KBS K-12 Partnership 2018 Summer Institute – **TUESDAY**, June 26

The Natural History of Now!

8:00am	**Breakfast, Introductions, Announcements**	**Auditorium**
8:30am	**Plenary Speaker: Dr. Jeffrey Conner**, Professor of Plant Biology *Why you (and your students) should care about adaptive evolution*	**Auditorium**
9:30am	Concurrent Session Teasers	
9:45am	**Break**	
10:00am	**Tuesday – Concurrent Session 1**	

A. The snacks in your backyard: wild and edible plants of Michigan (All) Organizers: Danielle Zoellner (KBS Academic Programs Coordinator)	**Bird Sanctuary**
B. **Pollination and native plants at the Bird Sanctuary** (All) Organizers: Sean Griffin & Matt Kolp (KBS Science Education & Outreach Fellows)	**Bird Sanctuary**

12:15pm	**Lunch**	**McCrary Dining Hall**
1:15pm	**Tuesday – Concurrent Session 2**	

A. **Staying Afloat: Exploring how fish maintain buoyancy** (ES) Organizer: Sarah Johnson (KBS Undergraduate Research Assistant)	**Terrace Room**
B. **Life In A Leaf: Unearthing the tiny world that lives inside a plant** (MS & HS) Organizer: Lana Bolin (KBS Graduate Student, Plant Biology)	**Stack Bldg Room 138**
C. **Buzzy buzzy bees and the process of pollination** (ES) Organizer: Allison Young (MSU Graduate Student, Integrative Biology)	**Stack Bldg Room 141**

2:15pm	**Break**	
2:30pm	**Tuesday – Concurrent Session 3**	

A. **I'd like to thank the writhing mass of gut bacteria inside me** (HS) Organizer: John Guittar (KBS Postdoctoral Research Assistant)	**Terrace Room**
B. **Be a Botanist: Creating a classroom herbarium** (ES) Organizer: Meredith Zettlemoyer (KBS Graduate Student, Plant Biology)	**Stack Bldg Room 138**

C. **The fungus among us!** (MS) **Stack Bldg**

Organizer: Robert Logan (KBS Graduate Student, Integrative Biology) **Room 139**

3:30pm **Connecting Sessions to NGSS Crosscutting Concepts** **Auditorium**
Organizer: Kara Haas

4:00pm **Evaluation & Adjourn** **Auditorium**

Your feedback helps us improve our programming for you. Please take a moment to complete this online evaluation form.

Link to today's online evaluation form: Link

KBS K-12 Partnership 2018 Summer Institute – **WEDNESDAY**, June 27

The Natural History of Now!

8:00am **Breakfast, Introductions, Announcements** **Auditorium**

8:30am **Plenary Speaker: Todd Losee**, Wetland Scientist at Niswander Environmental *Talk Title* **Auditorium**

9:30am **Concurrent Session Teasers**

10:00am **Wednesday – Concurrent Session 4**

A. **Underwater Robotics** (3rd Grade & Up)	**Terrace Room**
Organizer: Amy Cherry (Director of the Battle Creek Outdoor Education Center)	
B. **Life: Shared Characteristics and Unique Adaptations** (ES)	**Stack Bldg**
Organizer: Sara McAda (KBS Undergraduate Research Assistant)	**Room 138**
C. **Physical Computing Projects & Tech Tools for Student Voice** (All)	**Stack Bldg**
Organizer: Matt Hawkins (Gull Lake Middle School Teacher, 5th Grade)	**Room 139**

11:00am **Break**

11:15am **Wednesday – Concurrent Session 5**

A. **Sustainable Agriculture Children's Book (TBD)** (TBD)	**Terrace Room**
Organizer: Dr. Catalina Bartlett (Assistant Professor, MSU Department of Writing, Rhetoric, & American Cultures)	
B. **Behavioral Data Collection** (All)	**Stack Bldg**
Organizer: Dylan McKenzie (KBS Science Education & Outreach Intern)	**Room 140**
C. **Hidden in Plain Sight: Camouflage in Plants and Animals** (MS & HS))	**Stack Bldg**
Organizer: Ava Garrison (KBS Graduate Student, Plant Biology)	**Room 141**

12:15pm **Lunch** **McCrary Dining Hall**

1:15pm **Wednesday – Concurrent Session 6**

A. **Keeping Tabs on Turtles: An Introduction to Mark-Recapture and Quantitative Population Biology** (All)	**Terrace Room**

KBS W.K. Kellogg Biological Station

KBS LTER Kellogg Biological Station Long-term Ecological Research

Organizer: Brendan Reid (KBS Postdoctoral Research Assistant)

B. **The Little Things that Run the World: studying ants to learn about foraging, teamwork, and competition** (All) **Stack Bldg Room 138**

Organizer: Jackson Helms (KBS Postdoctoral Research Assistant)

C. **Evidence for Human Evolution** (MS & HS) **Stack Bldg**

Organizer: Heather Kittredge (KBS Graduate Student, Integrative Biology) **Room 139**

2:15pm **Break**

2:30pm **Lightning Lesson Plans** **Auditorium**

Teachers will share creative lesson plans in 10-minute 'lightning' presentations. There will be time for questions and brief discussion of each lesson shared.

3:30pm **Connecting Sessions to NGSS Crosscutting Concepts** **Auditorium**
Organizer: Kara Haas

4:00pm **Evaluation & Adjourn** **Auditorium**

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KBS K-12 Partnership 2018 Summer Institute – **THURSDAY**, June 28

The Natural History of Now!

Department of Forestry
MICHIGAN STATE UNIVERSITY

W.K. Kellogg Experimental Forest Field Day

7060 N. 42nd St., Augusta, MI 49012

8:00am	**Breakfast, Introductions, Announcements**	**Auditorium**
8:30am	**Plenary Speaker: Dr. Danielle Zoellner**, KBS Academic Programs Coordinator *Pine forests of the Carolinas*	**Auditorium**
10:00am	**Break**	
10:15am	**Load vans to travel to Kellogg Forest**	**Upper Parking Lot**
10:30am	**Forestry Overview** Organizer: Kenneth (KJ) Kettler, Manager and Forester, W.K. Kellogg Experimental Forest	**Kellogg Forest**
11:45am	**Carpool/Load vans to travel to McCrary Dining Hall**	**Kellogg Forest Lot**
12:00pm	**Lunch**	**McCrary Dining Hall**
1:15pm	**Carpool/Load vans to travel to Kellogg Forest**	**Upper Parking Lot**
1:30pm	**Forestry Research Talks**	**Kellogg Forest**

David Reed, MSU Postdoctoral Researcher, *Net Carbon Balance of Michigan Forests*
Paul Bloese, MSU Tree Improvement Supervisor, *Cultivating Natural Resistance to Beech Bark Disease*
Carl Brockman, Kellogg Forest Volunteer, *Maple Syrup*
Fahimeh Baziari, Professional Aide to KBS and Kellogg Forest, *Native Pollinator Gardens*

3:00pm	**Return to KBS**	
3:15pm	**Break/Snack**	**Auditorium**
3:30pm	**Connecting Sessions to NGSS Crosscutting Concepts** Organizers: Kara Haas	**Auditorium**
4:00pm	**Evaluation & Adjourn**	**Auditorium**

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KBS W.K. Kellogg Biological Station
KBS LTER Kellogg Biological Station Long-term Ecological Research

Session Descriptions – Tuesday, June 26, 2018

The snacks in your backyard: wild and edible plants of Michigan All ages

Organizer: Danielle Zoellner

Abstract: We will go over the basics of wild edible plants, and I will introduce you to some of our most common species that will likely be in your own "backyard". We will also discuss how you can incorporate edible plants into your teaching on several topics such as human health to invasive species impacts.

Pollination and native plants at the Bird Sanctuary All ages

Organizers: Sean Griffin & Matt Kolp

Abstract: We'll be showing progress on the new self-guided tour for the Sanctuary's native gardens; this session will highlight the importance of pollination services with a walk through parts of the sanctuary and include ideas for inquiry-based lessons on plant-pollinator interactions.

Staying Afloat: Exploring how fish maintain buoyancy Elementary School

Organizer: Sarah Johnson

Abstract: By observing why specific objects float and sink, we can simulate specialized organs in fish and sharks that allow them to stay buoyant.

Life In A Leaf: Unearthing the tiny world that lives inside a plant Middle & High School

Organizer: Lana Bolin

Abstract: Did you know that there's a complex world of microbes living inside every leaf of every plant? These microbes help plants survive drought, ward off herbivores, avoid diseases, and much more - in fact, without this tiny army of microbes, a plant will have trouble surviving at all! In this lesson, which includes a low-cost hands-on activity, students will learn about symbiosis and the scientific method while observing the fascinating diversity of microbes hidden inside a leaf!

Buzzy buzzy bees and the process of pollination Elementary School

Organizer: Allison Young

Abstract: In this lesson, students will play a game in which they act as honeybees pollinating cherry trees in different environmental conditions. Through the activity, students will learn (1) what pollination is and why it's important, (2) the role of insects (specifically bees) in pollination, and (3) how environmental conditions affect pollinators and therefore pollination success.

I'd like to thank the writhing mass of gut bacteria inside me High School

Organizer: John Guittar

Abstract: In this talk, I'll describe how we are colonized by bacteria from our mothers and our environments, and how these colonists keep us healthy and well-fed. Students will learn to think about humans not as individuals, but as walking ecosystems that are diverse and dynamic.

Be a Botanist: Creating a classroom herbarium Elementary School

Organizer: Meredith Zettlemoyer

Abstract: Come explore plant libraries! We'll be learning about plant diversity, why species go extinct, and the importance of historical collections by examining herbarium samples as well as collecting and making our own specimens.

The fungus among us! Middle School

Organizer: Robert Logan

Abstract: Fungi are everywhere! In our yards, our houses, our workplaces, our food, and our medicines. In this session, we will examine several different fungi found in common environments (kitchens, backyards, grocery stores, and more!) and learn about their role in our lives.

Session Descriptions - Wednesday, June 27, 2018

Underwater Robotics 3rd Grade & Up

Organizer: Amy Cherry

Abstract: Students will be introduced to the history and uses of ROV's, given scientific background on buoyancy, and given a mission to complete. In small groups, students receive a bucket of vehicle "parts" including propellers, control box and motor. They are then challenged to create a vehicle that can drive in a lake.

Life: Shared Characteristics and Unique Adaptations Elementary School

Organizer: Sara McAda

Abstract: What are the characteristics that all life shares? During this session students will learn about unique evolutionary advantages through the lens of life traits. Find out how basic needs like food and water are met in vastly different ways, but can make all the difference when it comes to survival.

Physical Computing Projects & Tech Tools for Student Voice All ages

Organizer: Matt Hawkins

Abstract: The micro:bit is a pocket sized computer that is programmable with easy to learn block-based coding. Projects we will explore include soil moisture sensing, plant watering, and timing gates. Bring your own Chromebook or laptop for this hands-on activity. Bonus resources include tech tools Padlet and Flipgrid for sharing student responses and stories.

Sustainable Agriculture Children's Book (TBD) TBD

Organizer: Dr. Catalina Bartlett

Abstract: TBD.

Behavioral Data Collection All ages

Organizer: Dylan Mckenzie

Abstract: Ever wonder how to collect field data on large mammals? Come to this session to learn when to use various sampling methods from scan and focal to random and systematic sampling. As an added bonus, attend this session to learn how these techniques have been used by MSu scientists to learn about Hyenas in Kenya!

Hidden in Plain Sight: Camouflage in Plants and Animals All ages

Organizer: Ava Garrison

Abstract: In a short lecture, students will learn about how animals and plants use camouflage to avoid predation and herbivory, and how those adaptations can affect population and community composition. An activity following the lecture will allow students to simulate the role of camouflage in seed predation and community composition.

Keeping Tabs on Turtles: An Introduction to Mark-Recapture and Quantitative Population Biology All ages

Organizer: Brendan Reid

Abstract: Estimating population sizes and survival rates is fundamental to ecology and conservation biology. This session will present a framework for teaching the basics of mark-recapture methodologies that can be fit to a wide variety of different teaching formats (from single class sessions to long-term field monitoring projects). Teachers can tailor the specifics of the lesson (such as the degree of math and probability involved) to the ability level of the students, and the study organisms are charismatic, engaging, and of great conservation concern: TURTLES!!!!

The Little Things that Run the World: Studying Ants to Learn About Foraging, Teamwork, and Competition All ages

Organizer: Jackson Helms

Abstract: What happens to dead insects, dropped pieces of food, and other edible materials in nature? In most parts of the world they are eaten by ants—earth's dominant predators and scavengers of small things. In the race to harvest resources within their territories, ant colonies use many strategies to discover food or take it from others. In this session we will learn about animal foraging behavior, teamwork, and competition, all while examining the hidden world beneath our feet.

Evidence for Human Evolution Middle and High School

Organizer: Heather Kittredge

Abstract: What does it mean to be human? In this session, we will review materials from the human origins exhibit at the Smithsonian museum of natural history. The materials include fossil and genetic evidence of human evolution and will allow students to conclude for themselves how all the evidence fits together to

explain the origins of human life.

Session Descriptions - Thursday, June 28, 2018

W.K. Kellogg Experimental Forest Field Day

7060 N. 42nd St., Augusta, MI 49012

Forestry Overview All ages

Organizer: Kenneth Kettler, Kellogg Forest Manager

Abstract: The Kellogg Forest is overseen by MSU's Forestry Department and has continual research on site since its creation in the 1920s. Learn about current management practices at the Forest then in small groups learn to use tools and methods used by foresters to measure trees and determine forest stand health.

Forestry Research Talks All ages

Organizers:

David Reed, MSU Postdoctoral Researcher, *Net Carbon Balance of Michigan Forests*

Paul Bloese, MSU Tree Improvement Supervisor, *Cultivating Natural Resistance to Beech Bark Disease*

Carl Brockman, Kellogg Forest Volunteer, *Maple Syrup*

Observe actual research plots for several ongoing projects at the Kellogg Forest. Hear first hand, from researchers, the questions they are asking and the research methods used to seek answers to keep today's forests healthy and productive.