinois University, Charleston, IL (LXX) .. Sarah Orlofske
Jason Hoverman - Exploring the complexities of disease risk in amphibian populations.
PO=Jeff Laursen, ST= Robert Sorensen
H= Ryan Koch; L= Tyler Achatz; C= Chi Peng;
S= Molecular and Life History Data: can they work together? by Dr. Vasyl Tkach, University of North Dakota, and Dr. Matt Bolek, Oklahoma State University.

2019 MN State University Mankato, Mankato, MN (LXXI) Vasyl Tkach
Bobbi Pritt - Worms you won't find in your garden.
PO= Robert Sorensen, ST= Robert Sorensen
H= J. Trevor Vannata; L= Victoria Phillips; HM=Thayane Ferreira Fernandes and James Miksanek; C= Mitchell Floura;

S= Influences of Biogeography and Ecology on Parasite-Host Diversity by Dr. Jillian Detwiller, University of Manitoba, and Dr. Jeffrey Bell, University of North Dakota.

2020 No meeting due to COVID-19 travel restrictions

2021 St. Norbert College, De Pere, WI (LXXII) Robert Jadin
Jefferson Vaughan – Microfilarial mysteries.
PO= Anindo Choudhury, ST= Robert Sorensen
H= Carson Torhorst; L= Hina Durrani; HM= Matthew Walker; C= Taylor Chermak
S= Voucher Specimens in Parasitology: Importance and Best Practice Presentations & Panel Discussion. Presenters: Agustin Jimenez, Sarah Orlofske, Vasyl Tkach and Anindo Choudhury (moderator)

2022 Southern Illinois University, Carbondale, IL (LXXIII) Melissa Stuart
Vjollca Konjufca – *Chlamydia* pathogenesis and vaccination approaches for inducing immunity in the female reproductive tract.
PO=Agustín Jimenez, ST= Shelly Michalski
H= L= HM= C=
S= Exploring host-tick associations to understand disease emergence patterns by combining long-term data sets and computational approaches Dr. Samniqueka Halsey; Panel Discussion: The Importance of Peers and Mentoring in Both Recruitment and Retention in the Sciences, led by Dr. Halsey

FINANCIAL REPORT

2021 AMCOP Financial Report
Jan. 1, 2021–Dec. 31, 2021

Bank Balance 01/01/21			**$7,446.49**	
Savings ($6871.48)		6871.48		
Checking ($575.01)		575.01		
2021 Expense Summary				
Expenses		**Budget**	**Actual**	
AMCOP Business Costs				
AMCOP 72 Program Photocopying		$60.00	$0.00	Donated by St. Norbert Printing
Certificates & Holders (Walmart)		$6.95	$6.95	
Herrick Award		$300.00	$300.00	
LaRue Award		$300.00	$300.00	
Cable Award		$200.00	$200.00	
Honorable Mention Awards (2 x $100)		$200.00	$100.00	
2021 ASP Student Travel Grant		$250.00	$0.00	
Research Grants Program (2 x $500)*		$1,000.00	$0.00	
reimburse Choudhury for Kress Inn payment for Platt			$158.00	
credit to Drabik for overpayment			$6.05	
credit to Choudhury for overpayment			$80.95	
cleared check for 2019 HM award			$100.00	
AMCOP Business Total		**$2,316.95**	**$1,251.95**	
St. Norbert Costs				
Conference Fee				
Conference Fee @ $5 per person		$220.00	$220.00	(44 guests)
Lodging				
1 double rooms @ $26/night x 2 nights		$52.00	$0.00	
24 single room @ $26/night x 2 nights		$1,248.00	$1,352.00	(26 rooms)
Lodging Total		**$1,300.00**	**$1,352.00**	
Catering				
Refreshments in Hugh Hall (dormitory)			$120.00	(per item)
Fri. Morning Refreshments @ $6.25/person		$275.00	$253.00	(44 guests; $5.75 each)
Fri. afternoon refreshments @ $5/person		$220.00	$220.00	(44 guests; $5 each)
38 lunch meals @ $9.95		$378.10	$407.95	(41 guests)
38 Pre-dinner reception @ $2/person		$76.00	$94.00	(47 guests)
Pre-dinner Reception cash bar fee		$50.00	$50.00	
38 standard banquets @ $16/person		$608.00	$752.00	(47 guests)
1 vegan buffet @ $13.95/person		$13.95	$13.95	
Banquet wine			$72.00	(6 bottles; $12 each)
Fri. Morning Refreshments @ $6.25/person		$275.00	$253.00	(44 guests; $5.75 each)
Refreshments in Hugh Hall (dormitory)			$120.75	(per item)
Catering Total		**$1,896.05**	**$2,356.65**	
St. Norbert Costs Total		**$3,416.05**	**$3,928.65**	
Total Expenses		**$5,733.00**	**$5,180.60**	
2021 Income Summary		**Projected**	**Received**	
2021 Meeting Member Payments				
2021 Dues Payments		$660.00	$660.00	(24 students; 21 professionals)
2021 Member Contributions			$1,038.60	
Registration Payments		$1,280.00	$1,280.00	(26 students; 18 professionsals)
Lodging Payments (25 @ $52)		$1,330.00	$1,300.00	(24 @ $52 & 2 @ $26)
Platt payment for 1 room Kress Inn ($79/night x 2 night)		$158.00	$158.00	
Dining Payments (38 lunches, 38 reg. buffet, 1 vegan buffet)		$1,000.05	$970.20	(35 lunch, 38 reg. buffet, 1 vegan buffet)
Elanco. Sponsorship		$300.00	$300.00	(received from Dan Snyder)
Silent Auction Revenue			$521.50	
unassigned cash deposit			$6.00	
bank error on 08/05/21 deposit			$0.08	
Torhorst overpayment (lunch paid 2x)			$9.95	
Choudhury overpayment (registration, dues, lunch & banquet paid 2x)			$80.95	
Drabik overpayment (amount paid was $6.05 extra)			$6.05	
Savings Interest Income			$6.86	
Checking Interest Income			$0.72	
Total Income		**$4,728.05**	**$6,338.91**	
Credits			$6,338.91	**Total Income**
7/21/21	$3,773.90 (multiple checks)		$5,180.60	**Total Expenses**
7/29/21	$300.00 (single check)		$1,158.31	Difference
8/5/21	$335.50 (cash)			
8/5/21	$1,566.18 (multiple checks)		$6,338.91	**Total Income**
8/27/21	$191.75 (single check)		$6,338.91	**Total Credits**
8/27/21	$6.00 (cash)		$0.00	Difference
	$158.00 (Choudhury payment for Platt room)			
monthly	$6.86 savings interest)		**$1,158.31**	**Closing Balance - Opening Balance**
monthly	$0.72 checking interest)		**$1,158.31**	**Operating Surplus (Loss)**
Total Credits	**$6,338.91**		$0.00	Difference
Bank Balance 12/31/21		**$8,604.80**		
Savings Balance 12/31/2021	$6,878.34			
Checking Balance 12/31/2021	$1,726.46			
Operating Surplus (Loss) for 2021		**$1,158.31**		
Closing Balance - Opening Balance for 2021		**$1,158.31**		

OLD BUSINESS

Proposals from Vasyl Tkach and Sarah Orlofske

Motion 1: Re-naming of AMCOP

Proposal:

To change the name of the organization to either Midwestern Association of Parasitologists (abbreviation: MAP) or Midwestern Society of Parasitologists (abbreviation: MSP).

The corresponding text in the Organizing document and by-laws will read:

"The organization shall be known as the Midwestern Association of Parasitologists (MAP), hereinafter referred to as the Association, or as MAP."

Corresponding changes will be made throughout the rest of the Organizing document and by-laws. S/T together with the rest of the leadership will prepare a revised version of documents containing these changes.

Rationale: Although AMCOP as a name has been well established during the decades of its existence and functioning, it is never too late to improve something that can be improved. For instance, many parasitological journals with long tradition (some over 100 years old) have changed their names to fit better to modern realities. We are an organization, not just a conference despite the fact that most of our activities are focused around our annual conference. We have elected officers and conferences do not have those, other than an organizing committees. Besides, the name "conference" is limiting. The pandemic has actually triggered some other regional societies to consider additional types of activities including shorter meetings between main conferences, educational activities, etc. Therefore, we propose to change the name to one that better describes who we are and better fits modern realities as well as current and potential future types of activities.

Motion 2: Re-naming the title "Presiding Officer"

Proposal:

To change the title "Presiding Officer" to "President".

The corresponding change will be made throughout the Organizing document and by-laws.

Rationale: This will be in line with the titles in other regional parasitological societies and similar other societies. It also removes the limiting notion of the Presiding Officer as something that is relevant exclusively to the single gathering (conference).

Membership Email Directory (Dues paid in either 2018 or 2019)

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Sofiane Aiche Eastern Illinois University saiche@eiu.edu	Kimberly Bates Winona State University kbates@winona.edu
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NOTES

NOTES

2023 AMCOP DUES

Name _____
Address _____
_____
_____
_____

Phone # _____

Email _____

DUES
Faculty & Emeriti ($20), Student ($10): $_____

CONTRIBUTION to student awards: $_____

TOTAL $_____

****
Please make checks payable to AMCOP.
****

Send this form and your check via US Mail to:

Dr. Shelly Michalski
AMCOP Secretary/Treasurer
Department of Biology
University of WI Oshkosh
800 Algoma Blvd
Oshkosh, WI 54901

This form also available at
www.amcop.org

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