SCIENCEBLAST
May 18, 2015 at Williams College

Sponsored by the Williams Center at Mt. Greylock and the Williams College Science Center

Science is more than just knowledge; it is a way to explore the world. Science is about innovation, creativity and ingenuity to find answers to new problems. The mission of ScienceBlast is to expose 11th grade students to college-level science and lab facilities while inspiring them to explore a range of scientific fields as they think about their science options in college.

Science Workshops

All workshops are offered during both sessions and will be capped at ten students. Session descriptions are on the second page.

Rank your session choices online at the following website:
http://sites.williams.edu/center-at-greylock/scienceblast/

The Science of Musical Sound
Tiku Majumder (Physics)
Thompson Physics Lab 215

Tiny Fossils, Big Microscopes, and the Evolution of Life on Earth
Phoebe Cohen (Geosciences)
Bronfman Science Center 065

The Biology and Chemistry of Taste
Matt Carter (Biology)
Jay Thoman (Chemistry)
Thompson Chemistry, Wege Auditorium

Plasticity: Your Brain’s Ability to Adapt
Betty Zimmerberg (Neuroscience)
Morley Science Center 310

The Science of Things Too Fast to See
Joan Edwards (Biology)
Thompson Biology Lab 202

Brightness and Distance in Astronomy
Steven Souza (Astronomy)
Thompson Physics Lab 301

The Science of Learning
Nate Kornell (Psychology)
Bronfman Science Center 317

Schedule of Events

8:40 - 9:00 am  Opening Remarks (Wege Auditorium)
Tiku Majumder, Director of the Science Center and Professor of Physics

9:10 - 10:00 am  Science Workshop, Session 1

10:05 - 10:20 am  Snack on the Science Quad (Eco Café, rain location)

10:30 - 11:20 am  Science Workshop, Session 2

11:30 - 11:55 am  Views on College Science (Wege Auditorium)
Panel of Williams College Science Students

12:00 pm  Buses depart to Mt. Greylock

If you have any questions, please contact Kaatje White (kwhite@williams.edu) or Jeffrey Rubel (jnr2@williams.edu).
SCIENCE WORKSHOP DESCRIPTIONS

The Science of Musical Sound
Tiku Majumder (Physics) and Talia Calnek-Sugin ‘15
Location: Thompson Physics Lab 215
In this hands-on exploration, we will consider what makes sound, and what distinguishes noise from musical sounds. We’ll look at the way in which the physical construction of simple instruments determines the pitch and sound quality that we hear. We’ll have a chance to explore the relationship between the pitch (frequency) of the sound and the length of the string or the tube, which produces that sound. If time allows, we’ll build simple speakers, which translate electrical signals into mechanical motion of air that we can hear.

Tiny Fossils, Big Microscopes, and the Evolution of Life on Earth
Phoebe Cohen (Geosciences) and Jeffrey Rubel ‘17
Location: Bronfman Science Center 065
The earth has been around for 4.6 billion years and life has been around for 3.5 billion years, but animals have only been here for about 0.6 billion years. What was going on in between the evolution of life and the rise of animals? In this hands-on workshop, we will explore the hidden fossil record of this period of earth history, viewing microscopic fossils from around the world under high-powered microscopes. Along the way, we will discuss how fossils form and what they can tell us about the co-evolution of earth and life through time.

The Biology and Chemistry of Taste
Matt Carter (Biology) and Jay Thoman (Chemistry)
Location: Thompson Chemistry, Wege
How does the tongue sense and perceive taste? In this hands-on workshop, we will taste a variety of foods and describe what is occurring on the tongue at a biological and chemical level. We will also explore how the sense of smell contributes to the flavor of food, as well as the other factors that contribute to our enjoyment of food. Finally, we will have fun with some “gastronomical illusions,” in which the brain is fooled into thinking it tastes something different from what is present on the tongue.

Plasticity: Your Brain’s Ability to Adapt
Betty Zimmerberg (Neuroscience) and Katherine Bennett ‘16
Location: Morley Science Center 130
Your brain possesses remarkable capacity for “plasticity”, the ability to change in response to experience. The exact ways in which the brain accomplishes this change is one of the hottest research topics in neuroscience. While the brain does possess some capacity for generating new neurons (brain cells), most information recorded in the brain is stored as strengthened or weakened gaps between these neurons or by growing or trimming the connections between brain cells. Some of these changes are quite rapid, as we will demonstrate in this hands-on workshop where we will investigate the ability of your brain to adapt to a changing world.

The Science of Things Too Fast to See
Joan Edwards (Biology) and Adie Mitchell ‘15
Location: Thompson Biology Lab 202
The development of ultra-fast high-speed cameras (that can film over 100,000 frames per second!) has transformed the way we study fast movements in the world of biology. In this hands-on workshop, we will explore how slowing down ultra-fast movements by filming with high-speed cameras has informed how exploding flowers dispense pollen, fruits propel seeds and mosses disperse spores. We will use the high-speed camera to film raindrop dispersal in the splash cups of the liverwort, one of the world’s first land plants.

Brightness and Distance in Astronomy
Steven Souza (Astronomy) and Timothy Nagle-McNaughton
Location: Thompson Physics Lab 301
One of the most important and difficult problems in astronomy is the accurate measurement of distances to stars, galaxies, etc. There are many methods, most based on trigonometry or the properties of light. We will explain and demonstrate how the relationship between apparent brightness and distance is used to determine distances of astronomical objects. We will also visit our rooftop observatory, and (safely) view the Sun, weather permitting.

The Science of Learning
Nate Kornell (Psychology)
Location: Bronfman Science Center 317
What does research say about how learning works? Teachers and students who understand their own learning have the potential to make their learning more efficient. There are no easy fixes, but we will examine a series of studies that point out important, and often counterintuitive, lessons about learning. For example, what happens when you try to answer a question and get it wrong? What about when you are taught in a way that does not fit your learning style? And when is the best time to study?