

Summer of Science 2023 Workshop Descriptions

Workshops are FREE but registration is required.

Please read the workshop descriptions carefully for **grade requirement, location & time and registration deadline.**

- Space is limited; first-come, first-served.
- You must register at least one week before the workshop is scheduled to take place (unless noted otherwise) so that we can send you the required paperwork, directions, and additional information needed for the session.
- Please do not register until you know 100% that you can attend. (Do not take a spot away from someone who really wants to come!)
- If a program is full, please contact Lauren.Traister@uvm.edu to be placed on a waiting list.

Workshop Descriptions

June 23: Learn About Lake Champlain on a Floating Classroom

Learn about Lake Champlain aboard the new University of Vermont research vessel. Explore this cutting-edge hybrid vessel and the scientific equipment featured. You will learn how to perform water quality testing, explore aquatic food webs, and gain experience in a university laboratory setting.

This workshop will take place aboard the R/V Marcelle Melosira on Lake Champlain in **Burlington, VT from 10-12pm**. Space is limited to 20 youth who will be **entering grades 7-12** in the Fall.

Instructor: Caroline McKelvey is the Watershed and Lake Education Specialist for the Lake Champlain Sea Grant and UVM Watershed Alliance program.

June 27: Flow Cytometry - Learn About how Scientists Unravel the Complexity of Cells, Tissues, Crops, Oceans, Vaccines, and More

Have you ever wondered how scientists and physicians know if a vaccine is working? How Lake Champlain is being tested for the presence of Cyanobacteria? How scientists determine if nanoparticles are “good” to transport therapeutic drugs in our bodies to cure diseases? Or how does a cool instrument call Flow Cytometer work? Researchers at the UVM Larner College of Medicine utilize state-of-the-art flow cytometry technology to answer many scientific questions. In this workshop you will learn what if flow cytometry, how a flow cytometer works, you will process some samples in a real flow cytometer instrument and gain experience in a university laboratory setting.

This workshop will take place at the leading research core facilities at the **UVM Larner College of Medicine from 8:30 am to 12:00 pm**. Space is limited to 10 youth who will be **entering grades 7-12** in the Fall.

Instructor: Dr. Roxana del Rio-Guerra is a Faculty Scientist from the Department of Surgery at the UVM-LCOM. She is the Director of the Harry Hood Bassett Flow Cytometry and Cell Sorting (FCCS) Facility and has more than 20 years of experience working with this technology.

June 28: Plant and Fungi Ecology and Evolution

Have you ever wondered what plants were alive with the dinosaurs? Why are mosses so short and trees so tall? What are mushrooms and are they really poisonous? How do trees communicate with each other through the 'wood wide web'? Come join us for a day of learning about the ecology and evolution of land plants. We will talk about how plants moved from water to land, why there is so much plant diversity, and how plants interact with other organisms like animals and fungi.

The day will include:

- * Woodland walk in Centennial Woods
- * Laboratory exploration of plants and mushrooms
- * Tour of UVM Greenhouse

This workshop will take place at **UVM in Burlington from 9 am – 3 pm**. Space is limited to 10 youth who will be **entering grades 7-12** in the Fall.

Instructor: Erin O'Neill is a Lab Coordinator for the Integrated Biological Sciences Department at UVM and Director of Scientists Uncovering Nature, a non-profit with a mission to connect kids to nature and farms.

July 6 and July 27: Build a Rocket

Join a team of engineers from Benchmark Space Systems at the company's Burlington headquarters for this two-day workshop where you will design, build, and test a small hybrid rocket engine. In the initial 4-hour workshop, you will learn how hybrid rocket engines work and be given an overview of thruster design, followed by a short tutorial on how to turn a design concept into a 3D printable model using open-source CAD tools. We will then have an open discussion and Q&A period where students can discuss design ideas and any other questions they have about rockets and space with a team of rocket scientists and designers. You will then have two weeks to create your own rocket designs individually or in pairs and send them to the Benchmark team to be 3D printed. The deadline to submit your designs is Thursday, July 20. For the second session, you will return to Benchmark HQ to test your designs. Benchmark engineers will help you fire your rockets using oxygen gas as an oxidizer and the

printed material of the engine itself as the fuel. Afterwards, the most successful design will be determined and we will have a round table discussion of the test results and observations.

This workshop will take place at **Benchmark Space Systems in Burlington from 10 am – 2 pm on both Thursday July 6 and 27. You must attend both sessions.** Space is limited to 10 youth who will be **entering grades 9-12** in the Fall.

Instructors: Engineers at Benchmark Space Systems.

July 10: Biomimicry

Have you ever wondered how owls can fly too quietly and geckos can stick to walls? Have you ever wondered if we can design airplanes or medical glues inspired by nature? The world is full of amazing designs that humans are just starting to understand so that we can engineer better materials and products that are sustainable and support life. Biomimicry is coming up with something new through inspiration from biological forms, processes, patterns, and systems.

The field of biomimicry applies to anyone! Engineers are building prosthetic limbs based on the movement of the human body, and wind turbines that are more efficient by studying whale fins. Architects are designing more efficient buildings with smart materials. Doctors are researching ways nature is able to heal itself to develop better medicine and treat patients.

For anyone who has walked outside, and wondered how something in nature works or is able to survive, then this is the workshop for you! You will learn about the different types of natural design and will talk about the design process. Next you will go outside and identify ways in which nature has designed an organism to survive, or different ways organisms adapt to their surroundings. Last you will head back into the lab to brainstorm ideas of how functions in nature can inspire changes to our lives that are better for the world.

This workshop will take place at **UVM in Burlington from 10 am – 2 pm.** Space is limited to 20 youth who will be **entering grades 7-12** in the Fall.

Instructors: Rachael Floreani, Associate Professor of Engineering at UVM.

July 12: Learn About Forest Ecology

Are you curious about why certain trees grow where they do? Would you like to learn more about how people study trees to answer questions like this? In this workshop, you will learn how to: identify some common tree species in the Champlain Valley using all of your senses, learn how foresters and forest scientists measure trees in the forest, dig a soil pit and learn how to look at soil to learn about the history of a site and how it determines what trees might grow there.

This workshop will take place at the **UVM Jericho Research Forest in Jericho from 9 am – 12 noon**. Space is limited to 20 youth who will be **entering grades 7-12** in the Fall.

Instructor: Jess Wikle is the manager of the UVM Research Forests

July 14-16: Natural Resources Management Academy

Are you interested in the environment and ready to explore, in depth, your passion for Vermont's natural resources? If you answered yes to this question, then you should attend the Natural Resources Management Academy (NRMA). Come ready to explore natural resources management and share a day with other youth from around Vermont who have the same interests.

You will have the opportunity to take in-depth, hands-on workshops with experts. Each workshop will allow for extensive in-the-field exploration of the subject matter. This summer's workshops will include: **Watershed Science, Fish Health CSI, Converting Food Waste to Fuels, Nature Awareness & Ecological Restoration**. In addition to these workshops, participants will engage in fun team building activities, canoeing, fishing, hiking, and a nightly campfire with s'mores.

This workshop will take place at the **Green Mountain Conservation Camp in Woodbury, VT** the weekend of July 14-16, 2023. Space is limited to 30 youth who will be **entering grades 7-10** in the Fall. **The \$125 registration fee is being waived this summer due to generous support from VT EPSCoR.**

Instructors: Workshops will be led by various natural resource professionals.

You must register **by June 14** so that we can send you the required paperwork, directions, and additional information needed for the program.

July 17: Special Conference/ Youth Day - Stem Cells, Cell Therapy and Bioengineering in Lung Biology and Disease

We are sharing this amazing opportunity!

As part of the Stem Cells, Cell Therapy and Bioengineering in Lung Biology and Disease Conference being held at the **University of Vermont in Burlington**, conference organizers are planning a special day for youth **entering grades 8-12** on Monday, July 17 from 8:30 – 4:00 pm.

The day will start with a breakfast as you are welcomed to campus along with the other workshop participants. You will then have the opportunity to participate in a campus and laboratory tour and observe a workshop in which the biomechanical regulation of lung function will be evaluated. During a mentoring lunch you will interact with Graduate Students and Postdoctoral Trainees in a more informal setting. During the afternoon the focus will be on "A

Career in Translational Science”. This session will be hosted both in person and online via Zoom and all youth are welcome to participate. Dr. Amy Ryan (University of Iowa, IA and Chair of the Conference) and Dr. Dan Weiss (University of Vermont, VT and Founder of the Conference) will lead an interactive discussion on scientific career paths. The day will end with a wrap-up question and answer session.

This opportunity will be limited to 20 youth and registration will open on May 1. Once we are provided registration information from the conference organizers we will post it.

July 18: Learn About Brain Connections with Neuronify

There are billions of cells in the brain, with even more connections than we can imagine. But how do these cells actually connect with each other to transmit all that information? In this workshop we'll use an open-source app called Neuronify to help learn about the different ways our brain cells send and receive information!

This workshop will take place at **UVM in Burlington from 9 am – 12 noon**. Space is limited to 15 youth who will be **entering grades 7-12** in the Fall.

Instructor: Jamie Carolyn Reulbach, UVM graduate student studying neuroscience

July 21: Microbe Detectives

Are you interested in science, medicine, or healthcare? If so, come to this workshop to learn what happens behind the scenes when a person with an infected arm wound goes to the doctor’s office! You will get to analyze the patient’s blood, bacterial culture swab, and tissue biopsy. You will also learn how we:

- Draw blood and make blood smears
- Look in microscopes at blood and bacterial smears
- Perform testing on visible bacterial growth to identify the microbe causing infection
- Tour of UVMMC clinical laboratory

Participants will also learn about different careers and the education pathways to the following jobs: Phlebotomist, Pathologist (MD), Medical Laboratory Scientist, and Histotechnologist.

This workshop will take place at **UVM Medical Center in Burlington from 9:00 am to 12:00 pm**. Space is limited to 20 youth who will be **entering grades 7-12** in the Fall.

Instructors: Shawney Bushey (MLS), Mari Tomanelli (MLS), JD Yergeau (MLS), Dr. Christi Wojewoda (MD)

July 24-28: Science Exploration Camp

Have you ever wanted to be a scientist? Take a week and try it out in the Science Exploration Camp. This camp will be packed full of hands-on experiments to explore a variety of science disciplines. You will get to explore different areas of science each day and learn how to think, discover, and hypothesize like a scientist.

This camp will take place at the **University of Vermont in Burlington** from **9:00 am- 3:30 pm**. Space is limited to 20 youth who will be **entering grades 6-8** in the Fall.

Instructors: Camp activities will be led by various science faculty and graduate students.

You must register **by June 24** so that we have enough time to order activity materials and can send you the required paperwork, directions, and additional information needed for the session.

July 31 – August 4: Morning Cup of Code

Note: this is a virtual programming

Vermont 4-H and UVM's College of Engineering and Mathematical Sciences are joining forces again to bring you another opportunity to learn to code!

In this 4-H World Changers series, you will learn how to use foundational coding concepts to build your own customizable quiz game! You get to choose the theme, characters, questions, and animations using the Scratch coding platform. By the end, you'll get to test friends and family in a fun interactive game!

This program will **take place online** from 10:00 am – 11:00 am daily from July 31 – August 4. But, our first lesson on Monday, July 31 will be 2 hours long – from 10:00 am – 12:00 noon. This program is for any **youth entering grades 5-12** in the Fall.

Instructor: Lisa Dion is a Senior Lecturer in Computer Science at the University of Vermont.

August 4: Human Brain Anatomy - a Hands-on Laboratory Experience!

If you're reading these words, a disk-shaped array of light sensitive cylinders in each eye are releasing chemicals on to a chain of brain cells that transmit this information to several million cells at the center of your head. From there the information destined for perception is spritzed to the most posterior portion of the cerebrum, the corrugated larger part of the brain that sits at the top. Through a series of connections built over millions of experiences, you translate these symbols in patterns of light into sounds and thoughts. How does the brain manage to accomplish this, and other impressive feats? Join professors and graduate students on a hands-on tour of neuroanatomy with real human brains. You'll have a chance to ask about the

mysteries of human experience and how you can go about studying topics in the health sciences.

This workshop will take place at the **University of Vermont in Burlington** from **2:00- 4:00 pm**. Space is limited to 20 youth who will be **entering grades 7-12** in the Fall.

Instructor: Nathan Jebbett is an Assistant Professor in the Department of Neurological Sciences at UVM's Robert Larner College of Medicine where he teaches classes in gross anatomy, neuroanatomy, and regenerative medicine to a diverse population of students in the health sciences.

August 6: Nature Awareness and Ecological Restoration

Curious about how to learn who lives in wild areas through sharpening your awareness? Ever wonder how to take care of wild areas that need support to recover health? If so, join the Mycolab team of nature mentors and scientists to learn and practice these skills in a fragile urban wild with other Vermont youth. We will play nature awareness games, practice skills, learn to: use field guides, identify creatures living on the land, record species' presence to protect the land, work with a map and compass, and practice basic skills on how to restore an ecosystem.

This workshop will take place in **Burlington from 10 am – 2 pm**. Space is limited to 15 youth who will be **entering grades 7-12** in the Fall.

Instructors:

The Mycolab team offers education, training and mentoring in the field of ecological restoration. The team includes: **Jess Rubin** is a seasoned environmental scientist, restoration practitioner, and creative educator, excited to train youth in earth repair. **Colton Francis** is a youth and teen nature mentor, an amateur botanist, and avid adventurer who guides with play and reverence for earth. **Brianna Arnold** is a youth nature mentor with a background in botany and agroecology who leads with a playful, singing spirit.

Questions? Contact lauren.traister@uvm.edu or call 802-656-7565

To request language interpretation/translation assistance and/or a disability-related accommodation to participate in this program, please contact the Lauren Traister at 802-656-7565 or email lauren.traister@uvm.edu, by June 1, 2023 so we may assist you.