



W. K. Kellogg  
Biological Station  
MICHIGAN STATE UNIVERSITY

KBS K-12 Partnership 2017 Fall Workshop – Tuesday, October 24

## A Sense of Place: Science in your School Yard

- 8:00am **Breakfast, Introductions, Announcements** Auditorium
- 8:30am **Plenary Speaker: Dr. Tyler Bassett**, MSU Postdoctoral Researcher Auditorium  
*A Sense of Place - The Past, Present, and Future of Southwest Michigan's Prairies and Savannas*
- 9:30am **Concurrent Session Teasers** Auditorium
- 10:00am **Concurrent Session 1**

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|--|----------------------------|
| A. <b>Can Theory Predict the Distribution of Foraging Animals?</b> (Middle & High)<br>Organizer: Misty Klotz (KBS Community Outreach Assistant)<br>Roy Robertson (KBS Volunteer, Retired Statistician) | <b>Bird Sanctuary</b>      |
| B. <b>STREAM School</b> (Middle School)<br>Organizers: Nate Alkire (Otsego Middle School)<br>Dr. Stephen Scogin (Hope College Dept. of Biology and Dept. of Education)                                 | <b>Stack Bldg Room 139</b> |
| C. <b>Carbon Time: Ecosystem Pools and Fluxes</b> (Middle & High)<br>Organizer: May Lee (MSU Graduate Student)   | <b>Stack Bldg Room 138</b> |

11:00am **Break**

11:15am **Concurrent Session 2**

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|--|----------------------------|
| A. <b>Can Theory Predict the Distribution of Foraging Animals?</b> (Middle & High)<br>Organizer: Misty Klotz (KBS Community Outreach Assistant)<br>Roy Robertson (KBS Volunteer, Retired Statistician) | <b>Bird Sanctuary</b>      |
| B. <b>A Classroom Activity Simulating Population-Level Evolution by Hand</b> (All ages)<br>Organizer: Travis Hagey (MSU BEACON Postdoctoral Researcher)  | <b>Terrace Room</b>        |
| C. <b>Teaching Science Outdoors</b> (Elementary)<br>Organizer: Kara Haas (KBS Science Education & Outreach Coordinator)<br>Renee Bayer (Asst. Director for Outreach & Engagement, CREATE for STEM)     | <b>Stack Bldg Room 141</b> |

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

<b>A. A Classroom Activity Simulating Population-Level Evolution by Hand</b> (All ages) Organizer: Travis Hagey (MSU BEACON Postdoctoral Researcher)	<b>Terrace Room</b>
<b>B. Shedding Light on Ecological Trophic Cascades</b> (Middle & High) Organizer: Courtney Larson (MSU Graduate Student, Dept. of Entomology)	<b>Stack Bldg Room 138</b>
<b>C. The Physics of Flight</b> (Elementary & Middle) Organizers: Susan Magnoli (KBS PhD Student & Science Fellow)	<b>Stack Bldg Room 141</b>

2:15pm **Break**2:30pm **Concurrent Session 4**

<b>A. Data Nuggets as a summative assessment</b> (All ages) Organizers: Marcia Angle (Teacher, Lawton Middle School)	<b>Terrace Room</b>
<b>B. Microbes Ate My Underwear</b> (All Ages) Organizer: Heather Kittredge (KBS PhD Student & Science Fellow)	<b>Stack Bldg Room 141</b>
<b>B. Shedding Light on Ecological Trophic Cascades</b> (Middle & High) Organizer: Courtney Larson (MSU PhD Student, Dept. of Entomology)	<b>Stack Bldg Room 138</b>

3:30pm **Group Brainstorm – NGSS Alignment****Auditorium**4:00pm **Evaluation & Adjourn****Auditorium****The evaluation form can be found online at this link:****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)

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### **Plenary: A Sense of Place - The Past, Present, and Future of Southwest Michigan's Prairies and Savannas**

*Speaker: Dr. Tyler Bassett, Post-doctoral researcher, Kellogg Biological Station*

This presentation will give a perspective on the intersections between cultural and natural history, hopefully providing a deeper awareness of the southwest Michigan landscape. More than 10,000 years of post-glacial vegetative expansion, combined with Native American land management practices such as fire, created the landscape that European settlers encountered in the 1800s - a mosaic of prairies, savannas, forests, and wetlands. Subsequently, the distribution of natural resources, particularly river courses, timber, and fertile soil, determined where that settlement occurred. I will focus in particular on prairies and savannas, which were historically common yet largely eliminated from the landscape by European settlement, and conclude with a discussion of prairie and savanna restoration.

### **Can Theory Predict the Distribution of Foraging Animals?**

Middle & High School

*Organizer: Misty Klotz (KBS Community Outreach Assistant)  
Roy Robertson (KBS Volunteer, Retired Statistician)*

Let's take math outside and learn a little about statistics. We will test the ecology theory of ideal free distribution (IFD) by testing quantitative hypotheses in the field! We will see if wildlife really do distribute themselves among resources without competition by analyzing the wild foraging behaviors of swans, geese and ducks.

### **STREAM School**

Middle & High School

*Organizer: Nate Alkire (Otsego Middle School)  
Dr. Stephen Scogin (Hope College Dept. of Biology and Dept. of Education)*

Let's take math outside and learn a little about statistics. We will test the ecology theory of ideal free distribution (IFD) by testing quantitative hypotheses in the field! We will see if wildlife really do distribute themselves among resources without competition by analyzing the wild foraging behaviors of swans, geese and ducks.

### **Carbon Time: Ecosystem Pools and Fluxes**

Middle & High School

*Organizer: May Lee (MSU Graduate Student, CREATE for STEM)*

The ability to trace matter and energy through pools and fluxes is central to making more accurate predictions about the world, such as the effects of climate change. However, we find that students often do not see the world in terms of pools and fluxes. Thus, we developed classroom activities to help students understand carbon cycling. These activities simulate carbon pools and fluxes in

ecosystems, and develop students' systems thinking. During this session, we will present and play with two new Carbon TIME activities developed for our Ecosystems unit. Please bring your computer!

### **A Classroom Activity Simulating Population-Level Evolution by Hand**

All grade levels

*Organizers: Travis Hagey, MSU BEACON Postdoctoral Researcher*

The goal of our project is to improve public knowledge about evolution, providing K-12 and undergraduate teachers with an intuitive and hands-on activity. We have developed a scalable K-16 classroom activity that illustrates how evolution occurs at the population level. Using a board-game type spinner, students assign phenotypes (plumage color) and differential reproductive to individual birds across a population, over successive generations. At the completion of the activity, students have created a pedigree of individuals, showing how plumage color changed over time through surviving clades. This activity examines how traits evolve under drift and selection, allowing students to make predictions and compare results.

### **Teaching Science Outdoors**

Elementary School

*Organizers: Kara Haas (KBS Science Education & Outreach Coordinator)*

*Renee Bayer (Asst. Director for Outreach & Engagement, CREATE for STEM, MSU)*

During this session participants will go outside to participate in winter themed science experiments and activities. We will debrief and discuss how to use the Heads On, Hands On, Hearts On framework to guide us while learning in the outdoors. Session participants will also practice the language and three-dimensional design from Michigan Science Standards.

### **Shedding light on ecological trophic cascades**

Middle & High School

*Organizer: Courtney Larson (MSU PhD Student, Dept. of Entomology)*

Structure and function is an important core concept that spans biology – from miniscule bio-molecules to large ecosystems. The structure of aquatic insect bodies allows them to perform unique roles in headwater stream ecosystems. These roles allow them to exist in a particular “niche” in the food web. When a disturbance to the stream occurs, this can have far reaching effects on the ecosystem, through trophic cascades in the food web. During this session, we will first examine the diversity of body structures that aquatic insects have and what roles they play in streams. Then, we will develop hypotheses on how a particular disturbance, such as the Emerald Ash Borer invasion in Michigan, can have an ecological trophic cascade throughout a stream system.

### **Physics of Flight**

Middle & High School

*Organizer: Susan Magnoli (KBS PhD Student, Science Outreach Fellow)*

What does it take to soar through the air? In this session, we'll go outside to observe the flight strategies of different animals and learn about the physics of flight. Participants will then design paper airplanes based on what we learn.

**Data Nuggets as a Summative Assessment Tool**

All Ages

*Organizer: May Lee (MSU Graduate Student, CREATE for STEM)*

Need a measurement tool to show how your students are developing quantitative analysis skills in your classroom? Let the Data Nugget website and grading rubric help your students hit the high benchmarks of scientific reasoning and writing. Is going paperless a goal in your classroom? We have exciting news to share about where this project is heading by spring of 2018.

**Microbes Ate My Underwear**

All Ages

*Organizer: Heather Kittredge (KBS Graduate Student, Science Outreach Fellow)*

Is the soil in your schoolyard healthy? In this session, we will review a lesson plan and activity where 100% cotton underwear is buried in the soil and after a few weeks the underwear is recovered to determine the microbial activity in the soil. This is a fun hands on activity that can be modified for all ages.