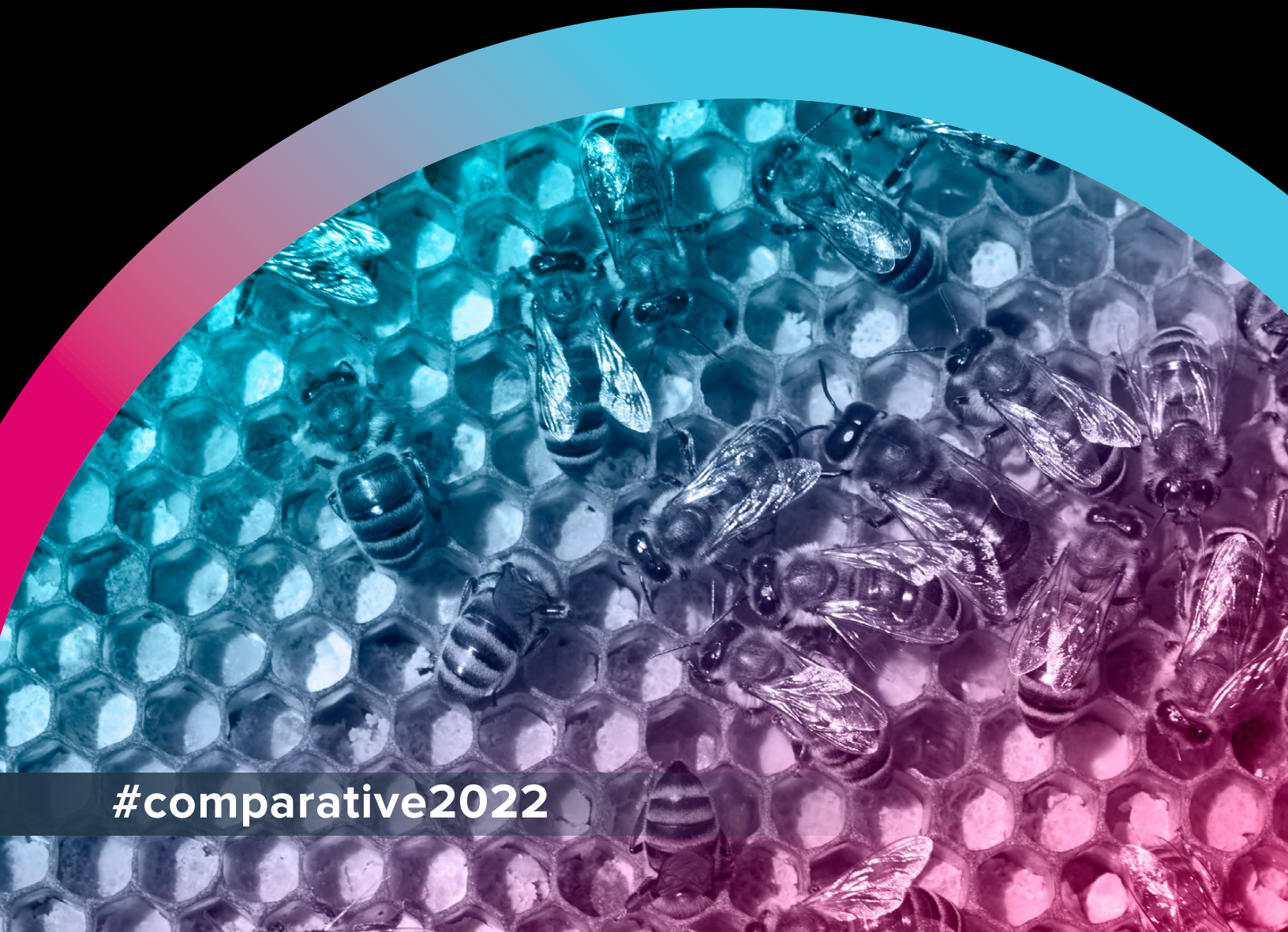
american physiological society®

AMERICAN PHYSIOLOGICAL SOCIETY

COMPARATIVE PHYSIOLOGY: From Organisms to Omics in an Uncertain World

OCTOBER 28–31, 2022
SAN DIEGO, CALIFORNIA



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Acknowledgements:

The meeting organizers and the American Physiological Society gratefully recognize the generous support from the following organizations. This conference is supported by the National Science Foundation under award No. 2225414.

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Contents

General Information

Location

The 2022 American Physiological Society Intersociety Meeting in Comparative Physiology: From Organisms to Omics in an Uncertain World is held at the Westin San Diego Downtown, 1051 Columbia Street, San Diego, CA 92101. Telephone: 619.239.4500.

Conference Management Office Hours

Friday, October 28, 2022 . . . . . **3–8:30 p.m.**

Saturday, October 29, 2022 . . . . . **8 a.m.–6 p.m.**

Sunday, October 30, 2022 . . . . . **8 a.m.–6 p.m.**

Monday, October 31, 2022 . . . . . **8 a.m.–4 p.m.**

Health and Safety

APS takes the health and safety of attendees and their guests seriously. All conference attendees and guests will be required to be fully vaccinated against COVID-19, as defined by the Centers for Disease Control and Prevention and the World Health Organization, prior to arrival at Westin San Diego Downtown. Attendees and their guests must complete their second vaccination no later than **October 13, 2022**, to be considered fully vaccinated.

Per local guidelines, APS highly recommends attendees wear a mask covering their nose and mouth while attending indoor events and sessions unless actively eating or drinking.

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Your registration to this conference includes entry into all oral and poster scientific sessions, all meals during the conference, online access to the submitted abstracts and a program book. **Registration is nontransferable.** You must pay the entire fee regardless of the number of sessions/events you attend. Guests of attendees are not permitted in the scientific sessions.

General Information

Press Registration

Press badges will be issued at the conference registration desk to members of the working press and freelance writers bearing a letter of assignment from an editor. Representatives of allied fields (e.g., public relations, public affairs, etc.) must register as nonmembers.

Photograph/Video Recording

Photo or video capture of any scientific presentation in whole or part is expressly prohibited. Recording or taking photography of another person without their explicit permission is prohibited.

Individuals observed photographing or videotaping any presentation, in whole or part, will be asked to leave the conference immediately and will forfeit their registration fee.

Code of Conduct

APS is committed to providing a safe, productive and welcoming environment for all conference participants and staff. All participants are expected to abide by the APS Conference Code of Conduct, which maintains that all individuals should be treated with respect and consideration; value a diversity of views and opinions; be considerate, respectful and collaborative; communicate openly and with respect, critiquing ideas rather than individuals; avoid personal attacks; be mindful of your surroundings and fellow participants; and be respectful of the rules of APS and the conference venue. Participants include, but are not limited to, attendees, speakers, volunteers, guests, APS staff, hotel staff, service providers and others. Contact APS staff at the conference registration desk if you notice a dangerous situation, someone in distress or violations of this Code of Conduct.

Program Objective

The theme of the meeting is “From Organism to Omics in an Uncertain World.” Comparative physiology seeks to discover how animals work and why animals function the way they do. These two seemingly straightforward questions have far-reaching implications and require a variety of investigative approaches at multiple levels of biological organization. Our challenge is to determine the details of physiological mechanisms while simultaneously gaining insights into ultimate causation, i.e., the evolutionary or adaptive significance of physiological process or trait. This many-fold focus on proximal mechanisms and ultimate causality requires that comparative and evolutionary physiologists use diverse analytical approaches and integrate molecular, cellular, organismal, morphological, biomechanical, biophysical, ecological and evolutionary information. This meeting will highlight some of the important work that comparative physiologists are doing to understand physiological function in the face of climate change and other anthropogenic factors and highlight the important emergence of omics approaches to our understanding of physiological function and adaptions.

Schedule at a Glance

	Friday October 28, 2022	Saturday October 29, 2022			Sunday October 30, 2022
	5–8 p.m.	9–10:30 a.m.	11 a.m.–1 p.m.	2–4 p.m.	9–10:30 a.m.
CRYSTAL I		3.0 — Abstract **Thermal Biology I** *Katie Marshall*	6.0 — Symposium **Field Energetics Compared to Lab: Multiple Stressor Impacts from Organisms to Omics** *Britney Firth* *Paul Craig* ***Sponsored in part by Canadian Society of Zoologists and Pyroscience***	10.0 — Symposium **Fishes in a Changing Climate: The Interaction between Temperature and Oxygen** *Rachael Morgan* *Anna Andreassen* ***Sponsored in part by Pyroscience***	16.0 — Abstract **Cardiovascular and Respiratory Physiology I** *Michael Hedrick*
TOPAZ	*Crystal Ballroom* 5–6 p.m. 1.0 **Opening Keynote Lecture** *Jessica Meir* ***Sponsored by American Journal of Physiology—Regulatory, Integrative and Comparative Physiology***	4.0 — Abstract **Osmotic and Ionic Physiology** *Jonathan Wilson*	7.0 — Symposium **Physiological Mechanisms of Stress-Induced Evolution** *Dietmar Kueltz* *Jason Podrabsky* ***Sponsored in part by Physiological and Biochemical Zoology***	11.0 — Symposium **Links between Mitochondrial Efficiency and Whole-Animal Performance Traits Under Stressful Environmental Conditions** *Julie Nati* *Loic Tuelier* ***Sponsored by J Exp Biol***	17.0 — Abstract **Ecotoxicology** *Kristin Nielsen*
DIAMOND I	6–8 p.m. **Opening Reception**	5.0 — Abstract **Developmental Physiology** *Claire Riggs*	8.0 — Symposium **Thermogenesis: Physiology and Molecular Mechanisms** *Martin Jastroch* *Michael Gaudry* ***Sponsored in part by Journal of Thermal Biology***	12.0 — Abstract **Metabolism and Energetics I** *Omera Matoo*	18.0 — Abstract **Osmotic and Ion Physiology II** *Farwa Sajadi*
		8–10:30 a.m.			8–10:30 a.m.
DIAMOND II		2.0 — Workshop **Open Electronics in Comparative Physiology** *Sergey Morozov*	9.0 — Abstract **Conservation Physiology** *Craig Franklin*	13.0 — Symposium **Vertebrate Cardio-Respiratory Physiology** *Christian Damsgaard* ***Sponsored in part by Comparative Biochemistry and Physiology***	15.0 — Workshop **Open Electronics in Comparative Physiology** *Sergey Morozov*
				4–6 p.m.	
AS NOTED				*Emerald Ballroom* 14.0 **Poster Session I**	

Schedule at a Glance

	Sunday October 30, 2022		Monday October 31, 2022		
	11 a.m.–1 p.m.	2–4 p.m.	9–10:30 a.m.	11 a.m.–1 p.m.	2–4 p.m.
CRYSTAL I	19.0 — Symposium **The Response of Fishes to Ocean Acidification, Hypoxia and Their Interactions** *Garfield Kwan* *Till Harter*	23.0 — Symposium **The Complex Lives of Mitochondria** *Dillon Chung*	28.0 — Abstract **Thermal Biology II** *Maria Christina Vasquez*	32.0 — Abstract **Thermal Biology III** *Johannes Overgaard*	36.0 — Symposium **Hot and Toxic: Understanding Animal Physiology and Behavior in the Context of Climate Change and Pollution** *Lela Schlenker* *Kerri Lynn Ackerly*
TOPAZ	20.0 — Abstract **Metabolism and Energetics II** *Grant McClelland*	24.0 — Symposium **Microbiomes: Implications for Organismal Physiology in a Changing World** *Nick Barts* *Kevin Kohl* ***Sponsored by J Exp Biol***	29.0 — Abstract **Morphology and Biomechanics** *Jake Socha*	33.0 — Abstract **Respiratory Physiology** *Scott Kirkton*	37.0 — Symposium **Novel and Understudied Mechanisms of Epithelial Ion Transport** *Dennis Kolosov* *Sima Jonusaite* **4–6 p.m.** 40.0 — Award **Scholander Award Oral Presentations** *Lynn Hartzler*
DIAMOND I	21.0 — Symposium **NO, H_2S and CO Action in an Uncertain World—The Role of Gasotransmitter-Mediated Signaling in Stress Response and Adaptation** *Lucie Gerber*	25.0 — Abstract **Acid-Base Physiology** *Rachael Heuer*	30.0 — Abstract **Evolutionary Physiology** *Lynn Hartzler*	34.0 — Abstract **Metabolic Suppression** *Les Buck*	38.0 — Symposium **Living in a Seasonal and Warming Environment** *Kenia C. Bicego* *Jose Eduardo de Carvalho*
DIAMOND II	22.0 — Symposium **Experiment-Based Data and Cues about the Evolution of Physiological Processes** *Luciane Gargaglioni* *Cleo A.C. Leite*	26.0 — Symposium **Origins and Mechanisms of Insect Flight** *Lisa Treidel* *Caroline Williams* ***Sponsored by Society for Experimental Biology***	31.0 — Abstract **Omics in Comparative Physiology** *Erica Heinrich*	35.0 — Abstract **GI and Microbiome Physiology** *Justin Conner*	39.0 — Symposium **The Physiology of Tracheal Respiratory Systems** *Jon Harrison* *Philip Matthews* ***Sponsored by Society for Integrative and Comparative Biology***
		4–6 p.m.			7–9 p.m.
AS NOTED		*Emerald Ballroom* 27.0 **Poster Session II**			*Crystal Ballroom* 41.0 — Plenary **Plenary Lecture and Awards Banquet** *Tobias Wang*

Daily Schedule

FRIDAY, OCTOBER 28, 2022

5–6 p.m.		**Session 1** • *Crystal Ballroom* **Opening Keynote Lecture**
5–6 p.m.	1.1	**Experimenting in Microgravity: Full Circle for a Physiologist Turned Astronaut** Jessica Meir, PhD, *NASA Johnson Space Center*

SATURDAY, OCTOBER 29, 2022

8–10:30 a.m.		**Session 2** • *Diamond II* Workshop **Open Electronics in Comparative Physiology** Chair: Sergey Morozov, *University of Helsinki*
9–10:30 a.m.		**Session 3** • *Crystal Ballroom I* Oral abstract session **Thermal Biology I** Chair: Katie Marshall, PhD, *University of British Columbia*
9 a.m.	3.1	**Mechanisms of Local Ddaptation in Plasticity of Cold Tolerance in the Eastern Spruce Budworm, Choristoneura Fumiferana.** Katie Marshall, PhD, *University of British Columbia*
9:30 a.m.	3.2	**Mechanisms of Cold Tolerance in Tardigrades, Hypsibius Exemplaris** Ana Lyons, PhD, *University of California, San Francisco*
9:45 a.m.	3.3	**Brought in From The Cold: Proteogenomics of Siberian Amphipods** Polina Lipaeva, MS, *Helmholtz Centre for Environmental Research-UFZ*
10 a.m.	3.4	**Comparative Functional Analyses of Mammalian UCP1 Provides Insights into Protein Structure-Function Relationships and the Evolution of Nonshivering Thermogenesis** Michael Gaudry, MS, *Stockholm University*
10:15 a.m.	3.5	**Identification and Thermal Profiling of miRNAs Regulating Cold Acclimation in the Mosquito, Aedes Aegypti** Ella De Nicola, PhD, *Carleton University*
9–10:30 a.m.		**Session 4** • *Topaz* Oral abstract session **Osmotic and Ionic Physiology I** Chair: Jonathan Wilson, PhD, *Wilfrid Laurier University*
9 a.m.	4.1	**Marine Catfishes Doing it Their Way. A Unique Nonmammalian Kidney Design for the Production of Hyperosmotic Urine.** Jonathan Wilson, PhD, *Wilfrid Laurier University*

Daily Schedule

SATURDAY, OCTOBER 29, 2022

9:20 a.m.	4.2	**Network Analysis of Gill Transcriptomics Provides Insight into the Impacts of Multiple Stressors in Atlantic Salmon** Michelle Monette, PhD, *Western Connecticut State University*
9:40 a.m.	4.3	**A Novel K^+-Dependent Na^+ Uptake Mechanism in Zebrafish, Danio Rerio, During Low pH Exposure.** Alexander Clifford, PhD, *University of California, San Diego, Scripps Institution of Oceanography*
10 a.m.	4.4	**Molecular Regulation of the Tilapia, O. Mossambicus, Myo-Inositol Biosynthesis Pathway** Jens Hamar, MS, *University of California, Davis*
10:15 a.m.	4.5	**Producing Larger Atlantic Salmon Smolts: Influences of Photoperiod Manipulations at Three Different Sizes on Gastrointestinal Osmoregulation** Daniel Laronde, MS, *University of British Columbia*
9–10:30 a.m.		**Session 5** • *Diamond I* Oral abstract session **Developmental Physiology** Chair: Claire Riggs, PhD, *Brigham and Women's Hospital*
9 a.m.	5.1	**Morphological and Physiological Variability has a Genetic Basis in the Developing Zebrafish** Gil Martinez Bautista, PhD, *University of North Texas*
9:15 a.m.	5.2	**Development of Thermoregulatory Control During Ontogeny of Weddell Seals (Leptonychotes Weddellii)** Linnea Pearson, PhD, *California Polytechnic State University*
9:30 a.m.	5.3	**Effects of Early-Life Caffeine Exposure on Adult Body Mass, Composition and Voluntary Wheel-Running Behavior** Haley Cabrera, *University of California, Riverside*
9:45 a.m.	5.4	**Genetics and Environment Regulate Early Embryo Cell Division Rates and Subsequent Survival in the Zebrafish, Danio Rerio** Lindsey Daniel, PhD, *University of North Texas*
10 a.m.	5.5	**Altered Maturation of Brain Mitochondria by Postnatal Hypoxia and High Altitude in Rats and Mice** Fernanda Aliaga Raduan, MS, *Universidad Mayor de San Andres*
10:15 a.m.	5.6	**Annual Killifish: Eye Development and Cellular Regeneration** Carmen Rodriguez, *Portland State University*

Daily Schedule

SATURDAY, OCTOBER 29, 2022

11 a.m.–1 p.m.		**Session 6** • *Crystal Ballroom I* Symposium **Field Energetics Compared to Lab: Multiple Stressor Impacts from Organisms to Omics** Chairs: Britney Firth, PhD, *University of Waterloo* Paul Craig, PhD, *University of Waterloo*
11 a.m.	**6.1**	**Respiratory Physiology of Wild and Lab-Acclimated Lepomis Sunfishes** Brittney Borowiec, PhD, *McMaster University*
11:30 a.m.	**6.2**	**Using Field Energetic Measurements to Inform Management Practices in Salmonids** Erika Eliason, PhD, *University of California, Santa Barbara*
12 p.m.	**6.3**	**Fish Respiratory Plasticity in the Lab Versus Field** Andy Turko, PhD, *McMaster University*
12:30 p.m.	**6.4**	**Challenges in "Solving" the Bioenergetics Equation for a Sexually Dimorphic Fish Using Field and Lab Methods** Graham Raby, PhD, *Trent University*
11 a.m.–1 p.m.		**Session 7** • *Topaz* Symposium **Physiological Mechanisms of Stress-Induced Evolution** Chairs: Dietmar Kueltz, PhD, *University of California, Davis* Jason Podrabsky, PhD, *Portland State University*
11 a.m.	**7.1**	**Comparative and Functional Analysis of Genome Topology Across Mammals** Lucia Carbone, PhD, *Oregon Health & Science University*
11:30 a.m.	**7.2**	**Stress-Induced Evolutionary Adaptation Versus Stress-Induced Evolutionary Innovation** Alan Love, PhD, *University of Minnesota*
12 p.m.	**7.3**	**Stress-Induced Macroevolution: How Genome Reorganization Creates and Preserves System Information by Changing Karyotype Coding** Henry Heng, PhD, *Wayne State University School of Medicine*
12:30 p.m.	**7.4**	**Gene Expression Plasticity Shapes Environmental Stress-Induced Adaptation in a Colonial Marine Tunicate** Alison Gardell, PhD, *University of Washington Tacoma*
11 a.m.–1 p.m.		**Session 8** • *Diamond I* Symposium **Thermogenesis: Physiology and Molecular Mechanisms** Chairs: Martin Jastroch, PhD, *Stockholm University* Michael Gaudry, MS, *Stockholm University*

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SATURDAY, OCTOBER 29, 2022

11 a.m.	8.1	**Thermogenesis and Energy Savings of Hibernation in a South American Marsupial: Calibrating a Physiological Model for Predicting Survival to Warming** Roberto Nespolo Rossi, PhD, *Universidad Austral de Chile*
11:30 a.m.	8.2	**Evolutionary Genomics of Thermogenesis in High-Altitude Deer Mice** Zachary Cheviron, PhD, *University of Montana*
12 p.m.	8.3	**Developmental Thermoregulatory Adaptations to Extreme Environments: Trade-Offs and Mechanisms** Cayleih Robertson, PhD, *McMaster University*
12:30 p.m.	8.4	**Reconstructing the Evolution of Mammalian Nonshivering Thermogenesis** Martin Jastroch, PhD, *Stockholm University*
11 a.m.–1 p.m.		**Session 9** • *Diamond II* Oral abstract session **Conservation Physiology** Chair: Craig Franklin, PhD, *University of Queensland*
11 a.m.	9.1	**When is Enough Enough? Incorporating Environmental Complexity into Physiological Experiments** Anne Todgham, PhD, *University of California, Davis*
11:25 a.m.	9.2	**Fire And Flood: Predicting the Physiological Impacts of Wildfire and Associated Runoff on Aquatic Fauna** Craig Franklin, PhD, *The University of Queensland*
11:50 a.m.	9.3	**Critical Oxygen Pressures for Aerobic Performance in Aquatic Animals** Brad Seibel, PhD, *University of South Florida*
12:10 p.m.	9.4	**Assessment of The Physiological, Biochemical and Behavioral Impacts of Exposure to a Marine Seismic Survey on the Pale Octopus, Octopus Pallidus, in Southeastern Australia** Ryan Day, PhD, *University of Tasmania*
12:30 p.m.	9.5	**The Impacts of Climate Change on the Physiology and Biochemistry of School Sharks in Southeast Tasmania** Katherine Ollerhead, PhD, *University of Tasmania*
12:45 p.m.	9.6	**Turbidity Impacts on Gill Morphology and Hypoxia Tolerance of Eastern Sand Darter, Ammocrypta Pellucida** Britney Firth, *University of Waterloo*
2–4 p.m.		**Session 10** • *Crystal Ballroom I* Symposium **Fishes in a Changing Climate: The Interaction Between Temperature and Oxygen** Chairs: Rachel Morgan, PhD, *University of Bergen* Anna Andreassen, PhD, *Norwegian University of Science and Technology*

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SATURDAY, OCTOBER 29, 2022

2 p.m.	10.1	**Genetic And Physiological Basis of Inter-Individual Variation and Plasticity in the Responses to High Temperature and Hypoxia in Fish** Patricia Schulte, PhD, *University of British Columbia*
2:30 p.m.	10.2	**How Do Warming and Hypoxia Affect Fish Cardiorespiratory Physiology and Immune Function?** Robine H.J. Leeuwis, PhD, *Memorial University of Newfoundland*
3 p.m.	10.3	**Is Individual Variation in Tolerance of Hypoxia and Warming Correlated in Fishes?** David McKenzie, PhD, *Centre National de la Recherche Scientifique*
3:30 p.m.	10.4	**Combined Effects of Warming and Hypoxia on Environmental Tolerance and Maximum Aerobic Performance of Fish** Daniel Montgomery, PhD, *University of British Columbia*
2–4 p.m.		**Session 11** • *Topaz* Symposium **Links Between Mitochondrial Efficiency and Whole-Animal Performance Traits Under Stressful Environmental Conditions** Chairs: Julie Nati, PhD, *Memorial University* Loic Teulier, PhD, *University of Lyon* *sponsored by Journal of Experimental Biology*
2 p.m.	11.1	**Linking Mitochondrial Substrate Oxidation to Thermal Tolerance in Insects: A New Perspective About Temperature Adaptations** Nicolas Pichaud, PhD, *University of Moncton*
2:30 p.m.	11.2	**Mitochondrial Meltdown: Fundamental Effects of Thermal Stress on Banded Wrasse, Notolabrus Fucicola, Heart Mitochondria** Jules Devaux, PhD, *University of Auckland*
3 p.m.	11.3	**Are cardiac muscle performance and mitochondrial function related in Atlantic salmon, Salmo salar at high temperatures?** Julie Nati, PhD, *Memorial University*
3:30 p.m.	11.4	**Improving Organ Preservation: Another Lesson from the Champion of Anoxia Tolerance, the Crucian Carp, Carassius Carassius** Lucie Gerber, PhD, *University of Oslo*
2–3:45 p.m.		**Session 12** • *Diamond I* Oral abstract session **Metabolism and Energetics I** Chair: Omera Matoo, PhD, *University of South Dakota*
2 p.m.	12.1	**Effect of Mitochondrial-Nuclear Genomes and Thermal Stress on Metabolism** Omera Matoo, PhD, *University of South Dakota*
2:30 p.m.	12.2	**Causal Mechanisms for Variation in Resting Metabolic Rates** Craig Perl, PhD, *Arizona State University*

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2:45 p.m.	12.3	**Changes in Metabolic Scaling Throughout Development in Thirteen-Lined Ground Squirrels, Ictidomys Tridecemlineatus** Jessica Li, *University of British Columbia*
3 p.m.	12.4	**Hypoxic Effects on Metabolic Performance and Viable Thermal Habitat in Obligate Ram Ventilating and Buccal Pumping Shark Species** Alyssa Andres, PhD, *University of South Florida*
3:15 p.m.	12.5	**Obesity in Mice is Postponed Under a Photic Cycle Oscillating at a Period Similar to or Shorter Than Their Endogenous Circadian Rhythm Period Length** Roee Gutman, PhD, *MIGAL-Galilee Research Institute*
3:30 p.m.	12.6	**Direct, Inter- and Transgenerational Impacts of an Endocrine Disruptor Mixture on Rats** Marie Darracq-Ghitalla-Ciock, PhD, *University of Grenoble-Alpes*
2–4 p.m.		**Session 13** • *Diamond II* Symposium **Vertebrate Cardio-Respiratory Physiology** Chair: Christian Damsgaard, PhD, *Aarhus University*
2 p.m.	13.1	**Gas-Exchange and Ion-Regulation During Development and Early Evolution of the Vertebrate Gill** Colin Brauner, PhD, *University of British Columbia*
2:30 p.m.	13.2	**Carbonic Anhydrase Function and Evolution in the Respiratory Gas Exchange System of Marine Fishes** Angelina Dichiera, PhD, *The University of British Columbia*
3 p.m.	13.3	**The Evolution of High Heart Rates** Bjarke Jensen, PhD, *University of Amsterdam, Amsterdam University Medical Centers*
3:30 p.m.	13.4	**Integrative Cardiorespiratory Mechanisms of High-Altitude Adaptation in Deer Mice** Graham Scott, PhD, *McMaster University*
4–6 p.m.		**Session 14** • *Emerald* **Poster session I**
Board #		
1	14.1	**The Effects of Domestication on Rainbow Trout Performance and Fitness in a Semi-Wild Environment** Madison Earhart, Clark McMaster, Jarrett Blair, Tessa Blanchard, Nicholas Strowbridge, William Bugg, Robert Devlin, Patricia Schulte, *University of British Columbia; University of Manitoba; Department of Fisheries and Oceans Canada*
3	14.2	**Do Mitochondrial Micrornas Regulate Metabolism During Hibernation In Thirteen-Lined Ground Squirrels, Ictidomys Tridecemlineatus?** Karyn Robichaud, Brynne Duffy, James Staples, Paul Craig, *University of Waterloo; Western University*

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5	14.3	**Theme and Variation of Mammalian Cells When Buffering Heat Stress** Carla B Madelaire, Lucas R Moreira, Janessa Montenegro, Kristin Crouse, Valerie Forbes, Diane Genereux, Elinor Karlsson, Allyson G Hindle, *University of Nevada Las Vegas; Broad Institute; University of Minnesota*
7	14.4	**Spinal Cord Neuronal Nitric Oxide Synthase Across Vertebrates: An Evolutionary Perspective for Spinal Oxygen Sensors** Marina R. Sartori, Luis G.A. Patrone, Elisa M. Fonseca, Luciane H.B. Gargaglioni, Richard J.A. Wilson, *University of Calgary; São Paulo State University*
9	14.5	**5-HT Neurons of the Medullary Raphe Contribute to Respiratory Control in Toads** Elisa Maioqui Fonseca, Carolina Ribeiro Noronha de Souza, Kênia Cardoso Bícego, Luiz Guilherme de Siqueira Branco, Luciane Helena Gargaglioni Batalhão, *University of Calgary; Federal University of Jataí; São Paulo State University; University of São Paulo*
11	14.6	**Interactive Marine Threats: Do Microplastics Mediate Responses to Thermal Stress in a Marine Invertebrate** Eric Coyle, Jonathon Stillman, *San Francisco State University*
13	14.7	**Development of Air-Breathing in Bristlenose Plecos, Ancistrus Cirrhosis** Lauren Crowder, Edward Dzialowski, *University of North Texas*
15	14.8	**Trade-offs in Lifetime Reproductive Successes, Life Span and Health Span in Selectively Bred High Runner Lines of Mice** Natalie Whitehead, Nicole Schwartz, Natalie Holt, Theodore Garland, *University of California, Riverside*
17	14.9	**Transcriptomic Analysis Reveals Differential Effects of Acute and Repeated Stimulation of the Hpa Axis and Glucocorticoid Receptor Blockade in Fasting Elephant Seals Pups, Mirounga Angustirostris** Diana Moreno, David Ensmiger, Daniel Crocker, Jose Vazquez-Medina, *University of California, Berkeley; San Jose State University; Sonoma State University*
19	14.10	**Body Composition and Energy Savings by Hibernation: Using Quantitative Magnetic Resonance in the South American Marsupial Monito Del Monte (Dromiciops Gliroides)** Carlos Mejias, Maite Villalobos, Roberto Nespolo Rossi, Universidad Austral de Chile; *Universidad Austral de Chile; Universidad Austral de Chile*
21	14.11	Withdrawn
23	14.12	**Red Knots Produce More Metabolic Water to Cope With the Heat When Fat Than When Lean** Michal S. Wojciechowski, Matthew J. Noakes, Grzegorz Zaniewicz, Małgorzata Jefimow, Agnieszka Ozarowska, Wlodzimierz Meissner, *Nicolaus Copernicus University; University of Gdansk*

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25	14.13	**A True Fish Out of Water: Characterizing the Acute Salinity Response of Beach-Dwelling California Grunion Embryos** Meranda Corona, Jens Hamar, Dietmar Kültz, *University of California, Davis*
27	14.14	**Development of a Fluorescent Nuclear Marker for Use in Live Tilapia Cells** Tracy Le, Jens Hamar, Dietmar Kueltz, *University of California, Davis*
29	14.15	**Discovering Genes Associated with Multigenerational Acclimation to Variable Temperature and Salinity in Daphnia Pulex** Jessenia Suarez, Jonathon Stillman, *San Francisco State University*
31	14.16	**Comparative Anoxia Responses of Hatchling and Juvenile Painted Turtles, Chrysemys Picta Bellii** Nelson Membreno, Daniel Warren, *Saint Louis University*
33	14.17	**Expansion of the Lateral Line System Among Blind Salamanders of the Genus Eurycea** Brittany Dobbins, Maia Rogers, Ruben Tovar, Thomas Devitt, Dana Garcia, David Hillis, *Texas State University; University of Texas at Austin*
35	14.18	**Warmer Temperatures Accelerate Developmental and Yolk Sac Consumption Rates of Larval White Seabass** Ria Bhabu, Gabriel Lopez, Martin Tresguerres, Garfield Kwan, *University of California, San Diego*
37	14.19	**Measuring Metabolic Rate During Metamorphosis Across Temperatures in the Alfalfa Leafcutting Bee** Kayla Earls, Julie Cruz, Jacob Campbell, Joseph Rinehart, Kendra Greenlee, *North Dakota State University; Lynn University, Boca Raton; U.S. Department of Agriculture, Agriculture Research Service, Fargo*
39	14.20	**Effect of Sexual Dimorphism in Turbinate Morphology on Heat Conservation in the Nasal Cavity of the Domestic Fowl** Marlee Poff, Tomasz Owerkowicz, *California State University, San Bernardino*
41	14.21	**Endothelial Cells Derived from Elephant Seals Respond to Hypoxia by Suppressing Inflammation and Upregulating Antioxidant Genes** José Pablo Vázquez-Medina, Kaitlin Allen, Julia María Torres-Velarde, *University of California, Berkeley*
43	14.22	**A Transcriptomic and Targeted Approach Towards Understanding the Tolerance of Wastewater Effluent in Four Darter Species, Etheostomatinae Spp** Paul Craig, Louis Pfeifer, Nicole Gauvreau, Rachel Dawe, Leslie Bragg, Mark Servos, *University of Waterloo*
45	14.23	**The Role of Angiotensin Ii to Support Arterial Blood Pressure Following Serial Hemorrhage in the Freshwater Channel Catfish, Ictalurus Punctatus** K. Austin Davis, Max G. Sanderford, *University of North Texas Health Science Center; Tarleton State University*

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47	14.24	**A Large Heart: How Does Developmental Hypoxia Affect Individual Cardiomyocyte Performance in the American Alligator, Alligator Mississippiensis?** Brandt Smith, Gina Galli, Ruth Elsey, Dane Crossley, *University of North Texas; University of Manchester; Rockefeller Wildlife Refuge*
49	14.25	**Is The Physiology of the Mytilus Species Complex, Mytilus Edulis/ M. Trossulus/M. Galloprovincialis, Negatively Impacted by Changes in Temperature and Salinity?** Casey Martin, *Portland State University*
51	14.26	**Double Strand Break Dna Repair in Response to Anoxia in Austrofundulus Limnaeus** Riley Roth-Carter, Jason Podrabsky, *Portland State University*
53	14.27	**Low Dose of Metformin Increases Blood Glucose in Mourning Doves, Zenaida Macroura** Karen Sweazea, Anthony Basile, Avin Kreisler, Kavita Singh, *Arizona State University*
55	14.28	**A Meta-Analysis of Whole-Body and Heart Mass Effect Sizes from a Long-Term Artificial Selection Experiment for High Voluntary Exercise** Nicole Schwartz, Robert Rosenthal, Theodore Garland Jr., *University of California, Riverside*
57	14.29	**High-Intensity Interval Training and Moderate-Intensity Continues Training on Mitochondria Biogenesis of Skeletal Muscles of Adult Mice** Delima Engga Maretha, *Raden Fatah State Islamic University*
59	14.30	**Investigations of Metabolic Alterations in the Spotted Seatrout (Cynoscion Nebulosus) Associated With Infection by a Myxozoan Parasite, Kudoa Inornate, Using 1d-1h Nmr Metabolomics** Augustus Snyder, Fabio Casu, Eric McElroy, Isaure de Buron, Jody Beers, *College of Charleston; South Carolina Department of Natural Resources*
61	14.31	**Inter-Individual Variation in Whole Animal and Tissue-Specific Mitochondrial Respiration in Fundulus Grandis** Samantha Bowden, Bernard Rees, *University of New Orleans*
63	14.32	**Supplementation with Akkermansia Muciniphila Does Not Curb Adiposity in Active Season Ground Squirrels** Courtney Kurtz, Jewel Zur Tulod, Travis Jennings, Khrystyne Duddleston, *University of Wisconsin Oshkosh; University of Alaska, Anchorage*
65	14.33	**Acid-Base Regulation in the Dungeness Crab in Response to a High Co2 Environment** Liam Tigert, Cosima Porteus, *University of Toronto Scarborough*
67	14.34	**Cellular Heat Responses of Desert Mammals Promote Survival in Extreme Conditions** Janessa Montenegro, Amy Klink, Carla Madelaire, Allyson Hindle, *University of Nevada, Las Vegas*
69	14.35	**Respiratory Response to Oxygen and Temperature Change in the Air-Breathing Weather Loach, Misgurnus Anguillicaudatus** Katherine Burbules, *University of North Texas*

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71	14.36	**Functional and Biochemical Characterization of in Vitro Primary Neurons in the Western Painted Turtle, Chrysemys Picta Bellii: An Emergent Model for Neurobiology Studies of Anoxia-Tolerant Vertebrates** Natalia Agostini Schneider, Colton Smith, Mia Warmka, Seth Hofheins, Daniel Warren, *Saint Louis University*
73	14.37	**The Effects of Parental Care on Neonatal Thermoregulation in a Biparental Rodent** Rikki Laser, Chen Yang, Thomas Cleland, Alexander Ophir, *Cornell University*
75	14.38	**Insect Resource Allocation to Prepare for Overwintering During Diet Restrictions** Madison Floden, Gagandeep Brar, Julia Bowsher, Arun Rajamohan, Kendra Greenlee, *North Dakota State University; U.S. Department of Agriculture, Agriculture Research Service, Fargo*
77	14.39	**Acclimation Temperature Modulates Resistance to Water Loss in Two Populations of a Widely Distributed Frog** Sam M. Hogue, Daniel E. Warren, Kasey D. Fowler-Finn, Michel E. B. Ohmer, *Saint Louis University*
79	14.40	**Postnatal Hypoxia Alters Mitochondrial Oxygen Affinity in Mice, But Not in Rats** Maud Demarest, François Marcouiller, Christian Arias-Reyes, Jorge Soliz, Vincent Joseph, *Institut Universitaire de Cardiologie et de Pneumologie de Québec*
80	14.41	**Changes in Hemoglobin Gene Expression During Development of a Coral Reef Fish** Sjannie Lefevre, Adam Downie, Jodie Rummer, Göran Nilsson, *University of Oslo; University of Queensland; James Cook University*
81	14.42	**Effects of Exercise Training on Locomotor Performance in Starvation-Selected Drosophila Melanogaster** Katrina Pinili, Allen Gibbs, *University of Las Vegas*

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8–10:30 a.m.		**Session 15** • *Diamond II* Workshop **Open Electronics in Comparative Physiology** Chair: Sergey Morozov, *University of Helsinki*
9–10:30 a.m.		**Session 16** • *Crystal Ballroom I* Oral abstract session **Cardiovascular and Respiratory Physiology I** Chair: Michael Hedrick, PhD, *California State University, East Bay*
9 a.m.	16.1	**Experimental Insights into Hypoxia Acclimatization and the Potential for Elevational Range Shifts in a Warming World** Naim Bautista, PhD, *University of Nebraska Lincoln*
9:15 a.m.	16.2	**Implications of Chronic Hypoxia During a Critical Developmental Window in Red Drum** Benjamin Negrete, PhD, *The University of Texas at Austin*

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9:30 a.m.	16.3	**Temperature and Body Size Impacts Aerobic and Cardiac Thermal Limits in Barred Surfperch** Krista Kraskura, PhD, *University of California, Santa Barbara*
9:45 a.m.	16.4	**The Role of Actin Polymerization in Closure of the Avian Ductus Arteriosus, Gallus Gallus** Jessica Rippamonti, PhD, *University of North Texas*
10 a.m.	16.5	**The Effects of Submerged Versus Surface Swimming on Central Venous Pressure and Cardiac Output in Juvenile American Alligators, Alligator Mississippiensis** Tyler Lawrence, MS, *University of North Texas*
10:15 a.m.	16.6	**Pulmonary Bypass Shunting During Warming and Cooling in Juveniles of the American Alligator, Alligator Mississippiensis** Manuel Madrigal, *California State University, San Bernardino*
9–10:30 a.m.		**Session 17** • *Topaz* Oral abstract session **Ecotoxicology** Chair: Kristin Nielsen, PhD, *University of Texas at Austin*
9 a.m.	17.1	**What Can Pop-Up Satellite Tags Teach Us About Reproductive Ecology, Toxicology and Temperature Stress in Wild Mahi-Mahi, Coryphaena Hippurus?** Lela Schlenker, PhD, *East Carolina University, Coastal Studies Institute*
9:15 a.m.	17.2	**Stressed Out: Investigating Additive Effects of Crude Oil And Hypoxia on Cardiovascular Function in Surgically Recovered Red Drum, Sciaenops Ocellatus** Derek Nelson, PhD, *University of North Texas*
9:30 a.m.	17.3	**Evolved Pollutant-Resistance Shapes Methylation and Gene Expression Responses to Hypoxia in Atlantic Killifish, Fundulus Heteroclitus** Yaamini Venkataraman, PhD, *Woods Hole Oceanographic Institution*
9:45 a.m.	17.4	**Impact of Aqueous Benzo(A)Pyrene Exposure on Anxiety-Like Behavior, Learning and Memory in Adult Zebrafish, Danio Rerio** Alicia Dunton, *University of North Texas*
10 a.m.	17.5	**Olfactory Avoidance of Toxic Volatile Electrophiles is Mediated by aA Broadly Tuned Olfactory Receptor in Drosophila** Teruyuki Matsunaga, PhD, *The University of Tokyo*
10:15 a.m.	17.6	**The Impact of Microplastic Ingestion on Tissue-Specific Gene Expression in the Tropical House Cricket, G. Sigillatus** Alexandra Cheslock, MS, *Carleton University*
9–10:15 a.m.		**Session 18** • *Diamond I* Oral abstract session **Osmotic and Ion Physiology II** Chair: Farwa Sajadi, *York University*

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9 a.m.	18.1	**Anti-Diuretic Control of the Malpighian Tubules Involves Inactivation and Disassociation of the V-Type H^+-Atpase in the Aedes Aegypti Mosquito** Farwa Sajadi, *York University*
9:15 a.m.	18.2	**Neuroendocrine Factors Influence Aquaporin Expression in the Adult Mosquito, Aedes Aegypti** Britney N. Picinic, PhD, *York University*
9:30 a.m.	18.3	**Voltage-Gated Ion Channels Regulate Ion Transport and Fluid Secretion Rate in the Malpighian Tubules of Larval Cabbage Looper, Trichoplusia Ni** Jocelyne Dates, *California State University San Marcos*
9:45 a.m.	18.4	**Voltage-Gated Ion Channel Expression in Osmoregulatory Tissues in Aedes Aegypti Larva Show Changes in Abundance Following Salinity Exposure** Serena Farrell, *California State University San Marcos*
10 a.m.	18.5	**Voltage-Gated Ion Channels are Expressed in the Malpighian Tubules of Larval T.ni and Alter in Mrna Abundance With Ion-Transporting Phenotype** Alexis Castaneda, *California State University, San Marcos*
11 a.m.–1 p.m.		**Session 19** • *Crystal Ballroom I* Symposium **The Response of Fishes to Ocean Acidification, Hypoxia and Their Interactions** Chairs: Garfield Kwan, PhD, *National Oceanic and Atmospheric Administration and Scripps Institution of Oceanography* Till Harter, PhD, *Scripps Institution of Oceanography*
11 a.m.	19.1	**It's Hard to Breathe: Hypoxia Sensitivity of Two Commercially Important Rockfish Species with Contrasting Habitat Use** Nicholas Wegner, PhD, *National Marine Fisheries Service*
11:30 a.m.	19.2	**The Effect of Photoperiod Manipulation in Freshwater on Acid-Base Regulation, Subsequent Seawater Transfer and Hypoxia Tolerance in Atlantic Salmon, Salmo Salar** Gam Le, PhD, *University of British Columbia*
12 p.m.	19.3	**Dueling Stressors: The Impacts of Hypoxia on Upper Thermal Tolerance in Coastal Fishes** Gail Schwieterman, PhD, *Carleton College*
12:30 p.m.	19.4	**Integrating Transcriptomics, Cellular Biology and Physiology to Understand Responses to Environmentally Relevant Acidification and Hypoxia** Martin Tresguerres, PhD, *University of California, San Diego*
11 a.m.–1 p.m.		**Session 20** • *Topaz* Oral Abstract Session **Metabolism and Energetics II** Chair: Grant McClelland, PhD, *McMaster University*

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11 a.m.	20.1	**Cross-Species Evidence That Endotherms Trade Off Thermoregulation for the Stress Response** Gary Burness, PhD, *Trent University*
11:30 a.m.	20.2	**Plasticity of Brown Adipocyte Mitochondrial Metabolism to Cold Hypoxia in High-Altitude Deer Mice** Grant McClelland, PhD, *McMaster University*
12 p.m.	20.3	**Metabolic Cost of Thermoregulation Decreases After the Molt in Developing Weddell Seal Pups** Heather Liwanag, PhD, *California Polytechnic State University*
12:15 p.m.	20.4	**Tissue-Specific Mitochondrial Networking and Metabolism in a Mammalian Model of Extreme Metabolism** Dillon Chung, PhD, *National Heart, Lung and Blood Institute, National Institutes of Health*
12:30 p.m.	20.5	**Mitochondrial Responses to Hif-1 and Acute Hypoxia Might Underlie Adaptation to High-Altitude in Mice** Maud Demarest, PhD, *Institut Universitaire de Cardiologie etde Pneumonologie de Québec, University of Laval*
12:45 p.m.	20.6	**Chronic Hypoxia Triggers Mitochondrial Plasticity in the Brain of Mice, But Not in Rats** Christian Arias-Reyes, PhD, *Université Laval*
11 a.m.–1 p.m.		**Session 21** • *Diamond I* Symposium **NO, H_2S and CO Action in an Uncertain World—The Role of Gasotransmitter-mediated Signaling in Stress Response and Adaptation** Chair: Lucie Gerber, PhD, *University of Oslo*
11 a.m.	21.1	**Role of Carbon Monoxide in Hypoxia Tolerance of Animals** Michael Tift, PhD, *University of North Carolina Wilmington*
11:30 a.m.	21.2	**Hydrogen Sulfide and Mammalian Hibernation: Potential Roles in Metabolic Suppression and Tissue Protection** James Staples, PhD, *University Western Ontario*
12 p.m.	21.3	**Shaping the Cardiac Response to Hypoxia: No and its Partners in the Goldfish, Carassius Auratus** Sandra Imbrogno, PhD, *University of Calabria*
12:30 p.m.	21.4	**Gasotransmitters in Health and Disease** Leo Otterbein, PhD, *Harvard Medical School*
11 a.m.–1 p.m.		**Session 22** • *Diamond II* Symposium **Experiment-Based Data and Cues About the Evolution of Physiological Processes** Chairs: Luciane Gargaglioni, PhD, *São Paulo State University* Cleo Leite, PhD, *Federal University of São Carlos*

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11 a.m.	22.1	**Central Control of Cardiorespiratory Interactions: From Cats to Catsharks** Edwin Taylor, PhD, *University of Birmingham*
11:30 a.m.	22.2	**Experiment-Based Data on Cardiorespiratory Interaction in Vertebrates** Cleo Leite, PhD, *Universidade Federal de São Carlos*
12 p.m.	22.3	**The Evolution on the Central Processing of Respiration** Luciane Gargaglioni, PhD, *São Paulo State University*
12:30 p.m.	22.4	**Neuronal Firing Rate Homeostasis in the Respiratory Network Through the Variable Expression of Cellular Feedback Systems** Joseph Santin, PhD, *University of Missouri*
2–4 p.m.		**Session 23** • *Crystal Ballroom I* Symposium **The Complex Lives of Mitochondria** Chair: Dillon Chung, PhD, *National Heart, Lung and Blood Institute, National Institutes of Health*
2 p.m.	23.1	**Regulation of Mitochondrial Homeostasis During Insect Dormancy** Jacqueline Lebenzon, PhD, *University of California, Berkeley*
2:30 p.m.	23.2	**Chasing the Mechanistic Basis of Extreme Metabolic Adaptation in Elephant Seals Using Ex Vivo and in Situ Approaches** Jose Pablo Vazquez-Medina, PhD, *University of California, Berkeley*
3 p.m.	23.3	**Fishing for Keys to Longevity in the Heart of the Greenland Shark** Holly Shiels, PhD, *University of Manchester*
3:30 p.m.	23.4	**Sustaining Power: Building Energy Networks in Striated Muscles** Brian Glancy, PhD, *National Institute of Arthritis and Musculoskeletal Diseases, National Institutes of Health*
2–4 p.m.		**Session 24** • *Topaz* Symposium **Microbiomes: Implications for Organismal Physiology in a Changing World** Chairs: Nick Barts, PhD, *University of Pittsburgh* Kevin Kohl, PhD, *University of Pittsburgh* *sponsored by Journal of Experimental Biology*
2 p.m.	24.1	**The Microbiome Buffers Tadpole Hosts from the Deleterious Effects of Heat Stress** Samantha Fontaine, PhD, *University of Pittsburgh*
2:30 p.m.	24.2	**The Roles of Beneficial Microbes in the Coral Holobiont** Monica Medina, PhD, *Penn State University*
3 p.m.	24.3	**Examining Microbial Drivers of Wildlife Fitness in the Growing Anthropogenic Landscape** Candace Williams, PhD, *San Diego Zoo Wildlife Alliance*

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3:30 p.m.	24.4	**Effects of Environmental Modification and Early-Life Stress on the Gut-Brain Axis in a Wild Mammal** Amy Newman, PhD, *University of Guelph*
2–4 p.m.		**Session 25** • *Diamond I* Oral abstract session **Acid-Base Physiology** Chair: Rachael Heuer, PhD, *University of Miami*
2 p.m.	25.1	**The Effect of Ocean Acidification on the Olfactory Physiology and Behavior of the Economically Important Dungeness Crab, Metacarcinus Magister** Cosima Porteus, PhD, *University of Toronto, Scarborough*
2:25 p.m.	25.2	**Effects of Elevated Co2 on Yellowfin Tuna, Thunnus Albacares, Early-Life Stage Respiration and Ammonia Excretion** Rachael Heuer, PhD, *University of Miami*
2:50 p.m.	25.3	**The Role of Water ph During Hypercapnia on Acid-Base Compensation in White Sturgeon, Acipenser Transmontanus** Ryan Shartau, PhD, *University of Texas at Tyler*
3:15 p.m.	25.4	**Dissecting Fish Otolith Biomineralization Responses to Climate Change Using Cell Biology and Organismal Physiology** Garfield Kwan, PhD, *University of California, San Diego*
3:30 p.m.	25.5	**Common and Species-Specific Effects Co2-Induced Ocean Acidification on Coral Photosynthesis and Oxidative Damage with Broad Implications for Reef Organisms** Angus Thies, MS, *Scripps Institution of Oceanography*
3:45 p.m.	25.6	**Investigating the Putative Role of GPR4 as a Molecular Acid Sensor in Fish Gills** Ryan Myers, *Scripps Institution of Oceanography, University of California, San Diego*
2–4 p.m.		**Session 26** • *Diamond II* Symposium **Origins and Mechanisms of Insect Flight** Chairs: Lisa Treidel, PhD, *University of Nebraska, Lincoln* Caroline Williams, PhD, *University of California, Berkeley*
2 p.m.	26.1	**The Phylogenetic and Biomechanical Origins of Insect Flight** Robert Dudley, PhD, *University of California, Berkeley*
2:30 p.m.	26.2	**Insect Flight Energetics: Linking Morphological and Metabolic Diversity** Charles-A. Darveau, PhD, *University of Ottawa*
3 p.m.	26.3	**Functional Versatility and Plasticity of Insect Flight Muscle** Ruud Schilder, PhD, *Pennsylvania State University*
3:30 p.m.	26.4	**Using Wing Polymorphisms as a Window into the Evolutionary Physiology of Flight** Lisa Treidel, PhD, *University of Nebraska, Lincoln*

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4–6 p.m.		**Session 27** • *Emerald* **Poster Session II**
Board #		
2	**27.1**	**Power, Problems and Predictions of Omic-Based Analysis for Physiological Processes** Ning Li, Francis Pan, Andrew Griffith, Donal Manahan, *University of Southern California*
4	**27.2**	**Understanding Variation in Hypoxic Gene Expression in the Gulf Killifish, Fundulus Grandis** Taylor Murphy, Bernard Rees, *University of New Orleans*
6	**27.3**	**Common Tenrecs, Tenrec Ecaudatus, Constrain Oxygen Consumption Without Direct Concomitant Changes to Body Temperature and Heart Rate in Hypoxia or Hypercapnia** Claudia Silva Rubio, Frank van Breukelen, *University of Nevada, Las Vegas*
8	**27.4**	**Acclimation to Diel Cycles of Temperature Improves Hypoxia Tolerance in Killifish** Megan Ridgway, Graham Scott, *McMaster University*
10	**27.5**	**Climate Change Impacts on the Shell Structure of an Ecologically Important Shellfish** Racine Rangel, Kristy Kroeker, Matthew Bracken, Luke Miller, Cascade Sorte, *University of California, Irvine; University of California, Santa Cruz; San Diego State University*
12	**27.6**	**Hepatic Mitochondrial Metabolism is Higher and Develops Earlier in High-Altitude Mice Than in Rats** Fernanda Aliaga Raduan, Christian Arias Reyes, Oscar Rollano Peñaloza, Jaime Pablo Iturri Soliz, Edith Schneider-Gasser, Jorge Soliz, Vincent Joseph, *Universidad Mayor de San Andres; Université Laval; Biomolab, La Paz; University of Zurich*
14	**27.7**	**Metabolic Responses to Crude Oil During Early Life Stages Reveal Critical Developmental Windows in the Zebrafish, Danio Rerio** Karem Vazquez Roman, Warren Burggren, *University of North Texas*
16	**27.8**	**Mechanisms Underlying Evolved Increases in Oxidative Capacity of Muscles in High-Altitude Deer Mice** Emily Garrett, Srikripa Prasad, Rena Schweizer, Grant McClelland, Graham Scott, *McMaster University; University of Montana*
18	**27.9**	**Phylogenetic and Localization Analyses of Mammalian Vnut Reveal a Unique Er Retention Sequence Replaces Vesicular Targeting Motifs in the C-Terminus** Stephanie Rayner, Gabrielle Jensen, Lara Gastaldello, Damon Poburko, *Simon Fraser University*

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20	27.10	**Oxidative Stress is a Potential Cost of Synchronous Nesting in Olive Ridley Sea Turtles** Gabriela Arango, David Ensminger, Diana Moreno-Santillan, Martha Harfush-Melendez, Elpidio Marcelino Lopez-Reyes, Jose Alejandro Marmolejo-Valencia, Horacio Merchant-Larios, Daniel Crocker, Jose Pablo Vazquez-Medina, *University of California, Berkeley; San Jose State University; Centro Mexicano de la Tortuga; Campamento Tortuguero Palmarito; Universidad Nacional Autonoma de Mexico; Sonoma State University*
22	27.11	**Dietary Fat Content Changes the Long-Term Acclimation Response of Captive Birds to Ambient Temperatures** Michael Campbell, Gabriela Mastromonaco, Grant McClelland, Sulayman Lyons, Gary Burness, *Trent University; Toronto Zoo; McMaster University*
24	27.12	**Using the Diet to Manipulate Microbiome-Generated Methane Production in Real Time: A 26-Day Case Study of a Rat** Marshall McCue, John Lighton, *Sable Systems International*
26	27.13	**Pejus and Pessimum Zones of an Oreochromis Mossambicus Cell Line Exposed to Hyperosmolality** Anna Lee, Meranda Corona, Dietmar Kültz, *University of California, Davis*
28	27.14	**The Role of the Microbiome in Adaptive Thermogenesis in Deer Mice, Peromyscus Maniculatus** Emma A. Zucker, Carol Bucking, Graham R. Scott, *McMaster University; York University*
30	27.15	**One Thing Leads to Another—the Role of Micrornas in the Transition from Diapause to Post-Diapause Quiescence in Overwintering Megachile Rotundata** Julie Reynolds, George Yocum, *Ohio State University; U.S. Department of Agriculture, Agriculture Research Service, Fargo*
32	27.16	**Pax6 Expression in the Eyes and Neuromasts of Sighted and Blind Salamanders of the Genus Eurycea** Braden J. Oddo, Brittany A. Dobbins, Reece C. Jones, Christian G. Teague, Ruben U. Tovar, Tomas J. Devitt, David M. Hillis, Dana M. García, *Texas State University; University of Texas at Austin*
34	27.17	**Sublethal Effects of Interactions Between Salinity and Temperature in an Intertidal Copepod** Caroline Terry, Wes Dowd, *Washington State University*
36	27.18	**Assessing the Physiological Bounds and Behavioral Responses of Northern Elephant Seals, Mirounga Angustirostris, to Global Change on the Southeast Farallon Island** Maxine Mouly, Emily Lam, Cambrie Congdon, Kyra Henderson, Stella Recht, Jose Pablo Vázquez-Medina, *University of California, Berkeley*

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38	27.19	**Thermal Plasticity of Metabolism is Maintained During the Shift from the Aquatic to Terrestrial Phase in Adults of the Eastern Newt, Notophthalmus Viridescens** Patrick Mineo, Corey Shaffer, *Elmhurst University*
40	27.20	**The Global Histone PTM Landscape Distinctly Varies by Tissue in Mozambique Tilapia** Elizabeth Mojica, Dietmar Kültz, *University of California, Davis*
42	27.21	**Transcriptomic Responses to within- and Transgenerational Environmental Warming in a Cold-Adapted Salmonid** Chantelle Penney, Gary Burness, Chris Wilson, *Trent University; Ontario Ministry of Natural Resources and Forestry*
44	27.22	**A Study of Mechanisms Influencing Left-Ventricle End-Systolic Pressure Volume Relationship Measures** Edward Marcus, *Boston Children's Hospital*
46	27.23	**Reevaluating the Significance of the Absence of Plasma-Accessible Carbonic Anhydrase in Rainbow Trout Gills** Emma Smith, Martin Tresguerres, Till Harter, *University of California, San Diego*
48	27.24	**Altered Ventricular Myocardial Volume in Hypoxia-Exposed Larval Zebrafish, Danio Rerio** Steven Williams, *University of North Texas*
50	27.25	**Reversible and Cross-Tolerance Effects of Early Developmental Temperatures on Juvenile Phenotypes in F. Heteroclitus** Tessa Blanchard, Madison Earhart, Nicholas Strowbridge, Ben Staples, Adam Harman, Patricia Schulte, *University of British Columbia*
52	27.26	**Effects of Early-Life Exposure to Fructose and Voluntary Exercise on Adult Activity Levels, Body Composition, Aerobic Capacity and Organ Masses in Mice** Marcell Cadney, Ralph Albuquerque, Nicole Schwartz, Monica McNamara, Alberto Castro, Margaret Schmill, David Hillis, Theodore Garland, *University of California, Santa Barbara; Universidade Federal da Paraíba; University of California, Riverside*
54	27.27	**Mitochondrial Physiology in Cardiac Muscle of Deer Mice Native to High Altitude** Ranim Saleem, Graham Scott, *McMaster University*
56	27.28	**Effects of Juvenile Food Availability on Body Mass, Stress Resistance and Longevity in Speckled Cockroaches, Nauphoeta Cinerea** Elizabeth Bailey, Sami Badwan, Jose Abril, Michael Gaviria, James Harper, *Sam Houston State University*
58	27.29	**Chronic Oxygen Exposure and Respiratory Physiology in the Hawk Moth, Manduca Sexta** Sara Wilmsen, Edward Dzialowski, *University of North Texas*

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60	27.30	**Environmental Temperature Predicts Resting Metabolic Rates in Tropidurinae Lizards** Jose Eduardo Carvalho, Danilo Giacometti, Melissa Bars-Closel, Tiana Kohlsdorf, Fábio Cury Barros, *Universidade Federal de São Paulo; Universidade de São Paulo; Universidade Estadual de minas Gerais*
62	27.31	**Mitochondrial Protection, Damage and Repair in Frozen Crickets** Stefane Saruhashi, Brent Sinclair, *University of Western Ontario*
64	27.32	**Do you Have the Guts to Maintain Water Balance When Challenged by Environmental Salinity? Larval Mosquitoes Do!** Marjorie Patrick, Natalie D'Silva, Hannah Otte, Larissa Ekwevi, Mariel Bautista, Samantha Tran, *University of San Diego; Brown University*
66	27.33	**Inland Culture and Characterization of California Ascidian Tunicate Isolates** Cameron Yee, Sophie Scott, Jens Hamar, Dietmar Kültz, *University of California, Davis*
68	27.34	**Stress-Tolerant Annual Killifish Cells Avoid Stress Granule Formation** Claire Riggs, Pavel Ivanov, Paul Anderson, *Brigham and Women's Hospital*
70	27.35	**Assessing Stress Iin Natural Populations of the Eastern Oyster, Crassostrea Virginica in Estero Bay, Florida** Melissa May, *Florida Gulf Coast University*
72	27.36	**Effects of Food Quantity and Quality on Cardiac Thermal Tolerance in a Temperate Marine Fish, Girella Nigricans** Emily Hardison, Erika Eliason, *University of California, Santa Barbara*
74	27.37	**Does Flight Capability Drive the Co-Adaptation of Thermal Performance and Behavioral Thermoregulation in the Variable Field Cricket, Gryllus Lineaticeps?** Lourenço Martins, Lisa Treidel, Caroline Williams, *University of California, Berkeley; University of Nebraska, Lincoln*
76	27.38	**Thermoregulation and Dietary Tryptophan During Early Life in Chicken: Influence of Sex** Kenia C. Bicego, Jessica Amaral-Costa, Caroline Cristina-Silva, Geni C. Xavier-Neta, Thais Fortunato-Oliveira, Raphael Szawka, Luciane Gargaglioni, *São Paulo State University; Federal University of Minas Gerais*
78	27.39	**Neuroprotection in the Cold: How Freeze Tolerant Crickets Survive the Brain Freeze** Lamees Mohammad, Brent Sinclair, *University of Western Ontario*
82	27.40	**Controlling Resting Oxygen Consumption Using the Spleen in Tenrec Ecaudatus?** Gilbecca Rae Smith, Frank van Breukelen, *University of Nevada, Las Vegas*

Daily Schedule

MONDAY, OCTOBER 31, 2022

9–10:30 a.m.		**Session 28** • *Crystal Ballroom I* Oral abstract session **Thermal Biology II** Chair: Maria Christina Vasquez, PhD, *Loyola Marymount University*
9 a.m.	**28.1**	**Comparing Physiological Responses of Mytilus Congeners to Multiple Stressors** Maria Christina Vasquez, PhD, *Loyola Marymount University*
9:30 a.m.	**28.2**	**Thermally Tolerant Intertidal Triplefin Fish, Tripterygiidae, Sustain ATP Dynamics Better Than Subtidal Species Under Acute Heat Stress** Jaime Willis, MS, *The University of Auckland*
9:45 a.m.	**28.3**	**Differential Gene Expression During Thermal Stress is Affected by Life Stage, Tissue and Transcriptional Dynamics** James deMayo, PhD, *University of Colorado, Denver*
10 a.m.	**28.4**	**Thermal Ecology of Ants in the Luquillo Mountains of Puerto Rico** Clayton Ziemke, *University of Southern Mississippi*
10:15 a.m.	**28.5**	**The Effect Of Acclimation Temperature on the Epigenetic Regulation of Gene Expression and Global Methylation Rates in Two Subspecies of Atlantic Killifish, Fundulus Heteroclitus Heteroclitus, F. Heteroclitus Macrolepidotus** Adam Harman, MS, *University of British Columbia*
9–10:30 a.m.		**Session 29** • *Topaz* Oral abstract session **Morphology and Biomechanics** Chair: Jake Socha, PhD, *Virginia Tech University*
9 a.m.	**29.1**	**Energetics and Biomechanics of Hovering in Fishes** Valentina Di Santo, PhD, *Stockholm University*
9:30 a.m.	**29.2**	**Biophysical Transitions in Insect Flight Dynamics are Bridged by Common Muscle Physiology** Ethan Wold, *Georgia Institute of Technology*
9:45 a.m.	**29.3**	**Using in Vivo Length and Activation During in Vitro Experiments to Model Scaling of Muscle Force Production Across Species** Caitlin Bemis, PhD, *Northern Arizona University*
10 a.m.	**29.4**	**Longitudinal Electromyographic Analysis of Jaw-Closing Muscle Activities During Ingestive Behaviors From Pre-Weaning to Juvenile Periods in the Rats** Masaharu Yamada, *Osaka University Graduate School of Dentistry*
10:15 a.m.	**29.5**	**Locomotor Function Shapes the Mechanical Properties and Operating Lengths of Muscles During Walking in Alligators** Adrien Arias, PhD, *University of California, Irvine*

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9–10:30 a.m.		**Session 30** • *Diamond I* Oral abstract session **Evolutionary Physiology** Chair: Lynn Hartzler, PhD, *Wright State University*
9 a.m.	30.1	**Why is Nephron Hypertrophy a Harbinger of Progressive Chronic Kidney Disease? an Evolutionary Approach** Robert Chevalier, PhD, *University of Virginia*
9:20 a.m.	30.2	**Beyond (Way Beyond) the G x E Paradigm** Warren Burggren, PhD, *University of North Texas*
9:40 a.m.	30.3	**Multivariate Trait Responses to Temperature Vary Across Levels of Biological Organization and Among Temperature-Evolved Populations of Drosophila** Ibrahim El-Shesheny, PhD, *University of Nebraska, Lincoln*
10 a.m.	30.4	**Hyperosmotic Stress-Induced Evolution of Proteomic and Transcriptional Response to Salinity Challenge in Tilapia Cells** Chanhee Kim, MS, *University of California, Davis*
10:15 a.m.	30.5	**Developmental Rate, Gene Expression and Mechanisms Underlying Mitonuclear Incompatibilities in the Intertidal Copepod, Tigriopus Californicus** Timothy Healy, PhD, *University of California, San Diego, Scripps Institution of Oceanography*
9–10:30 a.m.		**Session 31** • *Diamond II* Oral abstract session **Omics in Comparative Physiology** Chair: Erica Heinrich, PhD, *University of California, Riverside*
9 a.m.	31.1	**Molecular Signatures Predict Functional Differences Between Blubber Layers in Marine Mammals** Jane Khudyakov, PhD, *University of the Pacific*
9:30 a.m.	31.2	**Transcriptomic and Proteomic Responses Associated with Exercise Tolerance in a Deep-Diving Mammal** Elizabeth Piotrowski, MS, *University of California, Berkeley*
9:45 a.m.	31.3	**Relationships Between Systemic Inflammation and Ventilatory Acclimatization to High Altitude in Healthy Sojourners** Kathy Pham, *University of California, Riverside*
10 a.m.	31.4	**Mitochondrial Scope? A Novel Approach to Assessing the Interactive Effects of Thermal Stress and Oxygen Limitation on Mitochondrial Performance in Banded Wrasse, Notolabrus Fucicola, Heart** Alice Harford, PhD, *University of Auckland*
10:15 a.m.	31.5	**Infection with Vibrio Anguillarum Alters Immune Tissue microRNA Abundance of Diploid and Triploid Chinook Salmon, Oncorhynchus Tshawytscha** Ivan Cadonic, MS, *University of Waterloo*

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11 a.m.–1 p.m.		**Session 32** • *Crystal Ballroom I* Oral abstract session **Thermal Biology III** Chair: Johannes Overgaard, PhD, *Aarhus University*
11 a.m.	**32.1**	**Finding the Right Limit: Reconciling Ecological, Physiological and Methodological Aspects of Critical Thermal Limits in Ectotherms** Johannes Overgaard, PhD, *Aarhus University*
11:25 a.m.	**32.2**	**Are Thermal Performance Curves of Metabolic Rate Useful for Within- and Among-Population Analysis of Thermal Adaptation? A Study Using Parthenogenetic Populations of the Freshwater Micro-Crustacean, Daphnia Magna** Jonathon H. Stillman, PhD, *San Francisco State University*
11:50 a.m.	**32.3**	**Environmental Influences on Inter-Individual Variation and Phenotypic Integration Within Stress-Response Pathways** Wes Dowd, PhD, *Washington State University*
12:15 p.m.	**32.4**	**Evaporative Cooling and Increased Load-Lifting Efficiency Allows Nectar-Foraging Honeybees to Break the Thermal Performance Curve Barrier** Jordan Glass, PhD, *Arizona State University*
12:30 p.m.	**32.5**	**Is Heat or Desiccation the Major Physiological Challenge for Small Desert Animals?** Meredith Johnson, *Arizona State University*
12:45 p.m.	**32.6**	**Heat Waves in the Intertidal: How Microhabitat, Thermal Unpredictability and Food Availability Shape Physiological Performance in Mussels** Sarah Nancollas, MS, *University of California, Davis*
11 a.m.–1 p.m.		**Session 33** • *Topaz* Oral abstract session **Respiratory Physiology** Chair: Scott Kirkton, PhD, *Union College*
11 a.m.	**33.1**	**Making Sense of Co2 Sensing in Developing Zebrafish: The Role of Cytosolic Carbonic Anhydrase Ca17a** Kathleen Gilmour, PhD, *University of Ottawa*
11:25 a.m.	**33.3**	**Unidirectional Airflow Can Rapidly Flush the Tracheal System of the Darkling Beetle, Zophobas Morio** Jon Harrison, PhD, *Arizona State University*
12:50 p.m.	**33.4**	**Intermolt Development Reduces Tracheal Volume and Impairs Jump Performance in Grasshoppers** Scott Kirkton, PhD, *Union College*
12:05 p.m.	**33.5**	**Functional Evidence Supports a Role of Soluble Adenylyl Cyclase as an Intracellular Acid-Base Sensor in Rainbow Trout Red Blood Cells** Till Harter, PhD, *University of California, San Diego*

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12:20 p.m.	33.6	**Synapses are Transformed to Resist Hypoxia and Restart Amphibian Respiratory Function after Overwintering** Lara Amaral-Silva, PhD, *University of Missouri*
11 a.m.–1 p.m.		**Session 34** • *Diamond I* Oral abstract session **Metabolic Suppression** Chair: Les Buck, PhD, *University of Toronto*
11 a.m.	34.1	**Direct Measure of Ion Channel Arrest in Turtle Hepatocytes During Cyanide Exposure** Les Buck, PhD, *University of Toronto*
11:25 a.m.	34.2	**Responses of the in Vitro Turtle Brain to Visual and Auditory Stimuli During Severe Hypoxia** Michael Ariel, PhD, *Saint Louis University*
11:50 a.m.	34.3	**Crucian Carp Omics During Anoxia and Reoxygenation** Goran Nilsson, PhD, *University of Oslo*
12:15 p.m.	34.4	**Synchronization of Developmental Gene Expression and Morphogenesis During Dormancy in a Fly** Shelly McCain, PhD, *University of Colorado Denver*
12:30 p.m.	34.5	**Characterization of Histone Modification During Anoxia Tolerance in Austrofundulus Limnaeus** Chelsea Hughes, PhD, *Portland State University*
12:45 p.m.	34.6	**Transcriptome and Epigenome Dynamics at Bulk and Single Cell Resolution Identify Regulators of Torpor and Neuroprotection in the Hypothalamus of the Thirteen-Lined Ground Squirrel** Kathleen Keough, PhD, *Fauna Bio*
11 a.m.–1 p.m.		**Session 35** • *Diamond II* Oral abstract session **GI and Microbiome Physiology** Chair: Justin Conner, PhD, *University of Nevada, Las Vegas*
11 a.m.	35.1	**The Specialized Roles of the Intestinal Microbiome in Herbivorous and Carnivorous Fish** Carol Bucking, PhD, *York University*
11:25 a.m.	35.2	**Relationships of RNA of Intestinal Carbohydrases and Sugar Transporters Among Vertebrate Species** William H. Karasov, PhD, *University of Wisconsin-Madison*
11:50 a.m.	35.3	**Proteomic Analysis of Avian and Mammalian Intestinal Brush Border Membrane** Enrique Caviedes Vidal, PhD, *Consejo Nacional de Investigaciones Científicas y Técnicas, San Luis, Argentina*

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12:10 p.m.	35.4	**Microbiota-Derived D-lactate Fuels the Cori Cycle and Host Blood Glucose** Jonathan Schertzer, PhD, *McMaster University*
12:30 p.m.	35.5	**Most of the Alkaline Tide is Masked by Base Excretion to the Intestine in Digesting Pythons** Justin Conner, PhD, *University of Nevada, Las Vegas*
12:45 p.m.	35.6	**A Multi-Omics Approach to Understanding Plasticity in Hosts and Their Associated Microbes** Nick Barts, PhD, *University of Pittsburgh*
2–4 p.m.		**Session 36** • *Crystal Ballroom I* Symposium **Hot and Toxic: Understanding Animal Physiology and Behavior in the Context of Climate Change and Pollution** Chairs: Lela Schlenker, PhD, *East Carolina University* Kerri Lynn Ackerly, PhD, *University of Texas at Austin*
2 p.m.	36.1	**Understanding the Effects of Biotic and Abiotic Factors on Anthropogenic Toxicity in Aquatic Environments** Tamzin Blewett, PhD, *University of Alberta*
2:30 p.m.	36.2	**Using Red Drum as an Indicator of the Combined Effects of Toxicant Exposure and Climate Change in Estuarine Systems** Kristin Nielsen, PhD, *University of Texas at Austin*
3 p.m.	36.3	**Impacts of Crude Oil Exposure, Low Oxygen and Temperature on Aerobic Performance of Red Drum, Sciaenops Ocellatus** Kerri Lynn Ackerly, PhD, *The University of Texas at Austin*
3:30 p.m.	36.4	**Dietary Cadmium Disrupts Visually Guided Behavior and Alters Neural Activity in Zebrafish** Delia Shelton, PhD, *University of Miami*
2–4 p.m.		**Session 37** • *Topaz* Symposium **Novel and Understudied Mechanisms of Epithelial Ion Transport** Chairs: Dennis Kolosov, PhD, *California State University, San Marcos* Sima Jonusaite, PhD, *University of Guelph*
2 p.m.	37.1	**Carbon Concentration in Calcifying Cells of the Sea Urchin Larva: From Cellular Mechanisms to Global Relevance** Marian Hu, PhD, *Kiel University*
2:30 p.m.	37.2	**Effects of Salt and Organic Deicer on the Osmoregulatory Physiology of Freshwater Insects** Andrew Donini, PhD, *York University*

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3 p.m.	37.3	**Septate Junctions in Ion Transporting Epithelia of Invertebrates** Sima Jonusaite, PhD, *University of Guelph*
3:30 p.m.	37.4	**Why Do Epithelia Need Voltage-Gated Ion Channels? The Role of Voltage-Gated Ion Channels in the Regulation of Ion Transport in the Malpighian Tubules of Insects** Dennis Kolosov, PhD, *California State University, San Marcos*
2–4 p.m.		**Session 38** • *Diamond I* Symposium **Living in a Seasonal, and Warming, Environment** Chairs: Kenia Bicego, PhD, *São Paulo State University* Jose Eduardo de Carvalho, PhD, *Federal University of São Paulo*
2 p.m.	38.1	**Global Change Biology—the Need for Physiological Insights** Robyn Hetem, PhD, *University of the Witwatersrand*
2:30 p.m.	38.2	**Let's Get Hot: Seasonal Investment in Reproduction in a South American Hibernating Lizard** Kenia C. Bicego, PhD, *São Paulo State University*
3 p.m.	38.3	**Living Among Thorns: Physiological and Ecological Traits of Anuran Aestivation in Brazilian Semi-Arid Environments** Jose Eduardo Carvalho, PhD, *Universidade Federal de São Paulo*
3:30 p.m.	38.4	**Adaptations of Red Blood Cells to Estivation in the South American Lungfish, Lepidosiren Paradoxa** Elisa Maioqui Fonseca, PhD, *University of Calgary*
2–4 p.m.		**Session 39** • Diamond II Symposium **The Physiology of Tracheal Respiratory Systems** Chairs: Jon Harrison, PhD, *Arizona State University* Philip Matthews, PhD, *University of British Columbia*
2 p.m.	39.1	**Developmental Changes in Tracheal System Structure and Function** Kendra Greenlee, PhD, *North Dakota State University*
2:30 p.m.	39.2	**Active Control of Tracheal Volume in Larval Chaoborus Midges** Philip Matthews, PhD, *University of British Columbia*
3 p.m.	39.3	**Physiological Adaptation to High-Altitude in Tibetan Locusts** Stav Talal, PhD, *Arizona State University*
3:30 p.m.	39.4	**The Physiology of Tracheal Respiratory Systems** Jake Socha, PhD, *Virginia Tech*

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4–6 p.m.		**Session 40** • *Topaz* Awards session **Scholander Award Oral Presentations** Chair: Lynn Hartzler, PhD, *Wright State University*
7–9 p.m.		**Session 41** • *Crystal Ballroom* **Plenary Lecture and Awards Banquet** Chair: Daniel Warren, PhD, *Saint Louis University*
8 p.m.	**41.1**	**Dining with Snakes** Tobias Wang, PhD, *Aarhus University*

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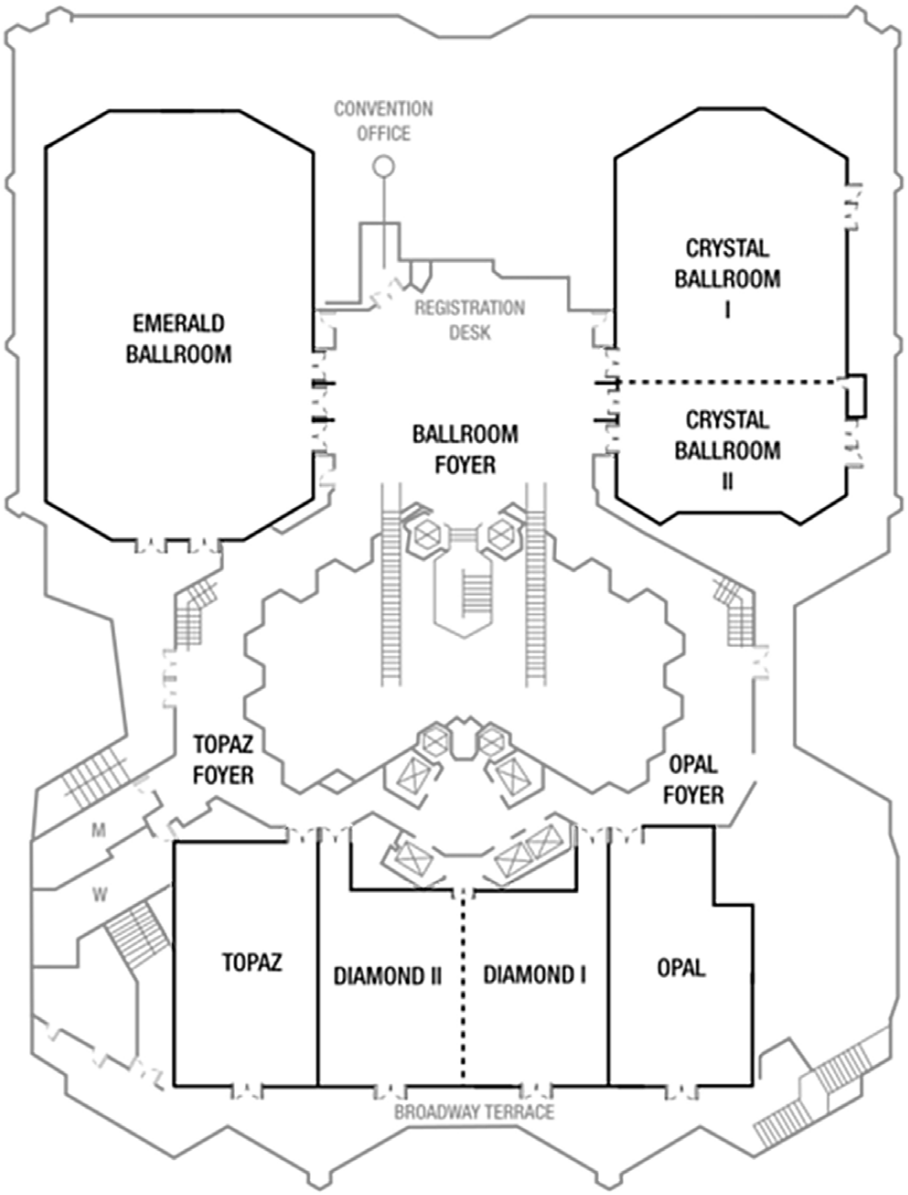
Floor Plan

LEVEL 2



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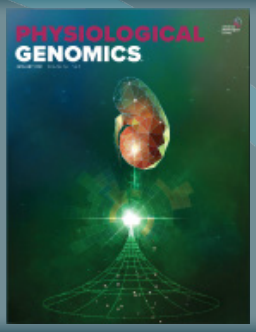
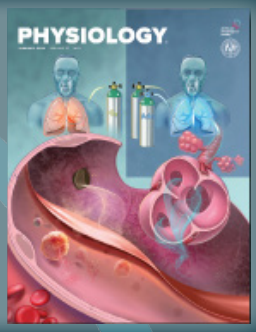
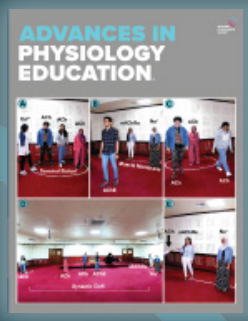
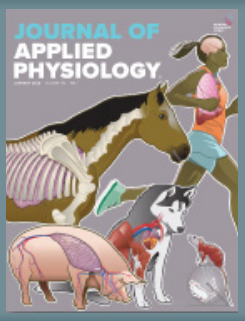


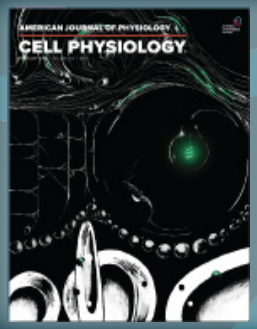


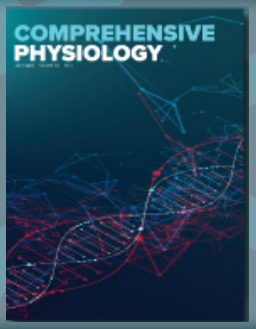
Advance scientific discovery

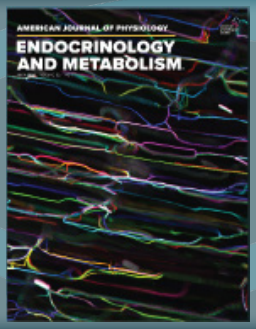


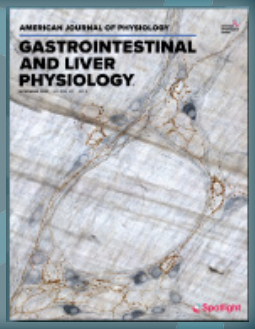


Understand life

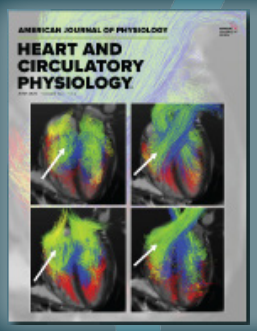


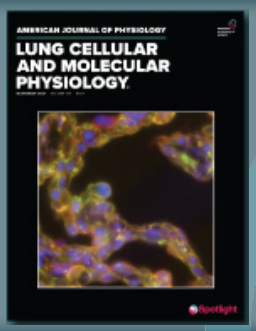


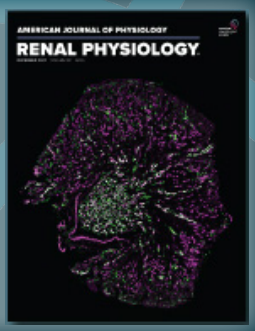




Improve health







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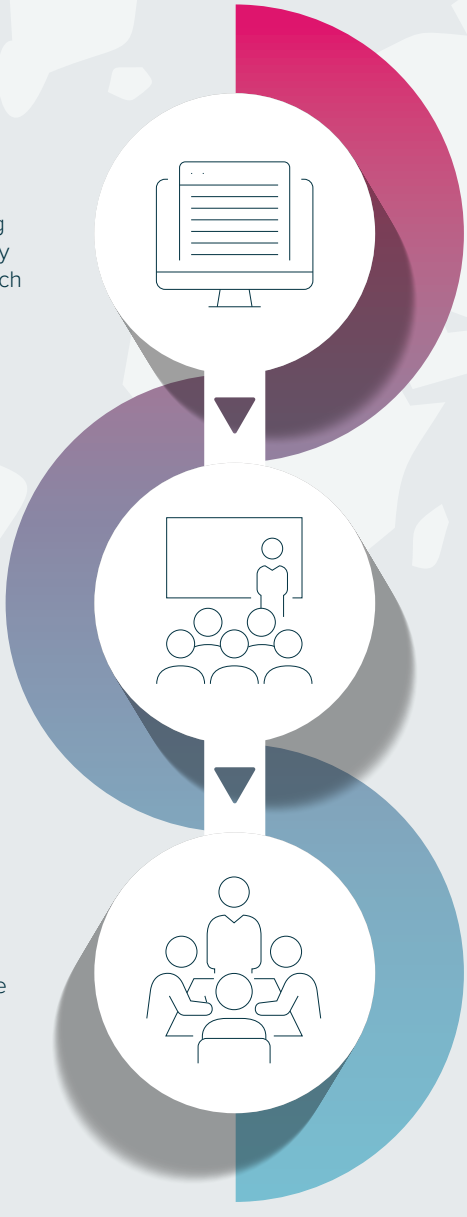

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