

# Virtual SR Programme

May 8, 2021 | 10AM - 5PM



Time	SR Webinar 1 <a href="#">join here</a>	SR Webinar 2 <a href="#">join here</a>	SR Webinar 3 <a href="#">join here</a>
10:00	Opening Remarks		
10:10	Molecular Genetics #1	Canadian Blood Services	FIRST Robotics Canada
10:20			
10:30	Molecular Genetics #2	UofT Trash Team	Blue Sky Solar Racing
10:40			
10:50	University of Toronto Medical Students	Stem Cell Club	Institute for Sustainable Energy
11:00			
11:10	Models of Human Diseases Medical Education Programs	Department of Physics: <i>What is Life? Can we measure it?</i>	
11:20			
11:30	Science Chase		
11:40			
11:50			
12:00	Break		
12:10	Biomedical Engineering Student Association	Gender and The Brain	Mathematics & UTFOLD
12:20			
12:30	University of Toronto Medical Students	Department of Physics: <i>Atmospheric Physics</i>	
12:40			
12:50	Molecular Genetics #1	Canadian Blood Services	University of Toronto Aerospace Team (UTAT)
1:00			
1:10	Molecular Genetics #2	Confederation of Laboratory Medicine and Pathobiology Student	Astronomy And Space Exploration Society (ASX)
1:20			
1:30	Science Chase		
1:40			
1:50			
2:00	Break		
2:10	Undergraduate Pharmacy Society	Near and Middle Eastern Civilizations/CRANE Project	Department of Physics: <i>Ocean Thermodynamics</i>
2:20			
2:30	University of Toronto Medical Students	Gender and the Brain	Zebra Robotics
2:40			
2:50	Physiology	Canadian Blood Services	Biozone
3:00			
3:10	Science Chase	Confederation of Laboratory Medicine and Pathobiology Students	Department of Astronomy & Astrophysics
3:20			
3:30			
3:40			
3:50	Break		
4:00	<b>KEYNOTE: From Basic Science to Star Trek Surgery</b> <i>Professor Dwayne Miller, Founder of Science Rendezvous</i> <a href="#">Join Keynote</a>		
5:00	End		

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Time	Daniels Faculty Presents... <a href="#">join here</a>	SR Science Fair & Science Pitch <a href="#">join here</a>
9:00		Student Check-In
9:10		
9:20		Opening Remarks
9:30		
9:40		
9:50		
10:00	Opening Remarks	First Round of Posters
10:10	Daniels Minecraft Design Camp	
10:20		
10:30		
10:40		
10:50		
11:00	Daniels Digital Design Camp	Break
11:10		
11:20		
11:30		
11:40		
11:50	Break	
12:00	Break	Second Round of Posters
12:10	Daniels Design Bootcamp	
12:20		
12:30		
12:40		
12:50		
1:00	Daniels Architecture & Film Bootcamp	Break
1:10		
1:20		
1:30		
1:40		Announcement of Winners & Closing Remarks (1:45)
1:50		
2:00	End	End

## Keynote: From Basic Science to Star Trek Surgery

*Speaker: Professor Dwayne Miller, Founder of Science Rendezvous*

**From Basic Science to Star Trek Surgery: Achieving the Fundamental (Single Cell) Limits to Minimally Invasive Surgery and Biodiagnostics**

One of the dream experiments in science was to directly observe atomic motions during the defining moments of chemistry and biology - to make a "molecular movie". This experiment was achieved and beyond any expectation this research discovered the basic physics to enable the laser to finally achieve its long held promise to attain single cell precision for surgery. The new technology is the first method by any means capable of scar free surgery and molecular bar codes for surgical guidance. In this context, the importance of blue sky research will be discussed in terms of the questions motivating scientist to explore deeper and how to benefit from discovery.

## Booths (in Alphabetical Order)

### Astronomy and Space Exploration Society

*Will you survive outer space?* Learn about astronomy/physics principles with the Astronomy and Space Exploration Society! Come in first place on our quiz and win a prize!

### Biomedical Engineering Student Association

Join us for a day in the life of a scientist. Several PhD researchers will vlog what their life looks like and answer your burning questions!

### Biozone

We will run through an interactive presentation covering different aspects of composting such as what's involved, how it works, and with an emphasis on the science and microbes involved. We will leave attendees with a link to resources.

### Blue Sky Solar Racing

Blue Sky hopes to provide attendees with significant exposure to its creation process, and the steps that are being taken to create its 11th generation car model. With a focus on ideation techniques like prototyping, this booth is designed as a means to create a fully immersive experience that facilitates transparency and fosters open conversations surrounding green technology and how it can develop solutions. There will be live demos, trivia games and the winner gets a prize.

### Canadian Blood Services

Learn about blood donation with the Canadian Blood Services! Complete our quiz for a chance to win CBS Swag.

## **Confederation of Laboratory Medicine and Pathobiology Students (CLAMPS)**

This activity is a simulation blood-typing scenario. Participants will act as laboratory researchers identifying the antigen composition of different simulated blood samples in order to identify the patient the blood belongs to. Through this activity, participants will learn about the direct utility of laboratory medicine in a clinical setting. We will have scientific explanations that are adaptable to various audiences, as we can go into varying depth (talking about blood types, Rh factor, genetic pattern of blood types etc.)

In this activity, our demonstrators will be using household items to mimic blood and antibody serums. This will include milk dyed with red food coloring and vinegar, which will coagulate similar to the antibody and blood solution. We will be running the demonstration in a “theatrical” performance where the audience will be participating in our experiment and helping us identify the blood sample. We will also provide the protocol to students this at home again later in they would like.

## **Daniels Faculty**

### **Daniels Minecraft Camp**

Daniels Minecraft Camp uses the powerful tool of Minecraft to explore design potentials. Join us for this demonstration of the software and green building design. Participants will learn about sustainable building materials and how to integrate and use nature through guided instruction then will be shown how to design unique, green architecture in Minecraft.

### **Daniels Digital Design Camp**

Platonic solids were used by the philosopher Plato and Astronomer Kepler to describe the basic building blocks of our world and universe. Join us for a talk and demonstration on how to use these building blocks to design an outdoor structure that provides shade on a sunny day. All demonstrations will use free software you can explore on your own.

### **Daniels Design Bootcamp**

Participants will learn fundamental concepts related to structure and green design and develop new relationships between nature and the built environment. Participants will learn how to use a free online web version of Sketchup to design a garden pavilion.

### **Daniels Architecture & Film Bootcamp**

Moving images are built just like buildings – they are constructed moments often referred to as typologies. Participants will be shown how to use a smartphone and a free online platform to create a GIF of a specific typology within their own space. Find new ways of documenting the world around you that you can share with others!

## **Department of Astronomy & Astrophysics**

TBA

## Department of Physics

### What is Life? Can we measure it?

*Speaker: Professor Dwayne Miller*

This talk will discuss latest advances that show how innumerable arrangements of atoms are guided by a few key types of motions that shows an enormous reduction in number of dimensions or possibilities. This work gives our first hints at how chemistry scaled in complexity to the limit of biological molecules to breathe life into otherwise inanimate objects. Could a similar reduction principle be at work that gives rise to the nonlinear biochemical pathways that lead to living response functions. This conjecture will be discussed along with the new technology that holds promise to open a new window on the study of cells - and from a physics perspective - the meaning of life.

### Atmospheric Physics: Up, up and Away! Doing Scientific Experiments from a Really Big Balloon

*Speakers: Professor Kaley Walker's Group*

Come along for the ride as we discuss how high-altitude balloons can be used to study Earth's atmosphere from "near-space". Learn how instruments are designed and tested to handle harsh conditions. We will take you along for the journey of a balloon flight capable of carrying 500-1000 kg of experimental equipment up to altitudes of 30-40 km. Hint, the balloon is 25 stories tall!

### Ocean Thermodynamics: Oceans in Motion

*Speaker: Professor Nicolas Grisouard*

The oceans have inspired many throughout history, and the tools developed to understand them have led to numerous advances in timekeeping, navigation, and mathematics. This presentation first provides an overview of the science of tides from ancient times all the way up to the modern satellite era. We then explain how physicists shape the contemporary study of the oceans and of the climate system.

## FIRST Robotics Canada

Students age 12+ can learn coding through FIRST Tech Challenge (FTC) Blocks in a simulated FIRST Tech Challenge programming environment. Join in a demonstration of the FTC SIM, a free online virtual robotics software designed for teachers, coaches, students, and team members to learn the basics of programming. Sign up to use FTC SIM for free at: <https://pixelpad.io/ftcsim/>

## Gender and The Brain

Using demonstrations of brain imaging and cognitive neuroscience, the Gender and The Brain booth will explore the social, biological, and psychological aspects of gender in the human brain. First, we will ask what gender is and what it looks like in the world around us using a sociology lens. Second, we will put on our figurative lab coats and investigate how the brain develops from fetus to adult and learn how neurons communicate with each other to send information from the brain through the body. Third, we will explore human behaviour and how gender interacts with the biology of our brain.

## Institute for Sustainable Energy

TBA

## Mathematics & UTFOLD

### ▼ △ Geometry in Art: Tessellations and Origami △ ▼

Recycling is a manufacturing process, worth the effort because of *net* energy and cost savings. It is in our best interest to use less paper and value every sheet to its fullest. Before tossing away your mail or homework, try folding it into art! We'll teach you how to make origami while appreciating its simple geometry.

## Models of Human Diseases Medical Education Programs

Learn about sustainable and healthy food, clean air and reduction of airborne infections, clean water and water security to draw attention to the diseases caused by infected water, lack of water or flooding, and solutions to deal with microbes that avoid resistance and maintain the ecosystem. Attendees will engage in fun activities and games such as Health food store, trivia on the water scarcity around the globe in support of the UNICEF project Hand hygiene for all, and on airborne bugs and pollutants that cause common diseases. Meet with doctors and dentists and learn about the work doctors, dentists, and other healthcare professionals have in promoting wellness and health in communities.

## Molecular Genetics

**Activity #1:** DNA is the building block of life. Come learn about DNA and watch how you can get your own DNA or the DNA from common fruits in your home!

**Activity #2:** What are animals that scientists study in labs? Come watch glow-in-the-dark fish and worms, two common animal models, in this live interactive session!

## Near and Middle Eastern Civilizations / CRANE Project

TBA

## Physiology

TBA

## Science Chase

TBA

## Stem Cell Club

Learn about the importance of stem cell donation as we present the process of registering and requirements to register as a stem cell donor. We will demonstrate how to use a swab kit to register as a stem cell donor.

## **Undergraduate Pharmacy Society**

**Vaccination Nation!** How do you know your vaccines are safe? This is the biggest question on everyone's minds today as we're living through the biggest mass vaccination program in history. But vaccines are an essential part of our lives every year, starting with vaccinations when we're born. Join the Leslie Dan Faculty of Pharmacy for our Vaccines Trivia Event on Kahoot! Any age can join in on the fun, learn about the vaccines we depend on, and play for prizes!

**PRIZES:** \$25/\$20/\$15 UofT Bookstore virtual gift cards for the top 3 winners of each Trivia Event!

## **University of Toronto Aerospace Team (UTAT)**

Come learn about the divisions and projects of the UofT Aerospace Team! Join us for a presentation as we share some of our exciting projects, and explore sustainability in the aerospace industry through the lens of each of our divisions, including sustainable rockets, space debris, and novel aircraft designs!

## **University of Toronto Medical Students**

Come explore different parts of the human body through our games and activities.

## **UofT Trash Team**

What is the plastics cycle and how do we, as scientists, research plastic pollution? Come explore and learn about the sources and fate of microplastics in our watershed and explore potential solutions to plastic pollution!

## **Zebra Robotics**

A brief introduction to robotics, along with a short and simple demonstration of a robot using sensors to "map" its environment. We will also run a quick Kahoot about sustainability to promote this year's theme of STEAM Green!