

KBS K-12 Partnership 2017 Spring Workshop – Tuesday, April 18th**The Kellogg edge: Breaking Boundaries in Ecology and Evolution Education**

8:00am	Breakfast, Introductions, Announcements	Auditorium
8:30am	Plenary Speaker: Dr. Kay Holekamp , University Distinguished Professor, Michigan State University <i>The evolution of intelligence in mammalian carnivores.</i>	Auditorium
9:30am	Concurrent Session Teasers & Information Session	Auditorium
10:00am	Concurrent Session 1	

A. History of the W.K. Kellogg Bird Sanctuary Organizers: Lisa Duke (Bird Sanctuary Manager)	Terrace Room
B. Building a Biological Battery: Electric Fish Know WATT to Do! (Elementary School) Organizers: Savvas Consantinou & Mauricio Losilla (MSU PhD Students)	Stack Bldg Room 139
C. The MultiSpeQ: Measuring Photosynthesis in the Classroom (Middle & High School) Organizers: Klara Scharnagl & Dan TerAvest (MSU PhD Student & MultiSpecQ Rep.)	Stack Bldg Room 138

11:00am **Break**11:15am **Concurrent Session 2**

A. Barcodes in water: using eDNA to monitor rare and invasive species (Middle & High) Organizers: Dustin Kincaid & Ariel Shogren (KBS K-12 Fellow & Notre Dame PhD Student)	Stack Bldg Room 141
B. Building a Biological Battery: Electric Fish Know WATT to Do! (Elementary School) Organizers: Savvas Consantinou & Mauricio Losilla (MSU PhD Students)	Stack Bldg Room 139
C. Grass-fed Cars: Learning about Biofuels at the GLBRC (High School) Organizers: Joyce Parker & Craig Kohn (Great Lakes Bioenergy Research Center)	Terrace Room

12:15pm **Lunch****McCrary Dining Hall**1:15pm **Concurrent Session 3**

A. Barcodes in water: using eDNA to monitor rare and invasive species (Middle & High) Organizers: Dustin Kincaid & Ariel Shogren (KBS K-12 Fellow & Notre Dame PhD Student)	Stack Bldg Room 141
B. The MultiSpeQ: Measuring Photosynthesis in the Classroom (Middle & High School) Organizers: Klara Scharnagl & Dan TerAvest (MSU PhD Student & MultiSpecQ Rep.)	Stack Bldg Room 138
C. Fun with the Sun: Patterns from the Sky (Elementary School) Organizers: Kara Haas (Science Education and Outreach Coordinator)	Stack Bldg Room 139

2:15pm **Break**

2:30pm **Concurrent Session 4**

A. Warming Up with Greenhouse Gases (Middle & High School) Organizer: Will West (KBS Post-doctoral researcher)	Stack Bldg Room 141
B. Grass-fed Cars: Learning about Biofuels at the GLBRC (High School) Organizers: Joyce Parker & Craig Kohn (Great Lakes Bioenergy Research Center)	Terrace Room
C. Population Dynamics with Beads & Bracelets (Elementary School) Organizer: Heather Kittredge (KBS K-12 Fellow)	Stack Bldg Room 139

3:30pm **Group Brainstorm – Summer Workshop NGSS etc.****Auditorium**4:00pm **Evaluation & Adjourn****Auditorium****The evaluation form can be found online at this link:****Or scan this code:****If you are unable to access the form at the moment, please let a workshop coordinator know.**

Session Descriptions (listed in order they occur in the schedule overview)

History of the W.K. Kellogg Bird Sanctuary

Organizers: *Lisa Duke (Bird Sanctuary Manager)*

Join Lisa Duke of the W.K. Kellogg Bird Sanctuary to learn why the Sanctuary was established, what we have accomplished in the past 90 years, and how we honor Mr. Kellogg's commitment to conservation, research, and education to this day!

Building a Biological Battery: Electric Fish Know WATT to Do!

Elementary School

Organizers: *Savvas Consantinou (MSU PhD Student)*

Mauricio Losilla (MSU PhD Student)

Six groups of fish have independently evolved an adaptation that allows them to produce, and sense, an electric field outside their bodies. How electricity is utilized varies among the groups; most fish are "weakly" electric and a few can produce strong electric fields. In this session, you will learn about how electric fish are a great model organism for teaching evolution. We have prepared a short informational talk about electric fish and an activity where children get to color and draw, then use batteries to learn more about the evolution of electric fish.

The MultiSpeQ: Measuring Photosynthesis in the Classroom

Middle & High School

Organizers: *Klara Scharnagl (MSU PhD Student)*

Dan TerAvest (MultiSpeQ Representative)

Photosynthesis is a complex process that can often be difficult to describe in the classroom setting. But what if students had a way to measure photosynthesis in the palm of their hand? Being able to measure photosynthesis using exploratory and hands-on approaches will enhance students' understanding of this fundamental process. In this workshop we will introduce the MultiSpeQ and explore different classroom questions.

Barcodes in water: using eDNA to monitor rare and invasive species

Middle & High School

Organizers: *Dustin Kincaid (KBS K-12 Fellow)*

Arial Shogren (Notre Dame PhD Student)

Understanding the geographic distributions of rare and invasive species is crucial for biodiversity conservation and ecosystem management. Traditional field surveys of aquatic species are time intensive, require expert taxonomic skills, and can overlook rare and secretive species. Researchers are now using environmental DNA (eDNA) to increase their ability to detect species in aquatic environments. In this session we will (1) learn why and how eDNA methods are being used to complement traditional survey methods, (2) demonstrate DNA extractions using a simple lab protocol, and (3) introduce a Data Nugget that demonstrates how researchers use eDNA to monitor salmon populations in river basins.

Grass-fed Cars: Learning about Biofuels at the GLBRC

High School

Organizer: *Joyce Parker (Great Lakes Bioenergy Research Center)*

Craig Kohn (Great Lakes Bioenergy Research Center)

What does sustainable agriculture look like? How do we balance the need for high yields with the environmental impacts of agriculture? Come take part in hands-on classroom activities that use the NGSS scientific practices of implementing investigations, analyzing and interpreting data, asking questions, and making arguments from

evidence to answer these questions and explore the impacts of agriculture, biofuels, and standard fuels on the environment and biodiversity.

Fun with the Sun: Patterns from the Sky

Elementary School

Organizers: Kara Haas (Science Education and Outreach Coordinator)

The earth's rotation around the sun is a difficult concept for many K-5 students, but shadows are fascinating! New Michigan Science Standards allow teachers to leverage student's natural curiosity and build knowledge across the grade levels. Participate in several shadow activities (created by teacher participants in the Teaching Science Outdoors program) that incorporate measuring, literature, mapping skills, etc.

Warming Up with Greenhouse Gases

Middle & High School

Organizer: Will West (KBS Post-doctoral researcher)

Climate change, the long term change in global weather patterns, can be difficult to demonstrate in the classroom, but this session will help overcome those challenges! In this exciting demonstration you will learn how to easily show how greenhouse gases trap heat in our atmosphere. You will walk away from this session with a presentation, worksheet and activity that will help middle and high school students understand how gas properties contribute to the process of global warming.

Population Dynamics with Beads & Bracelets

Elementary School

Organizer: Heather Kittredge (KBS K-12 Fellow)

There is natural variation in every population, but it is not always clear to K-12 students that this variation is the basis of evolution by natural selection. In this fun and hands on activity, students will gain a better understanding of how variation in a population of beads leads to evolution. By the end of the activity students will have a bracelet featuring generations of outcompeted 'bead organisms'!