

2025 Canadian Association of Physicists (CAP) Congress High School Teacher Workshop

Monday, June 9, 2025, 8:30 am – 5:30 pm
University of Saskatchewan
Arts Building, Rm 263, 9 Campus Dr., Saskatoon.

The [CAP High School Teachers Workshop](#) will be held on Monday, June 9, 2025, at the University of Saskatchewan as part of the CAP's 2025 Congress. This exciting and informative workshop will offer high school teachers an opportunity to meet colleagues from across Canada, as well as access to innovative learning techniques and educational resources. The day will feature world experts in physics through workshop activities and speakers, including tours of the Canadian Light Source, USask Observatory, and Physics and Engineering Physics Labs.

[Registration details](#) (registration to open mid-April, early-bird until May 28, 2025):

\$25 CAP Members

You can access the registration system at <https://crm.cap.ca>. After you log in, please go to “Your Events” and then go to “Register for the 2025 CAP Congress”

\$50 non-members, includes a High School Teacher membership in the CAP to Dec. 31, 2025.

To see more information about the High School Teacher membership, please follow <https://cap.ca/membership/hsc-membership/>. The 2025 CAP High School Teacher Membership Fee is \$30.

On the registration form, please make sure to select at least Monday for the “Attending on (Days)” option. Please note that teachers who pre-register can choose to attend only the High School Teachers Workshop Day (Monday) or select to attend other individual or all days of the CAP Congress at *no extra fee*.

Teachers are invited join the Congress Welcome BBQ, and free Herzberg Public Lecture.

Time	Session	
8:30 - 9:00	Registration	
8:45 - 9:00	Welcome – Arts 263	
9:00 - 9:45	Tracy Walker – Canadian Light Source Using Big Science Research to Deliver Education Outcomes Arts 263	9:00 – 9:45* <i>Plenary Parallel Session: Kathryn Daniel University of Arizona</i> “Two-Eyed Seeing”: Dynamical evolution across galactic scales and the future of big science
9:45 - 10:00	Break	
10:00 - 10:40	Patrick Kossmann – Perimeter Institute for Theoretical Physics Tools for Teaching Science Arts 263	Institute for Quantum Computing The Quantum Explorations Student Toolbox (QuEST) Arts 213
10:45 - 11:25	Blaire Flynn and Juliette DeLoye – SNOLAB Bringing SNOLAB science into your classroom Arts 263	
11:30 - 12:15	Joe Muise – St. Thomas More Collegiate Fantastic Physics Pro-D Arts 263	
12:00 - 13:00	Lunch provided by SNOLAB	
13:00 - 14:00	Panel: Supporting student success in physics Arts 263	
14:00 - 15:45	Physics Teaching and Learning Topic Tables Arts 263	
15:45 - 16:15	Break	
16:00 - 17:30	Tours (sign up here or at workshop)	
17:00 - 18:30	CAP Congress Welcome BBQ, tickets free with support from City of Saskatoon	
18:30	Transport to Western Development Museum (free)	
19:15	<i>Herzberg Memorial Public Lecture</i> Shohini Ghose – Wilfrid Laurier University Quantum 2.0	

Workshop Sessions

Tracy Walker – Canadian Light Source

Using Big Science Research to Deliver Education Outcomes

On the north end of the University of Saskatchewan Campus sits Canada's only synchrotron research facility, the Canadian Light Source (CLS). Since the grand opening in 2005 more than 5,700 scientists from 200 Canadian institutions and 45 countries have published close to 8,000 publications with 1,100 international collaborations using data collected at our facility. That's a lot of people engaged in discovering a lot of new scientific knowledge – and a fabulous resource and centre of learning for more than 1,000 educators and 2,800 students that the education team has worked with. STEM education and science literacy challenges require thoughtful and innovative approaches that help learners connect with real-world research while fostering curiosity, inclusion, and respect for diverse perspectives. The CLS Education Team contributes to these efforts by supporting educators, and sometimes their students, in engaging with research through inquiry-based learning and hands-on experiences where possible. A key focus of these efforts is weaving perspectives of First Nation, Métis, and Inuit peoples into science education, recognizing the importance of respect for Traditional Knowledge and cultural expressions in broadening participation of Indigenous peoples in STEM. This presentation will outline how you can engage with the CLS to provide context for the various curricular content, outcomes, and concepts in your courses.

Plenary Parallel Session: Kathyne Daniel – University of Arizona (regular conference program)

“Two-Eyed Seeing”: Dynamical evolution across galactic scales and the future of big science

“Two-eyed seeing” was coined by Albert Marshall, a Mi'kmaq elder, to describe the depth of perspective gained when perceiving the world through both an Indigenous and Western lens. Using this framework, I will describe my approach to science, which focuses on emergent behavior in disk galaxies as a driver of evolution. Dynamical resonances are essential to the evolution of disk galaxies. These resonances arise in the presence of massive structures, like a bar, spiral arms and satellites, and they reshape a galaxy as they diffuse, shepherd and rearrange orbits and stellar populations. This talk will highlight a collection of methods that together enable us to connect orbital dynamics to morphological evolution. The end of this talk will touch on the status of the next generation gravitational wave observatory in the US, Cosmic Explorer. In particular, how our approach to site selection embodies two-eyed seeing and why our approach is critically important to the future of big science.

Patrick Kossmann – Perimeter Institute for Theoretical Physics

Tools for Teaching Science

Tools for Teaching Science is a reference resource from the Perimeter Institute for Theoretical Physics for science teachers striving to improve student learning. It is suitable for teachers at any point in their career and for teachers in different science disciplines. The resource showcases a variety of tools you can use in your classroom that will help you plan not only the content for a lesson but also the learning students will be doing along the way. 48 tools are explored in the resource with strengths, alerts, and tips for differentiation. A selection of these tools will be explored during the workshop time

Fiona Thompson and Taylor Pacholko – Institute for Quantum Computing

The Quantum Explorations Student Toolbox (QuEST)

The Quantum Explorations Student Toolbox (QuEST) contains a series of hands-on activities tailored to introduce K-12 students to quantum mechanics. Designed to be affordable, open-source, and easy to replicate, these activities cover the historic development of quantum mechanics and deepen understanding of fundamental principles, while showcasing modern and future technologies.

This highly interactive workshop will guide teachers through some of the activities that are part of QuEST. By rotating through stations relevant to different high school grade levels, teachers will discover ways to celebrate the International Year of Quantum Science and Technology in their classes.

Blaire Flynn and Juliette DeLoye– SNOLAB

Description: Dive deep into the science **Bringing SNOLAB science into your classroom** taking place 2km underground at SNOLAB; Canada's underground science laboratory specializing in astroparticle physics. In this session educators will get an update on science underway at the facility and learn about opportunities to bring that research into classrooms through virtual class visits.

Joe Muise – St. Thomas More Collegiate, winner of the 2020 CAP Award for Excellence in Teaching High School Physics.

Fantastic Physics Pro-D

Physics teachers are fortunate to have access to some of the best professional development opportunities. Major research labs around the world have great outreach programs and embrace inspiring teachers, to help them inspire their students. This has been important in my development as a teacher, and for helping me build a network of like-minded educators.

Panel: Supporting student success in physics

Current affairs and success stories in teaching and learning Physics. The panel will include students and educators in Physics and Engineering Physics at the University of Saskatchewan.

Sean Maw Dr. Sean Maw graduated from the University of Waterloo in Systems Design Engineering (a B.A.Sc. and M.A.Sc.) and then completed his PhD in Neuroscience at the University of Alberta, before joining the Olympic Oval in Calgary to work as a Sports Engineer/Scientist. He then worked in MRU's Math Physics and Engineering Department for several years before coming to Saskatoon as the Huff Chair in Innovative Teaching, in the College of Engineering. During the last 11 years, Dr. Maw has initiated key elements of the College's Engineering Entrepreneurship program, and has co-led the development of the College's RE-ENGINEERED First Year program which he now leads. This program features Competency Based Assessment (CBA), amongst other novel elements. One of his most recent and relevant projects has been to assess math skills of incoming students to Engineering, and correlate those findings with high school admissions data and First Year performance. Besides sports engineering, and especially the physics of curling, Dr. Maw is active in the investigation of career trajectories for engineers and of Indigenous design and technology.

Mark Wurtz I was born in Melfort, SK, and graduated from high school there in 2002. I graduated with a Bachelor of Science in Engineering in the discipline of engineering physics at the University of Saskatchewan in 2007, a Master of Science in theoretical particle physics at the University of Saskatchewan in 2009, and a Doctor of Philosophy in theoretical particle physics at York University in Toronto in 2015. I worked for two years as a derivatives analyst in the financial services industry in Toronto, where I developed computer code to calculate the value of complex financial derivatives. For the last seven years to now, I have worked at the University of Saskatchewan in the Department of Physics and Engineering Physics where I teach classes and labs, oversee all the classroom physics demonstrations, schedule classes, supervise machine shop and electronics shop staff, and perform various other duties. I enjoy playing electric guitar and include some physics of music in my teaching.

Dan Krause earned a B.Sc. (mathematics), B.Ed. (secondary math/physics), and M.Ed. (Educational technology) at the University of Saskatchewan, and worked as a secondary mathematics and science teacher (mostly Physics and Chemistry) for nearly a decade in Saskatchewan, before shifting to online curriculum development and instructional design for several years at Saskatchewan Polytechnic. His teaching experience spans teaching in the classroom, in asynchronous online courses, and through live digital broadcasts, as well as serving on the secondary science implementation support team in the province and holding several divisional leadership roles dedicated to science and math education. He now teaches at the post-secondary level as a full-time lecturer in the College of Education for pre-service

mathematics and science teachers as he pursues his PhD at the University of Saskatchewan. He works with pre-service teachers who aspire to work in both elementary and secondary science classrooms across the province. Outside of the professional sphere, he lives in Saskatoon with his wife and son, and enjoys building computers, spending time in the community, and hoping that the Riders and Oilers win their respective leagues.

Eilidh (Ay-lee) Hlady is an undergraduate student entering her fourth year of Engineering Physics at the University of Saskatchewan. Born and raised in Saskatoon, she took every available math and science course in high school and credits her love of physics to the teachers who made it exciting and accessible. Since starting university in 2022, Eilidh has tried her best to stay busy. She's tutored math and physics, volunteered for the student body, and traveled to Norway for a week-long rocketry course. As a summer student, she's contributed to research on atmospheric composition with the Institute of Space and Atmospheric Studies (ISAS). Outside of academics, Eilidh is passionate about making STEM accessible and welcoming for young people. She teaches a weekly girls' coding club and volunteers with a local Girl Guides unit during the school year, helping kids find confidence and community within science. Her strong academic foundation has helped her navigate the transition from high school to university-level classes, and she's interested in how to spark excitement for physics in other.

Physics Teaching and Learning Topic Tables

A unique activity with several topic stations (tables) chosen in advance by survey. Participants will be welcome to choose tables with the most popular themes and may move to different tables during the activity. The participant driven discussion will be collected by notetakers who will record themes and trends in the discussion before presenting summaries to the larger group. The Topic Tables offer a novel and engaging way to share, connect and inspire teaching in Physics.

Tours

Sign up [here](#) or at the workshop

- Canadian Light Source
- Physics and Engineering Physics Department Tour
- University of Saskatchewan Observatory

Herzberg Memorial Public Lecture

This event is free to the public, presented at the Western Development Museum (transportation provided).

Shohini Ghose - Wilfrid Laurier University

Preparing for Quantum 2.0

From lasers to electronics and atomic clocks, quantum science has already transformed our lives. Now, emerging technologies such as quantum computers, sensors and quantum communications, offer the promise of a second quantum revolution. What makes quantum information processing so powerful? How does one cut through the hype to honestly assess its potential? Are you ready to participate in Quantum 2.0? Find out more in this talk.

About our Partners and Sponsors.

This workshop is presented in partnership with the Canadian Association of Physicists (www.cap.ca) and the University of Saskatchewan Physics and Engineering Physics Department (artsandscience.usask.ca/physics).

Support for the workshop is generously provided by SNOLAB (www.snolab.ca/) and the City of Saskatoon Hospitality Fund (www.saskatoon.ca/).