

# *Science Exploration Day - 2018*

## *Seminars*

### **ADVENTURES IN CIVIL ENGINEERING**

**(American Society of Civil Engineers)**

The role of the civil engineer in solving problems and providing solutions for the benefit of the public is presented through graphics and group discussions. You'll see what a civil engineer does and may want to make a career of it!

### **ANIMAL ADAPTATIONS**

**Mary Anna Russo (Helmer Nature Center)**

Learn how animals' physical traits and behavioral instincts help them survive. Animals we'll observe may include a ball python, box turtle, hissing cockroaches, and a rabbit.

### **AQUATIC MACROINVERTEBRATES: STREAM WATER QUALITY INDICATORS**

**Edith Davey (Ontario County Soil and Water Conservation District)**

Varying sensitivities of aquatic insects and crustaceans to pollution allow assessment of water quality by identification and quantification of the insects. Students will have hands-on experience identifying macro-invertebrates and calculating water quality of a stream.

### **BIODIVERSITY IN YOUR BACKYARD**

**Virginia Maier, Ph.D. (St. John Fisher College)**

Nature surrounds us. Understanding its diversity is important if we hope to live in harmony with the flora and fauna. In this session, we will explore the biodiversity of St. John Fisher College's suburban campus. We'll head outside and learn to identify our local species and investigate the factors that influence their ecology.

### **BLACK BEARS IN NEW YORK**

**Mike Wasilco (NYS Department of Environmental Conservation)**

Learn about the history of bears in NYS and their conservation management. Find out how to avoid problems with a bear and what to do if you encounter one.

### **BUILDING A WEB PAGE: FROM KEYBOARD TO 'NET**

**Robert Palmer (Web Design Consultant / Editor)**

Learn the basics of web page construction. You'lll manipulate fonts, add images and backgrounds, and edit content. Bring a thumbnail drive to save the coding.

### **CAUGHT ON CAMERA! TRAIL CAMERA BIODIVERSITY STUDY**

**Nadia Harvieux (Finger Lakes Community College)**

In the field of wildlife conservation, trail cameras (aka "camera traps") are a powerful tool to study animals in their natural habitat. Using camera trap images from FLCC Muller Field Station's spring 2018 biodiversity study, students will determine which habitat area has greater biodiversity: wetland, field, or forest.

## **CLEAN, GREEN, NUCLEAR POWER**

**Michael Mann (American Nuclear Society, R. E. Ginna Nuclear Power Plant)**

A brief overview of nuclear power, specifically how your own neighborhood nuclear power plant, the R.E. Ginna Station, operates to produce safe, ultra-low carbon electricity for our community.

## **THE EARTH'S CHANGING MAGNETIC FIELD**

**Rory Cottrell, Ph.D. (University of Rochester)**

Earth's magnetic field is an ever changing entity. The Paleomagnetic Research Group at the University of Rochester has studied these changes, through its development over 4 billion years ago to the decay in its strength over the last 160 years. This presentation will focus on some of the work that has been possible with the help of students, including field work and laboratory work.

## **FIRST ROBOTICS**

**Larry Lewis (FIRST Robotics Team 1511, Rolling Thunder)**

Interested in robots? The FIRST family of programs provides exciting challenges no matter what your grade level. You'll learn about challenges from the current season, get a chance to meet some of local team members and see what they are doing. See how this robotics program will help you learn more science, technology, engineering and math opening doors to a bright future.

## **FORESTRY: WHAT'S THE VALUE OF A TREE**

**Garret Koplun (NYS Department of Environmental Conservation)**

Get outside and learn how to measure tree height and diameter with the tools of a professional forester. See how tree height and diameter affect the value of a tree and how foresters can help determine forest stand values and the ecosystem services trees and forests provide.

## **THE GEMSTONE JOURNEY**

**Lee Tutt, Ph.D. (Rochester Academy of Science)**

Follow a pebble from its discovery in a faraway rough gemstone mine to a finished gemstone. We will begin at the mine and end in the stonecutter's workshop. Along the way we will look at the geography, geology, and mineralogy of gemstones. You will see how the principles involved in designing finished gemstones are applied, and how gems are "cut" and polished.

## **HOW DNA TECHNOLOGY CAN IMPROVE OUR LIVES AND OUR UNDERSTANDING OF LIFE ON EARTH**

**Adelaide Svoboda, Ph.D. (Nazareth College)**

You'll learn about DNA fingerprinting by doing an exercise to see how it works. We'll discuss DNA probes that target specific genes and you'll learn how sequencing and comparing the DNA of any species informs us about the evolutionary history of cells and of organisms.

## **HOW GENETICS AFFECTS WHAT YOU EAT**

**Amy Szewc-McFadden (USDA – Agriculture Research Service)**

To create new varieties of plants, agricultural breeders need to understand the genetics of the crops of interest. We'll first explore acidity in apples and the genetics behind the taste of these fruits. Then you will learn more about genetics by extracting and analyzing DNA from bananas.

## **INTERACTIVE HANDS-ON FORENSIC WORKSHOP**

**Deborah Janes and Timothy Wilson (American Chemical Society)**

We will investigate evidence collected at an imaginary crime scene and apply scientific principles to analyze the evidence. The principles involved are those scientists use every day to solve problems. No chemistry background is needed to participate in this workshop, just the willingness to participate in a fun and imaginary scenario with real world outcomes.

## **INTIMATE RELATIONSHIPS ON THE CORAL REEF- A VIEW THROUGH THE UNDERWATER LENS**

**Kevin Fager (Rochester Teachers' Association, retired)**

Interested in the ocean, photography, scuba, snorkeling, coral reefs? Come learn about the complex interactions that occur on the coral reef between fish and invertebrate communities. I will show images that illustrate these interactions and discuss how you can photograph this environment.

## **INVASIVE SPECIES**

**Patty Wakefield-Brown (Finger Lakes Institute)**

Invasive species in the Finger Lakes and elsewhere impact us all. Find out what is being done to manage the alien plants and insects. Learn how you can help in the fight against invasive species.

## **INVESTIGATING THE EFFECTIVENESS OF NANOPRODUCTS**

**Kelly Hutchinson-Andersen, PhD (Nazareth College)**

You'll work together to test the effectiveness of various nanoproducts, including nanofabric, and nanopaint. Given what companies say about the products, you will put the products to the test.

## **LASER FUSION**

**Reuben Epstein Ph.D. (University of Rochester, Laboratory for Laser Energetics)**

At the Laboratory for Laser Energetics, the powerful 60-beam OMEGA laser compresses and heats tiny hydrogen targets to conditions found near the center of the sun. We will explain how these experiments produce thermonuclear fusion, similar to the fusion power source of the sun, and how this could develop in the future into a commercial power source. We will also present highlights from our Summer High School Research Program.

## **LIGHTNING EXTRAVAGANZA**

**Jamie Oliver (Harris Space and Intelligence Systems Division)**

Witness a continuous lightning discharge from an 1800 watt Tesla coil and experience plasma forming. Learn about Nikola Tesla, one of the world's genius inventors and how his discoveries influence our everyday lives.

## **LLAMAS AND ALPACAS**

**Barb Kurzowski (We Be Crazy Llama Farm)**

Meet some llamas and watch how they behave. You'll learn about their origins, how they are cared for, and how humans use them.

## **THE MAD SCIENCE SHOW (AND TELL)**

**Carly Reed, Ph.D. (The College at Brockport)**

View an array of numerous chemical phenomena intended to surprise you and entertain. Witness explosions, color changes, and fire, all designed to generate thought about a scientific explanation.

## **THE MAKER MOVEMENT**

**Dan Schneiderman (RIT MAGIC Center, Rochester Mini Maker Faire)**

Do you want to tinker, craft, build, paint, solder, or make things? Have you ever been to a makerspace or a maker faire? Learn how to start prototyping your ideas and making things at home. See examples of what can be created: robots, electronic fashions, toothpick sculptures, soup can chandelier, and more!

## **MASTODONTS IN THE MUCK**

**Jutta Siefert Dudley, Ph.D (Rochester Academy of Science)**

Many swamps across the Great Lakes region contain the skeletal remains of elephant-like creatures called mastodons that were part of the Ice Age ecosystem. How did these animals live and why did they become extinct? Come find out what we know so far. You'll examine some samples and see how paleontologists digging in the muck uncover the past.

## **METHANE TO MONEY**

**Erik Schneider (Avon Central School)**

In the modern world we are all looking to make our lives “greener.” Learn how to recycle food and animal waste into an energy source and save or make money while doing it.

## **MITIGATING HUMAN ERROR IN THE PRODUCTION OF NUCLEAR POWER**

**D. P. Dunn (Ginna Nuclear Power Plant)**

Humans are prone to error and technology carries certain inherent risks. So, how do we manage risk while mitigating the impact of an error? We will discuss when and why errors happen, and explore a variety of techniques to lessen or eliminate errors.

## **NANO – IT’S EVERYWHERE!**

**Karen Huffman-Kelly, Ph.D. (Genesee Community College)**

Ever wonder what nano and nanotechnology really are? Or how it works? We will investigate nanotechnology concepts and perform a couple of simple nano techniques.

## **NOISE HURTS!**

**Ramona Pompea, Au.D. (Sounds for Life)**

Hearing loss in teens is on the rise due to ear bud use with smart phones and portable music players. What is the short term and long term impact of this preventable hearing loss? Come find out and learn some strategies to protect your hearing from hazardous noise levels.

## **OPTICS & PHOTONICS – EVERYWHERE IN OUR LIVES**

**Alexis Vogt, Ph.D. (Monroe Community College)**

Rochester is the birthplace of the optics industry and MCC is the only community college in the country offering an associate degree to train workers for this field. This session provides a snapshot of optics and photonics in each of our lives, in the Rochester community and worldwide.

## **ORIGAMI PRINTED ELECTRONIC TIGER**

**Bruce Kahn, Ph.D. and Mike Buffalin (Rochester Institute of Technology)**

Functional printing uses printing processes to produce devices instead of just graphics. 3D Printing and printed electronics are examples. In this activity, students will use principles of origami and printed electronics to produce a tiger with eyes that light up. Electronic components will be attached to printed metal lines, and folded into a tiger. When a button is pressed, the tiger’s eyes will light up.

## **PHYSICAL THERAPY**

**Connie Chau, Ph.D. (Nazareth College)**

Find out what a physical therapist does and who needs physical therapy. We will introduce you to our practices and academic preparation. You will see the control of balance demonstrated.

## **POLYMERS**

**Timothy Cawley (Rochester Museum and Science Center)**

In a mix of hands-on activities and demonstrations, students will work with different polymers making slime, piercing an inflated balloon, extracting DNA from a banana, and more.

## **PRECISION MEDICINE AND PERSONAL TREATMENT**

**Gary R. Skuse, Ph.D. (Rochester Institute of Technology)**

Health care is moving towards providing precision medicine that is tailored to you and others like you with the goal of improving the diagnosis and treatment of diseases. The National Institutes of Health is enrolling over a million people in a program to identify genetic and environmental factors to group people in categories. By stratifying people in this way, there is the potential to maximize the positive effects of treatment while minimizing undesired side effects. The collection of big data, as this is known, can enable us to inexpensively sequence and analyze the human genome. In conjunction with this trend, there are companies that offer consumer genetic testing that gives people information about their ancestry as well as their future health. Enormous data for research is generated in the genetics that underlie many common, and some not so common, diseases. We'll discuss these trends and their impact on you and the ethical concerns they raise.

## **RAPTOR CONNECTIONS**

**Daena Ford (Braddock Bay Raptor Research)**

Meet live raptors native to our area and learn about their role in the environment. The session will also touch on the migration research being done at Braddock Bay, including the spring hawk watch and raptor banding.

## **RUBBER HAND ILLUSION**

**Huey Hing, Ph.D. (The College at Brockport)**

What is more natural than identifying with one's own body? Yet, you probably spend little time contemplating how your brain identifies your own body parts as belonging to you. Studies of certain stroke patients, who can't tell that parts of their body belong to them, reveal that body identification is a complex process. The rubber-hand illusion experiment manipulates this process, fooling the brain into identifying a prosthetic hand as one's own hand, thus dramatically illustrating how our brain creates a sense of our body.

## **SAVING AND HEALING LIVES THROUGH EYE, ORGAN AND TISSUE DONATION**

**Karen Guarino (Lions Eye Bank at Rochester)**

Team up with others to play STAT RUN, an interactive game that introduces students to the field of eye, organ and tissue donation. Learn what can be donated and how donations are healing and saving the lives of thousands of people every year.

## **SPACE SUIT CHALLENGE**

**Michele Pagani and Patty Muscatello (Ward's Natural Science, Est.)**

Your mission – design a spacesuit that will best protect your worm astronaut in the extreme temperatures of space. You will work with a team of fellow engineers to create a protective covering for your worm astronaut.

## **SPILLS AND REMEDIATION**

**Pete Miller & Tom Hall (NYS Department of Environmental Conservation)**

How do you clean up a hazardous spill? What equipment is needed? What exactly is remediation and environmental cleanup? Come talk with a NYSDEC Spills Responder and Remediation staff to learn just what it is they do and just how they oversee and clean-up a hazardous spill.

## **TICKS AND DISEASE: HOW TO REDUCE YOUR RISKS WHILE STILL ENJOYING THE GREAT OUTDOORS**

**Lynn Braband (Cornell University, NYS Integrated Pest Management Program)**

We will review the life history of the four species of ticks in NYS and the diseases associated with them, emphasizing Lyme. Steps that may be taken to reduce the risk of being bitten by ticks will be discussed. These will include personal protection, host management, and habitat management.

## **TURTLES AND TORTOISES**

**Tina Crandall-Gommel**

Turtles and tortoises have a fascinating natural history. Today there are approximately 300 remaining species, over half of which are endangered or critically endangered. We will explore famous fossil finds and meet some turtle and tortoise friends, live.

## **WASTE-TO-ENERGY: BIOFUELS**

**Renuka Manchanayakage, Ph.D. (St. John Fisher College)**

Turning waste materials into useful fuels offers both economic and ecological benefits. Waste oils from cooking can be converted into biodiesel via a chemical reaction called transesterification. In these hands-on activities, you will explore properties of biodiesel fuels prepared from different types of oils and waste materials. Your investigation will help you to determine whether these fuels are suitable for Rochester winters.

## **WATER SUPPLY ENGINEERING**

**Richard Metzger (Monroe County Water Authority)**

What does it take to build a municipal water treatment facility? You'll learn about the environmental permission process, the digging of the long tunnel beneath Lake Ontario, and how the plant is designed so it treats the water you drink.

## **WHITE-TAILED DEER: HISTORY AND BIOLOGY**

**John R. Hauber (NYS Department of Environmental Conservation)**

While our forebears and Native Americans once depended on deer for survival, now the deer depend on us. We will discuss deer biology, including antler development and deer aging techniques.

## **WILDLIFE DETECTIVE**

**Ron Schroder (NYS Department of Environmental Conservation, retired)**

You'll learn how to detect the wildlife that lives around us by identifying the clues they leave behind. Hands-on samples will aid your sleuthing.

## **WILL WE EVER MAKE IT TO MARS?**

**Tara Sweet (Nazareth College)**

Could humans live on Mars? Could they survive the trip to get there? What are some of the physiological barriers to space travel and what is being done to address the concerns?

## **THE YEAR IN SPACE 2018 – THINGS THAT KEEP SOME OF US UP AT NIGHT**

**Damian Allis, Ph.D. (NASA Solar System Ambassador, Syracuse University)**

From mission launches to eclipses, comets to quasars, professional and amateur astronomers do their best to plan observations around significant events every year. What should we look for in 2018? Find out what notable space science missions and events are expected. Learn about the most interesting astronomical phenomena you can witness from your backyard.