



Winter 2014

OAPT Newsletter

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The OAPT was formed to advance the teaching of physics in the secondary schools, colleges, and universities of Ontario. For more information on the OAPT, visit our website at www.oapt.ca.

The OAPT newsletter is published four times a year. Back issues and submission guidelines can be found at www.oapt.ca/newsletter/.

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Ontario Association of Physics Teachers

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Welcome Back!

Lisa Lim-Cole

The new school year has started and I welcome all of you back! I am honoured to be the new OAPT president and look forward to another great year in which we will continue to explore Physics Education. Creating a collaborative environment where physics educators are encouraged to engage in professional dialogue will be the central focus. I am hoping that as we continue forward, we will grow as an organization: continually striving to provide quality professional development. Plans are well underway for the way for the 2015 OAPT Conference to be hosted by the University of Guelph. This year's conference theme is, "Bridging the Gap: Strengthening Ties between K-12 and Postsecondary Educators".

The OAPT executive continues to encourage the membership to contribute to the OAPT newsletter. Articles that support teachers at all levels (elementary, secondary and post-secondary), celebrate teacher and student achievements, book reviews, demonstration and lesson ideas, and research papers are all welcome! Please submit them to our editor Jane Kennedy at: Jane_Kennedy@durham.edu.on.ca

The OAPT is an organization of volunteers; and we continue to provide programs through the generous contributions of all members and partners. Please consider supporting your OAPT this year!

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5th IUPAP ICWIP

An Undergrad's Experience

Jennifer Della Mora, York University

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At the 5th IUPAP International Conference on Women in Physics (ICWIP), held at Wilfrid Laurier University in Waterloo, women from around the world had the opportunity to share their passion about physics research, education and technology. Of particular importance was the focus on the role of women in physics; because, to this day, there remain obstacles which hinder a woman's success in science education and careers ñ and they need to be addressed. As an undergraduate student of physics at York University entering my final year, I am fortunate to say that I have never felt out of place in this field despite that it remains predominantly male. However, I learned much about the uphill battle that still exists for women in sciences in certain parts of the world.

"The earlier a child is exposed to science, the better their chance of developing an interest to pursue it — what is needed to encourage young girls to study science, is the first hand experience of a girl who is one step ahead and who is proud of what she is learning"

The ICWIP was a three day conference which not only developed resolutions to address gender issues and promote the participation of women in physics, but also acknowledged and celebrated scientific work by women in physics in lectures and poster sessions. A notable moment was the book signing and conversation with Dr. Ursula Franklin, a distinguished female physicist, humanitarian, author and educator. Her words on the importance of following one's dream in the face of adversity were incredibly inspiring. We were also treated to a captivating lecture by Dr. Melissa Franklin — who was involved in the discovery of both the top quark and the Higgs boson — about the importance of creating a lab environment where creativity and free thinking flow.



Another lecture which I greatly enjoyed was given by Dr. Patience Mthunzi of South Africa. Her talk discussed her research involving ‘optical tweezers’ and their application in the study of embryonic stem cells, neurodegenerative disorders, HIV and cancer. I was particularly enthralled by her lecture as, in 3rd year, I completed a laser experiment that used optical tweezers. I remember wondering to myself how this incredible concept could be useful to the betterment of our world. It seems my question was answered. Dr. Mthunzi uses optical tweezers (made of a laser beam) to separate healthy and diseased cells for further testing — picking out each individual cell without damaging it. This is an incredibly useful tool for biological research, and is derived from optics.



Of the different workshops series whose topics included gender studies, improving the workplace, professional development, and ethics in science practice, I chose to attend the meetings centered on physics education as I have an interest in becoming a physics educator myself. The workshop schedule included sessions about gender differences in the understanding of science and physics, the apparent patterns of subject choice by male and female students, using inquiry-based teaching strategies, and a variety of other physics education-related topics.



During the workshops I was introduced to a wonderful resource developed by the Faculty of Education at the University of British Columbia with assistance from the BC Association of Teachers. The resource features a collection of educational materials for math and science from K-12. The resource is free and is accessible at :

<http://scienceres-edcp-educ.sites.olt.ubc.ca/>.

The discussions generated at all the workshops were very engaging, and it was interesting to hear the varying perspectives of physics educators from different countries. Most discussions arrived at the consensus that the earlier a child is exposed to science, the better their chance of developing an interest to pursue it. Furthermore, perhaps what is needed to encourage young girls to study science is the first hand experience of a girl who is one step ahead and who is

proud of what she is learning. It was suggested that science students (and particularly females) in senior grades should visit classrooms to motivate younger students to pursue studying sciences at higher levels.

The **5th IUPAP International Conference on Women in Physics** successfully united women from diverse cultural backgrounds as well as varied branches of physics education, research and industry. It promoted the building of a strong and inclusive worldwide physics community. I was incredibly inspired by the accomplished women I met, and it was wonderful to be exposed to all the options I have with my university degree in physics. I gained a deeper understanding of the role of women in physics as well as their struggles, and I left with an even greater appreciation of the education I have received here in Ontario. I would encourage all physics teachers to attend conferences such as this, as you are a critical component in the success of young physicists!

OAPT Studio Tour

OAPT Visits *Lost Girl* and FAST Motion Studios!

Lisa Lim-Cole — OAPT President — Durham District School Board

Paul Rapovski spent a whole day leading a tour of the **Lost Girl Studios** and the **FAST Motion Studio** in Toronto with the OAPT. His enthusiasm and passion for his work was clearly demonstrated as he described the various sets, roles and STEM based careers available in the film, television and gaming industry. The entertainment industry fascinates our students. Yet, the connection between what they watch and play and how science and mathematics allows for the development and creation of these products are not often made in schools. I look forward to further discussing the potential educational programs that can result with industry and education partnerships are formed.

OTP – OAPT Summer Institute

Why not attend?

Teresa Franklin, Valour JK-12 School

I was asked in a survey to list barriers to attending the summer institute in **Innovations in Physics Teaching and Learning**. My greatest problem was the ridicule I faced from friends and family, when I told them I was going to a ‘Physics Camp’. I assured them that it would be lots of fun. And the experience lived up to my expectations — it was fun, but also an opportunity for me to pick up useful ideas for my classes, and to further develop my own thinking about the practice of teaching physics.

The three day session was led by Chris Meyer, Lisa Lim-Cole and James Ball, who delivered workshops such as *Art and Dramatic Play in Physics*, *Modeling Wave and Light Behaviour* and *Electricity by Inquiry and Simulations*. We had to act out Newton’s Laws of Motion, construct a wave machine from marshmallows and wooden skewers and became part of a wave ourselves to demonstrate refraction. Other tasks involved making a circuit with a light bulb, a dry cell and only one piece of wire and spinning a glass of water on a board vertically and horizontally. The workshops also modelled the use of cooperative groups which provided opportunities for everyone to wrestle with the assigned tasks and to share our understanding of the problem.

“The experience lived up to my expectations — it was fun, but also an opportunity for me to pick up useful ideas for my classes, and to further develop my own thinking about the practice of teaching physics.”

Another interesting workshop was on making better use of teacher-led demonstrations by having students make predictions and offer explanations before and after the demo, again using a cooperative group structure. This technique was also used with analyzing the physics principles in video clips such as Road Runner cartoons and high diving feats.

There was also time to look at some of the Perimeter Institute resources, including a sneak peak of a new package on analyzing atomic spectra adapted for Grade 9 astronomy.

As the only physics teacher in my small high school, I also appreciated the opportunity to engage in discussions with other teachers about some of the challenges we all face in helping our students learn.

I Went to Summer Camp (And had lots of Physic Phun!)

Stephanie Barich, Pickering High School, Ajax

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This July I had the opportunity to travel to beautiful northern Ontario and go to Physics Camp in Sudbury. What is Physics camp? Well it was an intense 3 day adventure in the halls of Cambrian College watching, wondering and trying a variety of Physics activities. The workshops were presented by some of the most dedicated Physics teachers I have met – James Ball, Chris Meyer and Lisa Lim-Cole. Our physics camp included physics teachers from all over the province who, like myself, wanted to have some Physics ‘phun’. Each presentation had their own activities that the teachers tried and discussed. One of the benefits of teaching physics is that the learning is hands-on, in other words we get to play and tinker with all kinds of equipment. Many times this equipment can include everyday items such as elastics and washers to show the nature of our expanding universe, or metre sticks and stop watches to mimic the Doppler Effect. Not all the workshops were your ‘traditional’ science activities. We watched videos to examine the kinematics of dives and used drama in the form of tableaux to demonstrate concepts. I even learned how to make origami boxes and butterflies. How is origami related to Physics? Well you might be surprised that modern origami has many applications in today technologies such as antenna design for satellites.

“One of the greatest things about teaching Physics is that you can apply the concepts and theories to everything around us – everyday activities, students’ interests, and recent events in the media.”

Since returning to school in September I have made it my mandate to try at least two new activities in each unit with my Grade 12 University Physics class. So far I have found the change exciting and inspiring. It is funny to watch my students’ progress through the activities that I myself tried this summer as a Physics enthusiast. I have observed my students to be engaged and asking those though provoking questions that come from the deep corners of the brain. One of the greatest things about teaching Physics is that you can apply the concepts and theories to everything around us – everyday activities, students’ interests, and recent events in the media. I was able to use Chris Meyer’s Flux Capacitor activity as an icebreaker with all my classes. The activity fostered a positive attitude towards learning while strengthening the necessary skills to for effective collaboration.

After teaching for many years and turning the old age of 40 this year, I was pleasantly surprised that I could still enjoy the rigours of summer camp. Just as child in summer camp I met new people, tried new things and came home with a fresh perspective – only my experiences greatly enhanced my practice as a Physics educator. And I didn’t even include the fact I went down into a mine to visit SNOLAB! But, that is another story.



OAPT in Partnership with the
University of Guelph – Physics Department

UNIVERSITY
of GUELPH

CHANGING LIVES
IMPROVING LIFE

The 37th Annual Conference

Bridging the Gap: Strengthening Ties Between K-12 and Postsecondary Educators

May 7-9, 2015

- OAPT Public Talk by **Jay Ingram**, Canadian author and broadcaster
- Ralf Gellert, lead scientist for APXS on Martian rovers provides an update on the **Curiosity Mission**
- Introduction to **PHYTOSPHERIX!** A new polysaccharide nanoparticle with countless applications by John Dutcher, Canada Research Chair and co-founder of Mirexus Biotechnologies.
- **Panel discussions** led by representatives from K-12 and post-secondary educators discussing common goals and challenges.
- The **Great Orbax**, from the Monsters of Schlock presents demonstrations to liven up any classroom/lecture!
- **Hands-on workshops** presented by outstanding teachers! Take home resources ready for classroom use!
- **Exhibit area** with scientific suppliers and teacher resources!

Join us! Let's Engage in Discussion!

Registration information will be available at: www.oapt.ca



Jay Ingram – May 7 talk
Canadian author and
broadcaster sponsored by



Contact Conference Chair
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