

# A 2-DAY ADVENTURE FOR GRADE 11 GIRLS!

Live on Brock campus and experience the Sciences hands-on.

# SCIENTIFICALLY YOURS



## May 5-6, 2010

Online registration  
Hands-on lab projects  
Talk at dinner with women scientists  
Recreational Activities  
Networking  
Plenary Speaker

*Ask your teacher or guidance counsellor if you qualify for registration (limited enrollment)*

The Status of Women in Science Committee, Faculty of Mathematics and Science  
Brock University, 500 Glenridge Ave., St. Catharines, Ontario L2S 3A1  
Contact: Baoling Bork Telephone: 905-688-5550, ext. 4025 Email: [mentor@brocku.ca](mailto:mentor@brocku.ca)  
<http://www.brocku.ca/scientificallyyours/>

### **What is Scientifically Yours?**

Scientifically Yours is a two day residential workshop designed to encourage young women to continue their studies in the sciences and to pursue careers in science-related fields. Scientifically Yours provides an opportunity for female students to learn more about science in a university setting.

### **How much does the workshop cost?**

The workshop, accommodations, activities and meals cost \$225.00 + GST

### **What will I learn from the workshop?**

You will learn about career opportunities from professional women who have careers in the sciences, including medicine, university research, and industry. Everyone will participate in six of sixteen science and mathematics projects. Through the projects, you will get hands-on laboratory and group presentation experience. The two-day event also includes a plenary lecture by a distinguished female scientist, recreational activities, networking, and an opportunity to share dinner with a number of professional women scientists. The workshops will be conducted with the assistance of Brock University student mentors and faculty

### **Do I qualify for the workshop?**

To qualify for the workshop, you must be a Grade 11 female student and have an interest in math and science. You must also commit to staying on campus for the duration of the workshop.

### **How are the participants selected?**

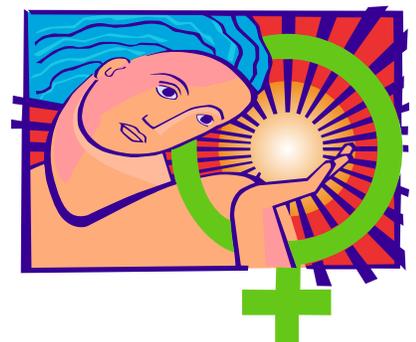
Each school will select up to two participants and a nominee to attend Scientifically Yours. If there are any spots available after the selected participants have registered, a nominee will be chosen at random from the participating high schools. The participant must register online by April 4th, 2010.

### **How Do I Apply to Register for Scientifically Yours?**

See your Head of Guidance for details on how and when to register. Provisions to pay via cheque or credit card have been made available online via [www.brocku.ca/scientificallyyours](http://www.brocku.ca/scientificallyyours). Cheques must be sent to Marie Reimer at Brock University, St. Catharines, Ontario L2S 3A1 no later than April 4th, 2010. Registration will be confirmed online.

### **Whom should I call if I have questions about the Scientifically Yours programme?**

If you have any questions about Scientifically Yours, call Baoling Bork, at (905) 688-5550, ext.4025, e-mail: [coscmentor@brocku.ca](mailto:coscmentor@brocku.ca)



## Project Selections

Everyone will participate in six projects. You will be able to select two, and we will do our best to see that you get at least one of them.

### BIOLOGY

#### (1) There is a fungus among us!!

*Phycomyces blakesleeenans* is a fungus commonly found in just about every manure pile and affectionately known in lab circles as the "prince of rot". In order to release spores it has to clamber its way out of the dung towards the light. Since structures that carry the spores are susceptible to UV radiation it produces a yellow pigment,  $\beta$ -carotene, to protect itself from the harmful rays of the sun for the same reason you apply sunscreen to your skin. In this project we will extract the  $\beta$ -carotene from cultures grown in three different light applications and compare the results.

#### (2) DNA Fingerprinting

A crime was committed in the '70s and circumstantial evidence presented at the trial was instrumental in the sentencing of the accused to life in prison. The convicted declares his innocence. After 30 years in prison, key evidence left behind at the scene holds the clue to determining the innocence of the accused. Students will generate a genetic profile of themselves and the victim using actual forensic techniques and in the end, who knows, you may even solve a crime!

### HEALTH SCIENCES

#### (3) Health and Human Performance

Did you know that cardiovascular disease is the leading cause of death in Canada? To keep you heart smart, this workshop will demonstrate the importance of healthy blood pressure values, how to perform an ECG, and how to measure the pressure in an artery using state-of-the-art equipment. In addition to a healthy heart, strong bones are important to the prevention of osteoporosis. This session will demonstrate techniques to measure bone and discuss important factors influencing bone health. Lastly, students will be introduced to a maximum oxygen consumption test, performed by university athletes, using top of the line exercise physiology equipment. Students will be shown how fat and carbohydrates are used during different exercise intensities, how

muscle tissue is built and strengthened, and how this information can help shape the diet of an athlete.

### CHEMISTRY

#### (4) Purely H<sub>2</sub>O?

A key step in the purification of city drinking water is the addition of a coagulant to assist with the removal of suspended particles. Suspended particles (colloids) scatter light and cause water to look turbid (cloudy). Alum is a chemical coagulant which is often used for clarifying drinking water. Students will make and use alum in various water samples before filtering the water through a sand and anthracite filter. To check the effectiveness of the treatment, the turbidity of the samples will be measured.

#### (5) Flames, Fireworks and Explosions

You can choose from many spectacular experiments - The Volcano Reactions, Barking Dogs, Instant Fire, and Coloured Fireworks among them - to learn more about how fireworks are made and some common causes of explosions and fires in science labs. Demonstrators will help you set up these exciting reactions so that you can perform them safely.

#### (6) Coffee Cups, DNA, and Slime

Question: What on earth do these three things have in common? Answer: They are all part of the group of chemicals called polymers. While the molecular formulae are all different, they are all made by chemically linking together many identical small molecules. In this session, we will be making a number of polymers, including the Ghostbusters' "slime." We will look at how they are formed, and their many uses. We will also consider the solutions to problems that can be associated with the re-use and recycling of mass-produced plastics. (And, yes, you can take your slime home with you.)

### COMPUTER SCIENCE

#### (7) Robo Tech: Battle Bots

Welcome to the dangerous world of robotics! This is a world of strength, intelligence and FUN. Computer Science will introduce you to the world of robotics and computer programming in this workshop through a user friendly system made up of laptops and LEGO Mindstorm robots. Through

hands-on instruction you will learn how to program a robot to perform tasks essential to victory in a Battle Bot tournament. Do you have what it takes to be a programming champion? You'll never know until you try!

## **EARTH SCIENCES**

### **(8) Go Fish!**

Bring to life the ancient remains of fossilized fish from the Green River Formation in Wyoming! Using fossil preparation tools and techniques employed by paleontologists and curators in museums worldwide, you will have the opportunity to uncover and prepare your own specimen of a fossilized fish. Each specimen is different- so you may uncover other fossils during your preparatory work! We will discuss how these unique fossils formed and how studying the environments of the past give us a glimpse at our future! When complete take your specimen home with you (and prove it wasn't all a tall fish tale!).

## **INTERDISCIPLINARY**

### **(9) Sunprints: Where science meets art**

An interactive hands-on workshop exploring the fascinating world of primitive photographic processes. Learn to make your own sunprints (also called cyanotypes) while also discovering the science behind the art. Fusing the knowledge of light sensitive chemicals with the intentions of capturing an image on paper, took this branch of science out of the lab and into the studio.

## **PHYSICS**

### **(10) Physics is Too Cool!**

In this unit, you will learn about super-cold cryogenic substances like dry ice and liquid-nitrogen. You will investigate how well different types of materials conduct an electrical current at these low temperatures. The materials you will get to examine are metals, semiconductors, and superconductors. It's these superconductors that are expected to have important technological applications because of their many unusual properties; including their ability to levitate magnets, as you will see!

### **(11) Laser Holography**

Holograms are all around us: in credit cards for

security, in art, and soon, in computers. In this workshop, you will learn how laser light has this property called "coherence" that gives rise to the phenomenon of interference, which can be used to create 3-D images. You will make your own reflection hologram that can be viewed at anytime.

## **MATHEMATICS**

### **(12) Take a Calcoolus Tour**

Discover how fun "calcoolus" can be using the interactive games and explorations of a software program developed by one of Brock's own Mathematics professors. You will be amazed at how much mathematics you can learn without even trying!

### **(13) An Ant Takes a Walk Through the Fourth Dimension**

Join an ant as he discovers a whole new world. From one piece of paper you can discover a world of higher dimensions with only a few cuts, folds, and some tape. With these simple steps, the world of higher dimensions becomes closer than ever before!

## **OENOLOGY AND VITICULTURE**

### **(14) The Yeast Crime**

The Crime: Two weeks ago, the prestigious Chardonnay Wine, produced in Brock University's own winery and destined for a GOLD MEDAL at the Wine Olympics, was found to have a foul smell of wet band aids and a horse barn instead of the lovely melon, pineapple, grape fruit and banana aromas with a hint of vanilla. Your Mission: to determine if one of the spoilage yeasts found in the winery infected the chardonnay and spoiled it. You will use your scientific training, deductive reasoning and evaluation of evidence to determine which of three suspect yeasts is the culprit yeast that infected the wine and caused the foul odour in the wine.

## **PSYCHOLOGY**

### **(15) Rat behaviour: Befriend the laboratory animals**

We will take a brief look at animal research using rodents. We will do a rudimentary experiment such as measuring locomotor behaviour in an activity box in different situations, as well as, there will be plenty of opportunities to handle the juvenile rats

and learn about their everyday behaviour. We will also feed them a chocolate treat!

### (16) Sleep Lab Tour

Students will be introduced to the physiological recording of brain waves (EEG), eye movements and muscle-tension measures which are invaluable in mapping sleep and wakefulness and differentiating REM sleep (when most dreams occur) from other sleep stages. You will monitor each other in the sleep lab on videotape and analyze brain activity with the aid of computers. Discussions will involve theories of sleep and dreaming and will be based on questions you provide.

### (17) Measuring the Mind

Discover how to measure brain function and thought through interactive neuropsychological tests - what are your 'neurological strengths'? Experience what it's like when your brain isn't able to do what it's used to doing. Discover how you can measure your mind and what those measures can tell us about the brain and how it functions.

### Scientifically Yours Committee Members

Baoling Bork - Computer Science  
Dorothy Levay - Mathematics  
Pat Miller - Office FMS Dean  
Heather Hudson - Office of FMS Dean  
Elizabeth Illnicki-Stone - Student Development Centre  
Monica Pompetzki - Centre for the Environment  
John-Paul Goldsworthy, Co-op Programs  
Gail Higenell - Biological Sciences OEVI  
Astride Silis - Earth Sciences  
Gail Neff - Chemistry  
Thad Harroun - Physics  
Beth Natale - Recruitment and Liason  
Izabella Ludwa - Community Health Sciences  
Diane Eaton - Biological Sciences  
Melanie Pilkington - Chemistry  
Dawn Good - Psychology  
Sergio Paone - Chemistry  
Rany Audeh - Information Technology Services  
Christina Phillips - Office FMS Dean  
Jacinta Dano - Biological Sciences  
Glenda Hooper - Biological Sciences  
Amanda Etherington - Co-op Programs  
Rick Cheel - Dean, Faculty of Mathematics and Science

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