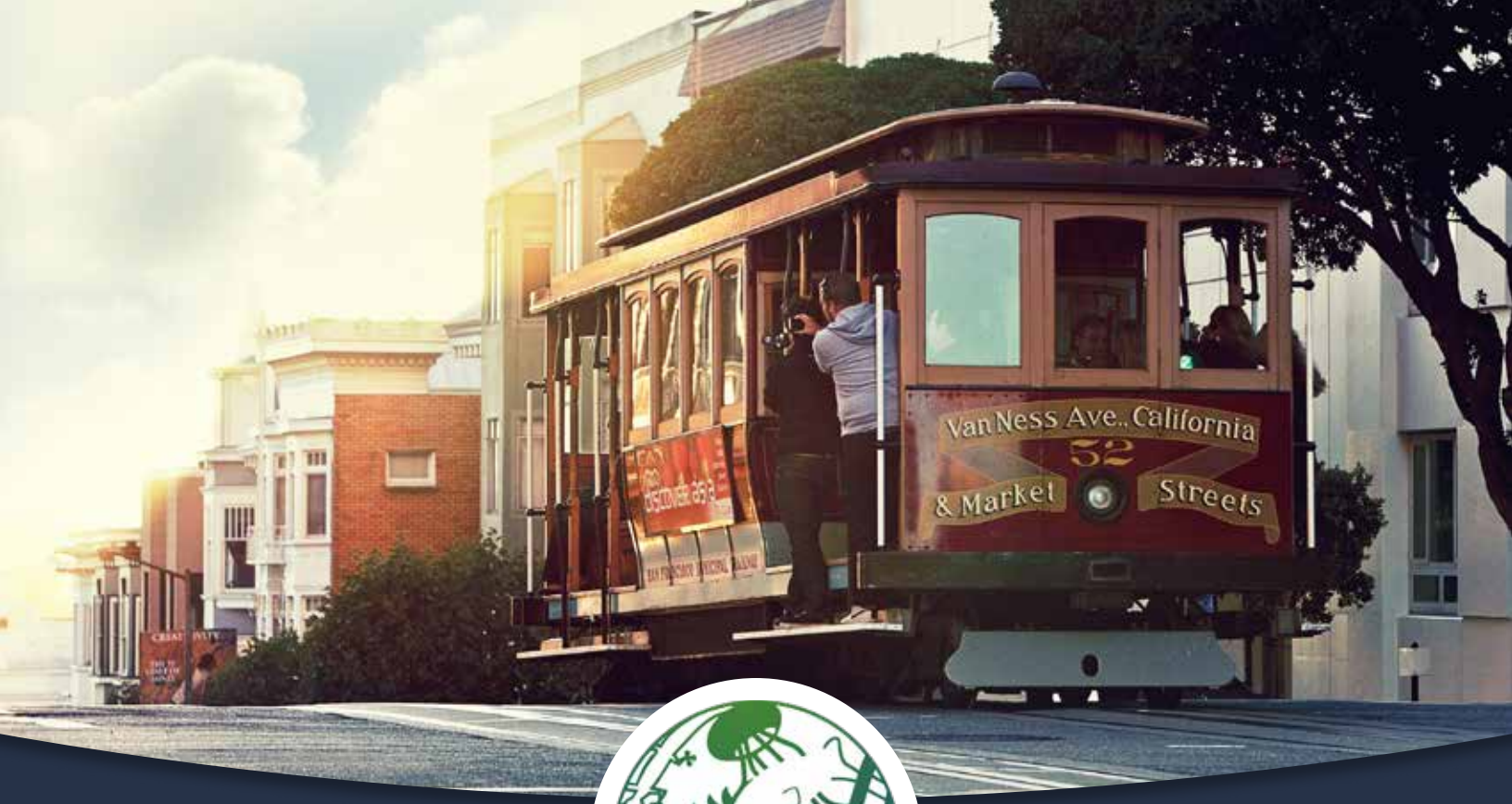

The Society for Integrative and Comparative Biology

with the
American Microscopical Society
The Crustacean Society

FINAL PROGRAM

San Francisco Marriott Marquis
3-7 January 2018

10:45 am	**121-2**	*McCue MD, Barton M, Terblanche JS; St. Mary's University, Stellenbosch University*	Improving Respirometry Equations for Robust Estimates of Metabolic Rate Across Diverse and Extreme Experimental Gas Conditions
11:00 am	**121-3**	*Rangel RE, Johnson DW; California State University Long Beach*	Effects of Temperature and Mass on the Metabolic Rate of a Sedentary Reef Fish, The Bluebanded Goby (*Lythrypnus dalli*)
11:15 am	**121-4**	*Burford BP, Carey NJ, Goldbogen JA; Hopkins Marine Station of Stanford University*	Does grouping reduce the standard metabolic rates of squid?
11:30 am	**121-5**	*Neptune TS, Watson CM; Midwestern State University*	Divergence of the physiological phenotype: variation in metabolic rate among *Anolis oculatus* ecotypes on Dominica
11:45 am	**121-6**	*Hall JM, Warner DA; Auburn University*	Embryological development and global change: how do reptile embryos respond to thermal stress in urban environments?

12:00 pm ..... **Lunch Break**

10:00 AM – 12:00 PM **Session 122** **Salons 3-4**

Awesome Biomechanics: From Righting to Fighting

Chair: Mary Stoddard

10:00 am	**122-1**	*O'Donnell DJ, Hristov NI, Chadwell BA, Ashley-Ross MA; Wake Forest University, Center for Design Innovation, Ohio University Heritage College of Osteopathic Medicine*	The Mechanics of Righting Behavior in Theraphosid Spiders
10:15 am	**122-2**	*Rubin AR, Mayerl CJ, Blob RW; Auburn University, Clemson University*	Biomechanical Factors Influencing Successful Self-Righting in Upside-down Pleurodire Turtles
10:30 am	**122-3**	*Pepper RE; University of Puget Sound*	Dispersal of seeds from splash-cup plants
10:45 am	**122-4**	*Carrier DR, Cunningham C; University of Utah, Swansea University*	The effect of foot posture on capacity to apply free moments to the ground: implications for fighting performance in great apes
11:00 am	**122-5**	*Cheu AY, Bergmann PJ; Clark University*	Basilisk Olympics: Multiple modes of locomotion influences the degree of functional constraint in a trait
11:15 am	**122-6**	*Balaban JP, Azizi E; Univ of California, Irvine*	Elastic energy storage broadens the thermal performance range of accelerating lizards
11:30 am	**122-7**	*Wehrle BA, Traverne M, Herrel A, Krajnovic M, Tadic Z, German DP; Univ of California, Irvine, CNRS-MNHN, Univ of Zagreb*	Interplay of gut length, diet, and ecology in lacertid lizards
11:45 am	**122-8**	*Stoddard MC, Yong EH, Akkaynak D, Sheard C, Tobias J, Mahadevan L; Princeton University, Nanyang Technical University, Interuniversity Insitute of Marine Sciences, University of Bristol, Imperial College London, Harvard University*	Evolution of Avian Egg Shape: Morphospace, Mechanics and Flight

12:00 pm ..... **Lunch Break**

10:15 AM – 11:45 AM **Session 123** **Salons 5-6**

Morphogenesis and Organogensis

Chair: Thom Sanger

10:15 am	**123-1**	*Sanger TJ, Lachance D, Harding L, Kyrkos J, Czesny B, Mata C, Stroud JT; Loyola University Chicago, Senn High School*	The Mechanisms of Thermal Stress Induced Craniofacial Malformation in Lizards
10:30 am	**123-2**	*Johnson GR, Donovan-Maiye R, Maleckar MM*; Allen Institute for Cell Science*	A novel conditional model of cell organization: building an integrated cell
10:45 am	**123-3**	*Abramyan J; University of Michigan, Dearborn*	Heterochrony in Eye Development and its Effect on Jaw Formation

P1-52 WEBER, HE*; WINTERS, GC; BOBKOVA, Y; BOSTWICK, C; KOHN, AB; MOROZ, LL; Transylvania Univ., Neurosci., Univ. of Florida Whitney Lab; *hannahweber20@gmail.com*

Uncovering the Secret Secretory Molecules of the Octopus bimaculoides Learning and Memory Circuit

Octopuses exhibit behavioral flexibility and demonstrate a remarkable ability to learn and remember, which is the result of a centralized nervous system containing about 500 million neurons. Cephalopod nervous system centralization is an example of convergent evolution, with parallel centralization events occurring multiple times throughout evolutionary history. The learning and memory circuit present in *Octopus* is located in the vertical lobe and contains three different categories of neurons: superior frontal lobe cells, amacrine interneurons, and large efferent neurons. For this project, we examined secretory molecules (neuropeptides and classical neurotransmitters) present in the memory forming circuitry of *Octopus* and localized them in *Octopus* neural tissue. Using standard molecular cloning techniques and *in situ* hybridization, we effectively identified and localized three new neuropeptide molecules in vertical lobe circuit cells, one of which labels presynaptic superior frontal lobe cells while the other two label large efferent neurons. Additionally, we identified two of the first markers for glial-like cells in *Octopus*. We also cloned Nitric Oxide Synthase for the first time in *Octopus* and identified both nitric oxide and dopamine (via Aromatic-L-Amino Acid Decarboxylase) as potential vertical lobe neurotransmitters. Considering these findings together, the independent evolution of *Octopus* brains appears to have employed a unique combination of both neuropeptides and classical neurotransmitters, broadening our understanding of convergent evolution in distant phyla as well as revealing new questions to address in the future.

122-7 WEHRLE, BA*; TRAVERNE, M; HERREL, A; KRAJNOVIC, M; TADIC, Z; GERMAN, DP; Univ. of California, Irvine, CNRS-MNHN, Univ. of Zagreb; *bwehrle@uci.edu*

Interplay of gut length, diet, and ecology in lacertid lizards

A transplanted population of Italian Wall Lizards (*Podarcis sicula*) from an island in Croatia has become omnivorous and morphologically distinct from its source population in ~30 generations, making it a compelling example of rapid evolution. Vertebrates that eat plants often have longer guts to accommodate diets with low nutrient densities and recalcitrant components, such as fiber. However, this new *P. sicula* population does not have longer gut lengths than its source population. Still, sex differences in gut length were only apparent in the new population. Are these populations too recently diverged to find differences in gut length? Do females usually have longer guts? To more broadly understand the ecological drivers of gut length in natural systems, we surveyed other *P. sicula* populations, and their sister species, *Podarcis melisellensis*. We expect lizards that eat more plants will have longer guts, and that sex effects increase concomitantly with herbivory. We sampled *P. sicula* from 5 islands, *P. melisellensis* from 8 islands, and one mainland population of each species. From each site, we analyzed lizard stomach contents to determine ingested diet and measured gut lengths. Dietary analyses, including taxa and component consumed, are still underway, but preliminary data reveal only *P. sicula* populations consumed considerable proportions of plants. Intestine length will be analyzed in the context of diet data. Females had longer guts in half the populations, regardless of species. *P. melisellensis* generally had shorter guts than *P. sicula*, and their gut lengths differed among 1/3 of populations. However, *P. sicula* gut length only differed between two populations. This suggests *P. sicula* may have canalized longer gut lengths, giving them an advantage to make the transition to plant based diets.

P3-255 WEIGAND, NM*; TONRA, CM; WAGNER, RD; POPESCU, VD; Ohio University, Ohio State University; *nw178500@ohio.edu*

Evaluating potential effects of proximity to roadways in a road-naïve population of turtles

Roadways are the single largest man-made structure in the United States, and their ecological effects are conspicuous. Turtles are among the vertebrate taxa most affected by roadways because of their low vagility and use of roadway habitats. While studies have documented some consequences of transportation infrastructure on turtles and other herpetofauna, many impacts remain unknown. This is particularly true in the case of road-naïve populations, where a lack of previous exposure to roadways could provide insight into potential and related biological and physiological challenges posed to animals within the affected area. In 2013, the Wayne National Forest in southeastern Ohio was bisected by a high-traffic, high-speed, four-lane highway. This previously-intact forest habitat is populated by numerous species and the impacts of the new roadway have not yet been quantified for most, including Eastern Box Turtles (*Terrapene carolina carolina*), a Species of Concern in Ohio and at risk throughout its North American range. Through the use of a control-impact study, we evaluated the potential ecological and physiological effects of proximity to roadways in a road-naïve population of turtles, compared to a population unaffected by paved roads. We employed radio-telemetry and temperature loggers to evaluate space use, movement behaviour, and habitat selection by turtles relative to their proximity to the highway. We used novel techniques in corticosterone testing (using nail keratin samples) to evaluate the presence of chronic stress in animals both near the highway and inhabiting an intact section in the same forest. Spatial analyses provide insight into turtle behaviour, predict specific vulnerabilities to roadways in long-lived herpetofauna, and inform conservation strategies and policy decisions related to wildlife road mortality mitigation efforts.

P2-75 WEIKEL, A*; COLON, E; REDMOND, S; Radford University; *aweikel1@radford.edu*

The effects of Vespa Amino Acid Mixture (VAAM) and 2,4 Dinitrophenol (DNP) on mitochondrial metabolic reactions and the production of ATP

The proton motive force is the result of the inner mitochondrial membrane's electrochemical gradient. This functions by the movement of protons and electrons through a series of electron carrier proteins that provide power for the production of adenosine triphosphate (ATP). The substances being examined in cauliflower mitochondrial isolates, are 2, 4 Dinitrophenol (DNP), a known proton motive force uncoupler, and vespa amino acid mixture (VAAM), a commercially available sports drink derived from Asian giant hornets, a potential coupler. Cauliflower mitochondria were exposed to these substances in three different concentrations (0.3% each, 0.03% each, 0.003% each) to determine if they counteract each other's effects on oxidative phosphorylation. The data collected showed that at high concentrations of VAAM there was an increase in oxidative phosphorylation that led to cellular deterioration even if DNP was present; while at low concentrations the DNP counteracted VAAM allowing the mitochondria to maintain the proton motive force. By measuring the pH levels and ATP production of each treatment group over time, we concluded that VAAM enhanced proton transport which translated into increased ATP production while DNP did not. Mitochondria exposed to 0.003% DNP and VAAM produced more ATP than the mitochondria in the control, but at higher concentrations 0.03% and 0.3% DNP and VAAM, mitochondria produced less ATP than the mitochondria in the control. This suggests that VAAM and DNP affect either the same part of oxidative phosphorylation or closely related aspects.