

## CAP AWARD + PHYSICS TEACHERS = ∞ POSSIBILITIES

### Opinion piece for CAP Newsletter

*Lisa Cole*

I was honoured to be the recipient of the 2017 CAP Excellence in High School Physics Teaching Award and be recognized by my peers, former students, parents and the Canadian Association of Physicists for my work in Physics Education in Ontario. I was also thrilled to be selected to attend the Teacher Workshop at CERN in July 2017 as a result of the award! Thank you CAP and Perimeter Institute!

I have spent the past 18 years committed to developing and providing active learning experiences for students, teachers and the public through a variety of roles – classroom teacher, Science Department Head, Science & Technology & STEM Program Facilitator at the Durham District School Board, President of the Ontario Association of Physics Teachers ([www.oapt.ca](http://www.oapt.ca)) and Eastern Ontario Teacher Network Coordinator for Perimeter Institute Outreach ([www.perimeterinstitute.ca](http://www.perimeterinstitute.ca)). My passion and dedication to physics education is a result of the inspiring educators I have had the privilege to meet and collaborate with and the students who continue to ask questions and push my own thinking about my role as an educator today. I feel it is important to foster curiosity and provide opportunities for all students by creating inclusive learning environments that support achievement. Educators play a critical role – we help students realize their potential and imagine possibilities for their future! We support students as they discover who they want to become! As a first generation immigrant, I have faced my share of obstacles in my personal life and in my own educational journey. However, I have been very fortunate to have encountered amazing educators who inspired, guided and supported me to become the physics and STEM educator I am today. Educators have the power to impact people's lives!

Over the past 18 years, I have learned to work with secondary students and build a physics program that fosters curiosity that engages students to learn and view the world through a physics and mathematics lens. The language of science and mathematics allows humanity to be innovative problem solvers, designers, creators, and explorers. My students may

claim that I “taught” them a lot about physics, but truly, they have taught me about what it means to be an educator that mentors, advocates, facilitates and learns alongside my students. I have also developed a great appreciation for my colleagues and the opportunities to network with professionals. My active participation within the Ontario Association of Physics Teachers community and the Physics Teacher Network with the Perimeter Institute for Theoretical Physics stretches my own thinking around physics education. I think about the importance of scientific literacy and numeracy in today's dynamic global society.

During my time as the Program Facilitator for Science and Technology (K-12) for the Durham District School Board, I was able to collaborate with exemplary educators to co-create a system STEM (Science, Technology, Engineering and Mathematics) Plan and provide supports as elementary and secondary schools implemented strategies and programs. I have dedicated my professional career to working alongside educators to create and inspire our educators to support student achievement in science. Physics continues to struggle with societal stereotypes and although K-12 Science Curriculum in Ontario is rich in physics concepts, these stereotypes continue to create anxiety amongst our students and educators. My work with educators focuses on breaking down barriers in physics education. I am always thinking about how I engage with audiences to break down these stereotypes and consider different perspectives in physics education to provide diverse opportunities for all people. I believe that by supporting educators, we will be able to reach more students.

One of the most memorable moments of my career will be the trip to CERN in July 2017. During this trip I was able to network with physics educators from around the world and CERN scientists and engineers. As a result of this



Images they plan on including:  
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opportunity, we collaborated in co-creating and co-delivering the Cultural Collisions by Origin-Canada program inspired by art@CMS-CERN. The program was a unique collaboration between international scientific research institutions (Origin), the System Planning, Research and Innovation Division at the Ontario Ministry of Education and the Ontario Science Centre. #Cultural\_Collisions @OriginPhysics. It is quite amazing that one conversation with Dr. Michael Hoch art@CMS-CERN, resulted in a project that connected high school art, science and physics students with professional artists, musicians and physicists from across Canada and around the world!

I encourage the physics community to network and collaborate with educators! It is critical that we start to support our youth by working together to create moments that engages our students learn and create opportunities for them to wonder, question, explore and discover the fascinating mysteries that still puzzle physicists today! It truly is an exciting time in science with a wealth of opportunity! Let's inspire students together! We are truly better together! Let's Connect!

I am currently on secondment to the Ministry of Education as an Education Officer on the Innovation Design & Implementation (IDI) Team.

## TAKE ACTION FOR GENDER-BALANCED AND DIVERSE SCIENTIFIC MEETINGS

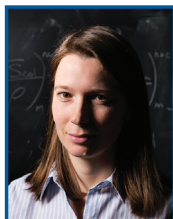
We are writing to suggest action to enhance “equity, diversity, and inclusion” [1] in physics, particularly representation of women, as well as other under-represented groups (“visible minorities, Indigenous peoples, people with diverse gender identities and people with disabilities” [1]), as invited and keynote speakers at conferences.

At a recent international conference we attended involving 200 participants from around the world, there were 5 keynote and 12 invited speakers. None of the keynote speakers were women, and only 1 of the 12 invited speakers was a woman. At the same time, the conference featured excellent proffered (not invited or keynote) presentations by women at all career stages, as well as men. The lack of women on the keynote and invited speakers list was striking and discouraging, as was the fact that there were few women on the conference organizing

committee. This is certainly not the first conference in recent years to exhibit such disparities in representation amongst invited and keynote speakers.

There are plenty of reasons to take action to ensure scientific meetings are both gender-balanced and diverse. In parallel with the three broad “Merit Indicators” considered in NSERC’s Discovery Grant evaluation, consider the following three reasons for seeking gender balance and diversity at meetings.

- i) *To enrich development of highly qualified personnel (HQP):* Making connections is at the heart of scientific meetings, and interactions between trainees and younger investigators may come more easily when there are senior/established researchers that the trainees or younger investigators can relate to. Gender balance and diversity are important for establishing good interactions and connections between generations of researchers. It also provides role models for young women physicists and others from under-represented groups, thereby encouraging them to stay in the field.
- ii) *To enhance researcher career progression:* Not including or under-representing women and individuals from other under-represented groups as keynote and invited speakers hinders the careers of these scientists. In the highly competitive environment for grants and jobs, an invited or keynote speaker entry on a CV is an indication of respect amongst peers and recognition of research excellence and innovation. If one or more groups within the population is under-represented, then the corresponding/associated scientists are also at a disadvantage when it comes to applications for jobs, grants, research chairs, promotions, and so on. If there are unconscious or implicit biases in play resulting in groups not being invited, then these are (hidden) barriers.



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