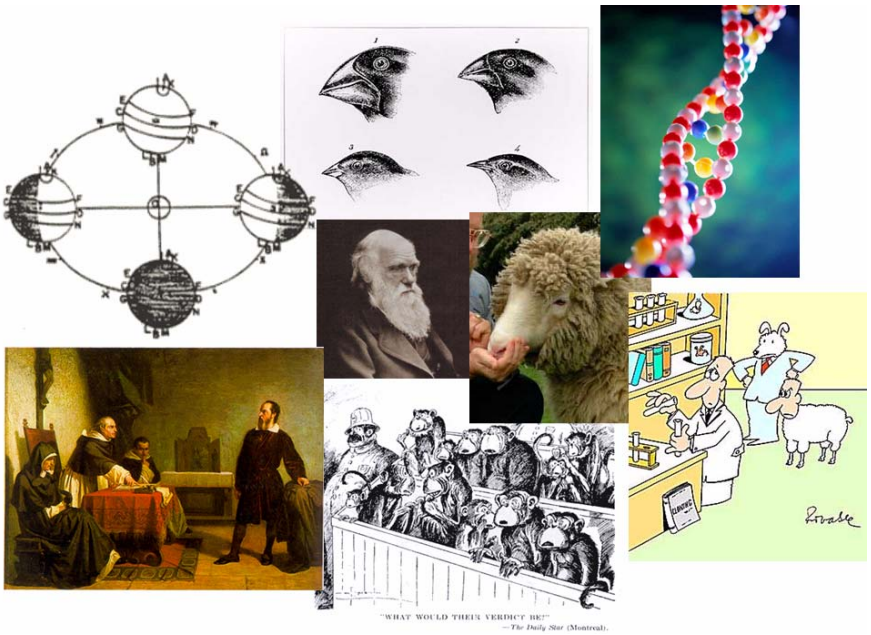
METHOD to the Madness



From Galileo to Dolly the Sheep, science has constantly developed new ideas that have challenged conventional thought, oftentimes driving society mad trying to reconcile these new ideas with existing ones. It's amazing to consider that the scientific method has been the driving force behind these discoveries and that the results are powerful enough to change science and society in remarkable ways. So what is so special about the scientific method? How is it affecting our society?

Emory Researchers are making new discoveries that will challenge our society both today and tomorrow. In this class we will examine the "method to the madness" of 5 current Emory Researchers, exploring questions of:

- Can we convince cancer cells to act normal again?
- Could we one day tap into the inner workings of organisms and direct them to follow our commands just by simply adding a molecule?
- How could life emerge from dirt, air and water?
- Can an analysis of how fruitflies defend themselves from parasitic wasps provide insight into the viability of humans ingesting a "poison" as a preventive medicine?
- Can we learn what plants ancient Americans consumed and then determine their cultural practices and how we might also benefit from those plants and practices?

After learning about these discoveries, you will be challenged to apply the scientific method to propose your own ideas that might just turn tomorrow's world upside down.

The Structure of Cancer
Jacob Kagey

Medicine has found ways to cure many diseases: from polio to small pox. However, cancer has been treated throughout time in many different ways but there is still no cure. What about cancer makes a cure so elusive? Cancer occurs when cells stop listening to signals from themselves and cells around them and begins to divide uncontrollably. In this module we will explore how changes in the DNA structure can change how genes are expressed. To study these phenomena we will investigate a model tumor suppressor gene, which is silenced in breast cancer due to changes to the structure of the DNA.

Hold the Antibiotics: You CAN Teach Old Bacteria New Tricks!
Shana Topp

Are bacteria good for anything other than causing maladies like strep throat, tuberculosis, and food poisoning? Well, what if you could lead helpful bacteria to pollutants to break down the toxic compounds? Or, how about guiding bacterial cells to a disease site in your body so they can deliver medicine? In this module, we will learn about the built-in biochemical interactions that enable an *E. coli* cell to "smell" and then swim toward important chemicals in the environment. Then, we'll think about how we can reengineer this natural system to make cells move toward new chemicals: It's the Bacterial Olympics! Along the way, we'll discuss how to formulate a question using the Scientific Method, and we'll consider the societal implications of redesigning organisms to do work for us.

Nature's Blueprint for the Origin's of Life?
Seth Childers

Have you ever wondered how life began? Imagining life spontaneously emerging from the "dust of the earth" nearly 4 billion years ago has puzzled theologians, philosophers, and scientists throughout the ages. Theories to answer this question have sent ideas of science and religion onto a collision course in courtrooms and school board meeting rooms across the country. So how could we build life from seemingly inanimate components? My research attempts to reveal nature's blueprint for the simplest natural architectures, learn rules of biological architecture, and compare the similarity of these rules with those learned by the Egyptians when they cr eated the magnificent pyramids. Our studies into these biological architectures reveal that simple molecules can form cell like structures. You will experiment with these remarkably simple forces and even help construct intricate structures that may have been present 4.5 billion years ago and assembled into you and me.

You Are What You Eat
Neil Milan

"You are what you eat." In our health-conscious society, this old adage is often used to promote a healthy diet. But, are there any benefits to eating "bad" foods—even those that are known to be toxic? And, if so, what potential benefits could outweigh the danger of being poisoned?! Using research on fruitflies and their parasites as a model, we'll explore the potential benefits of (carefully) consuming toxic foods as a way to stay healthy and disease-free. Sound far-fetched and irrelevant? Believe it or not, humans have been doing this for decades—perhaps even centuries—though such practices may be coming to a close… To put this work in further perspective, we'll also examine topics such as evolution/adaptation (how are they able to eat poisons and live?) and antibiotics (what exactly goes into that medicine your doctor prescribed?). By the end, you may re-discover the truth to another adage: what doesn't kill you makes you stronger.

Interpreting Ancient American Art and Science
Laura Brannen, Art History Department

What can one really old object tell us? How do we go about figuring out what that one object "means"? Using the scientific method on one ancient American object, you will learn how we can help determine ancient trade patterns, migrations, religious beliefs, and medical practices. Can we use what we have learned about this one object to enlighten us today? What is the value of an ancient object? Can it really be an avenue to the past to aid the future of the human experience? What can other objects tell us? Through examination of objects as works of art and as scientific specimens with material remains to test in the Carlos Museum Parsons Conservation Lab, hopefully you will find answers to some of these questions and learn how to interpret art, culture, and science together.