

Fall 2022

INTERACTIONS

The Department of Physics Newsletter



McLennan Physical Labs (credit: University of Toronto) MESSAGE FROM THE CHAIR

Welcome to the Fall 2022 issue of Interactions, the Department of Physics newsletter!



Dear Physics community,

Another academic year is well underway, with our courses back in classrooms and labs and an increasing number of meetings and events running in person or in a hybrid format. After two years of virtual events, we were pleased to resume in-person celebrations with our June and September Department parties, while also enabling people to join online. As always, lots has been happening in the Department, as you'll see in this issue of the Newsletter.

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In July, we were pleased to welcome the first new faculty member resulting from our 2022 searches when <u>Brian Wilson</u> joined us as Assistant Professor Teaching Stream. Brian is well known to many of us, as he has previously been a sessional lecturer and part-time faculty member in the Department, as well as TA Coordinator in recent years. In other <u>announcements</u>, Matt Russo took up a part-time term appointment as an Assistant Professor Teaching Stream, taking over the role of TA Coordinator. July 1st also marked the promotion of Nicolas Grisouard and Debra Wunch to Associate Professor, Qinya Liu to Professor and Jason Harlow to Professor Teaching Stream (the latter two announced in the Spring Newsletter), and Christopher Lee to a continuing part-time appointment as Assistant Professor. We will welcome several new faculty members next year, including Xiang Li as Assistant Professor Tenure Stream in the Physics and Chemistry of Quantum Materials and Sergio de la Barrera as Assistant Professor Tenure Stream in Experimental Quantum Condensed Matter; they will be profiled in a future Newsletter. Our announcements also celebrate Steve Butterworth, Manager of Physics Computing Services for his 20 years in the Department.

This issue of the Newsletter introduces Post-Doctoral Fellow in quantum condensed matter <u>Finn Lasse-Buessen</u>, quantum optics PhD Student <u>Daniela Angulo Murcillo</u>, and Biological Physics Specialist <u>Belinda Kusuma</u>. Our Emeriti Profile features <u>Fraser Code</u>, who retired in 2003 after many years of teaching and research at both UTM and UTSG. Our Alumni Profile features <u>Sarah Torrie</u>, who is a high school physics teacher at Victoria Park Collegiate Institute and the winner of the <u>2022 Prime Minister's Award for Teaching Excellence in STEM</u> "for her uniquely creative approach to science education, and for her innovative strategies to help students develop their skills and interest in science".

A recent paper on superconductivity and magnetic order in strontium ruthenate materials by Hae-Young Kee and graduate students Austin W. Lindquist and Jonathan Clepkens is featured in this issue's <u>Research Spotlight</u>. More stories about research and other happenings can be found at <u>Physics News</u>.

Congratulations to our eight June 2022 PhD graduates, and a warm welcome to our incoming cohort of 60 new MSc and PhD students – a record intake due to a larger-than-usual number of offers being accepted this year.

Physics students, staff, and faculty continue to be recognized with a variety of <u>awards</u>. At our June end-of-year party, Samuel Li was awarded the Loudon-Hines Gold Medal, and the four recipients of the Van Kranendonk TA Awards were announced: Nicholas Anto-Sztrikas, Daniel Schultz, Sreekar Voleti, and Suzanne Wong. The 2022 Administrative Staff Awards went to Beata Kuszewska and Christopher McGugan, while the Technical Staff Award went to Larry Avramidis and a Special Staff Excellence Award was given to Peter Hurley. Also at the party, the Physics Student Union announced the second cohort of recipients of their Teaching Awards to recognize exceptional pedagogy in undergraduate courses: Paul Kushner for PHY151F and Michael Luke for PHY354S. U of T continued to do well in the Canadian Association of Physicists Lloyd G. Elliott University Prize Exam, with Samuel Li, Amirali Atrli, and Tony An taking three of the top ten spots for 2022.

We were delighted when the Dean announced the Faculty of Arts and Science awards in the spring, with April Seeley receiving the Distinguished Long Service Award and Jason Harlow receiving an Outstanding Teaching Award. Other recent awards to faculty include Juna Kollmeier being named the 2022 Jacques Solvay International Chair in Physics and Yong Baek Kim and Ue-Li Pen becoming Fellows of the Royal Society of Canada. Congratulations to all!

Our <u>Physics Career Accelerator Program (physCAP)</u> ran again this year, with almost 50 mentor/mentee pairs in the Physics Mentorship Program. A new group of grade 10 students joined Pursue STEM, while the grade 11 students were able to meet in person during a June field trip to the Old Mill, Crawford Lake and Borer's Falls. It has also been a very busy year for <u>Outreach in Action</u>, including virtual school visits, Girls SySTEM, Science Rendezvous, Doors Open, and the Science Unlimited Summer Camp. I would like to thank 2021-22 Outreach Committee Chair David Bailey, Special Projects Coordinator Sheela Manek, and everyone who volunteered for physCAP and outreach activities – we couldn't do these without you!



Newton's Bust in McLennan Physical Labs on Halloween (credit: Daisy Yuan)

The start of the academic year is an appropriate time to emphasize the roles that we all have in creating and maintaining a positive and inclusive environment that welcomes and supports everyone in the Physics Department, including those who are traditionally underrepresented in physics. We are a community of scholars in which everyone has something to contribute. I would like to thank our <u>Inclusivity</u>, <u>Diversity</u>, <u>Equity and Accessibility (IDEA) Committee</u> and <u>Physibility</u>, a student-run equity group, for their efforts in this area. One initiative over the past year was the development of the IDEA Statement <u>"Physics as an Inclusive Community"</u>. Following consultations that included a survey, town halls, and voting, this statement was endorsed by faculty, staff, and students, and copies are now posted on the Physics website and around the building.

In other news, our multi-year UTQAP self-study finally wrapped up in the spring, with the administrative response to the external reviewers' report. Following this review, we are now starting to develop an Academic Plan that will guide the Department for the next five years.

To conclude, we are happy to hear from you and to receive your feedback on Interactions – please contact our Editor, Sheela Manek, at <u>newsletter@physics.utoronto.ca</u> with your comments and news.

Kimberly Strong Professor & Chair



McLennan Physical Labs Walkway (credit: Daisy Yuan)

Faculty Profile Brian Wilson

Assistant Professor, Teaching Stream in Undergraduate Physics Education



Congratulations on your new position Professor Wilson!

Your PhD in Astrophysics is from U of T, why did you choose this field for your doctoral studies?

When I was around 10 or 12, my father got interested in reading about physics and mathematics. He bought books like A Brief History of Time and The Emperor's New Mind. I started reading them too, and while I didn't understand them, I decided some day I would. So I knew from a young age that I was going to do a PhD. The choice between math and physics, physics, or astrophysics was made after my first year of undergraduate studies. I didn't like the way my

calculus and algebra courses were taught, and my very first lab was embarrassing (I got a value of 13 +/- 3 m/s^2 for g), but the physics classes and tutorials were great. Astrophysics had fewer labs than physics, so that was my choice. From there, the cosmology material was what most interested me, hence I wound up studying General Relativity.

You have been a sessional lecturer and part-time faculty member in the Department for a number of years now. What do you love most about teaching?

Like many teachers, I love witnessing the "Ah-ha!" moment when a student finally understands a difficult concept. It's hard to witness this in large courses, but the buzz of conversations in a room full of excited and engaged students is the next best thing because I know that good learning is happening. I especially love watching students who didn't think they would succeed prove to themselves that they can figure things out.

What are your favorite subjects to teach and why?

Thermal physics and lab courses. Thermal physics is so broadly applicable to the world, and it has so many connections with astrophysics that it's the closest I'll come in the physics department to teaching an astrophysics course. Also, I always enjoyed statistics more than the other branches of mathematics. The lab courses may seem odd given my experience, but it turns out it's not physics experiments that I disliked in first year, it was the lack of clarity in what I was supposed to be learning in the labs. I am keenly interested in making sure that future students do not get turned off from experimental physics the way I was.

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What are you looking forward to the most about your new position?

The extra stability from my new position will let me invest more energy into various projects I've been interested in. For example, it lets me get involved in the second- and third-year lab courses, hopefully for several years. Those courses need some modernization, which I expect will take years to complete. I've recently begun to give more thought to providing better support to teaching assistants. This will be easier to implement as a full-time faculty.

What do you like to do in your spare time?

Right now I enjoy playing with my young children, which is my only hobby that hasn't been negatively impacted by the pandemic. When social gathering is allowed, I enjoy playing ultimate frisbee and volleyball. But my favourite hobby is playing board games. I used to spend a fair bit of time at Snakes & Lattes on Bloor Street. As a PhD student, my supervisor told me to spend less time in the chess club, which was a wise decision.



McLennan Physical Labs Walkway (credit: Darya Zanjanpour)



McLennan Physical Labs Walkway (credit: Dixshant Shree Shreemal)

Post Doctoral Fellow Profile Finn Lasse-Buessen



Dr. Finn Lasse Buessen joined the University of Toronto as a postdoctoral fellow in 2019 as part of the quantum condensed matter group. He was recently awarded a fellowship in the Mitacs Elevate program and is now collaborating with Professor Dvira Segal and the Torontobased quantum technology startup "Entangled Networks" to research scalable quantum algorithms and their implementation on distributed quantum computers.

Dr. Lasse-Buessen obtained his PhD in theoretical physics at the University of Cologne, Germany, where he was part of a group that had a strong focus on computational condensed matter physics. He spent many years developing and refining numerical techniques for the simulation of quantum magnetism. His work was motivated by the goal to help better understand the formation of quantum spin liquids – peculiar phases of matter that can emerge when conventional magnetic long-range order at low temperature is strongly suppressed. When magnetic order makes way for a quantum spin liquid, new types of quasi-particles can arise from collective degrees of freedom that are mediated by massive long-range entanglement. Such quasi-particles can have entirely different physical properties than the original constituents; they promise an avenue of fascinating research!

Having invested an extensive amount of time in the development of state-of-the-art scientific simulation software, it is important to Finn to ensure that the software can benefit a greater number of researchers in the community. He therefore has become passionate about making scientific software available as open-source code. His most noteworthy achievement in this respect is the publication of the "SpinParser" software. The software enables researchers to simulate quantum magnetism in a "plug-and-play" fashion, abstracting away most technicalities of the actual code implementation while still being optimized for running on some of the world's largest supercomputers. You can find the "SpinParser" project and some of his other work on his <u>GitHub</u> profile.

Recently, Finn also became interested in exploring the possibilities of quantum computing. His current research is focused on the question of how we can exploit near-term quantum computing hardware to simulate the dynamics of quantum many-body systems. Finn is excited to work towards a future in which we can routinely harness the computational power of quantum devices to accelerate our understanding of fundamental science!

Outside of academia, Finn enjoys the water – whether it is by swimming, rowing, canoeing, or kayaking. You may also find him biking, doing yoga, or simply preparing a delicious meal – Finn likes to explore new dishes! Since arriving in Canada, he makes sure to set aside some of his spare time to travel and explore the beautiful nature that the country has to offer. He still has a long list of places that he would like to visit in Canada!

Graduate Student Profile Daniela Murcillo-Angulo

PhD Candidate Experimental Quantum Optics



Daniela has always been drawn to math and science. As a child, she would spend a lot of time in her dad's grocery store talking to the customers, and she remembers an engineering professor that visited the store often and taught her how to play chess and gave her math riddles. This curiosity for math and science got stronger during high school and led her to choose mechanical engineering as her major (at first) at a university in her native Colombia. However, during her second year of engineering she realized that

she was interested in more foundational subjects and, against her parent's wishes, she switched majors without telling them and started physics. Optics became her favourite subject during undergraduate studies and she became fascinated with light and wave mechanics. She then saw how intertwined light is with quantum mechanics and joined a research group in quantum information.

Following her passion for quantum optics, Daniela applied for a summer internship at the Institute of Quantum Computing (IQC) in Waterloo. She was accepted and came to Canada in 2016 to work in a lab studying quantum dots. Before that, she had followed Professor Steinberg's work closely. She was amazed by the unusual questions that would interest his group: from making a photon act like eight photons to measuring Bohmian trajectories. Being so close to Toronto was the perfect opportunity to visit Professor Steinberg's lab and see where all the magic happened.

In 2017, she came to U of T to study light-matter interaction using cold atoms and lasers under the supervision of Professor Steinberg. Her experiment uses cold atoms to mediate interactions between photons and harness those interactions to study problems such as measuring the amount of time that a photon spends as an atomic excitation if it is transmitted through a cloud of atoms.

What she likes the most about the Steinberg group is that they are free to ask questions that don't necessarily show an immediate practical application, which has become less common in modern research since things are moving towards technological advancement. Her research addresses a fundamental question about the interaction of light with matter that seemed very basic at first but turned out to be very challenging from both an experimental and theoretical perspective. Their theoretical work even predicts, counterintuitively, that a photon can spend a negative amount of time 'inside of' an atom.

Daniela is very passionate about life. When she is not working in the lab, she enjoys going on long bike rides, running, or playing the guitar and singing. She also enjoys discussing politics and reading novels that dig into the human condition, such as those of Dostoevsky.

Undergraduate Student Profile

Belinda Kusuma

Program: Specialist in Biological Physics, Minor in Math Year of Study: 4



Why did you decide to major in Physics? What was your inspiration?

I've always known that I wanted to do science one day, and that didn't changed when I started looking for a university. Physics in particular draws me because everything in this universe obeys the laws of physics, and I want to know it all. I specifically went into biological physics because I also enjoy doing biology, and this program is a wonderful combination of the two.

What do you enjoy most about the physics program?

I like that the physics program encourages students to take all the foundational courses in all branches of physics, which allows a strong foundational knowledge that can then be applied in many things. I also like that the program gives its students so much freedom to choose whichever courses they want to take for the later part of their degree, allowing us to tailor our own degree.

What other extra-curricular activities are you involved in during your degree?

I am part of a student dance group called Yun Dance Crew, which practices and performs Chinese dance. I am also quite active in the Newman Catholic Centre here at the University of Toronto.

What are your research interests?

Currently I am working in Dr. John Rubinstein's cryo-EM lab, which uses electrons to look at super small things to very high resolutions, such as proteins. I'm working on increasing the efficiency of streptavidin crystals formation in order to create a support for the protein sample, allowing for fewer proteins to be used to gain the same resolution.

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What is your favorite course and why?

I love PHY354, Advanced Classical Mechanics. I've always enjoyed classical mechanics, because you do not have much more than intuition about what happens, but there are still so many surprises and fun things that happen in the more complicated set ups. Furthermore, Prof. Michael Luke was a wonderful teacher and lecturer who manages to make even moments of inertia interesting.

What are your future plans?

I hope that I'll still be working in science! I am planning to go to grad school, and I am looking for alternative careers in science, such as science communication or science outreach.

Where do you see yourself in 10 years?

I hope I've finished my PhD by then, but other than that, I still don't quite know. We'll see where I go!

Tell me something interesting about yourself.

I knit! And crochet, sew, embroider and basically do a lot of hand crafting. It uses a different part of my brain than I would have used to do physics, and sometimes, after a knitting session, I realized that the solution to a problem set question is just there.



McLennan Physical Labs South Patio (credit: Daisy Yuan)

Emeriti Profile

Welcome to the Emeriti Profile where we ask one of our emeritus faculty questions about their careers and what they have being doing since retirement. Is there a faculty member that you recall from being a student and are you wondering what they are up to? Do you have fond memories of a certain instructor? Tell us who they are and we will try and connect with them for an update.

Fraser Code



How many years you were a faculty member?

I was a professor for 32 years, from July 1971 to July 2003.

Can you tell us about your educational background from your undergraduate degree to your PhD?

I received a BSc from Victoria College at the University of Toronto. I was awarded the Governor General's Silver Medal and was the winner of the 1965 Canadawide contest from the Canadian Association of Physicists. The prize was a trip to their conference in Vancouver. Those were very different days, in that the pilot welcomed me into the cockpit to observe the crew in action during the flight.

What was your PhD on and why?

My PhD thesis was titled Magnetic Resonance Molecular Beam Studies on HD and D_2. This was a fundamental experiment in quantum mechanics and produced the most accurate measurement of the nuclear quadruple moment of the deuteron to the present time. It was of fundamental importance to quantum mechanics.

What kind of physics did you teach? And why?

At UTM I taught electronics and physics for biology and medicine. My favourite course was the Second Year course Clocks, Quanta and Chaos for non-physicists. At the St. George Campus I taught graduate courses in quantum mechanics and classical electro-dynamics.

What are your fondest memories of being a faculty member in the U of T Physics Department?

I have fond memories of the friendship and the support of my colleagues. I enjoyed being the chair of the Colloquium Committee.

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How has the Physics Department changed since you were a faculty member?

Both the department and the campus at UTM have grown considerably since my day. When I arrived UTM was named Erindale College. In my early tenure there were still small swimming pools that had been part of the original estates that had preceded the university. Biophysics is now an important part of the department.

What have you been doing during your retirement?

Following retirement I was a community member of the Research Ethics Board at CAMHthe Centre for Addiction and Mental Health. I advocated strongly for patients and their families during the nineteen years I was a member.

I continue to sing tenor in my church choir. I enjoyed digital photography, and tackled organizing the pile of family photos until I lost my sight in August, 2021. Since then I have been learning to use assistive technology and to touch type.

I enjoy learning languages, and listen to French and German radio broadcasts. I am attempting to understand the news in standard Chinese. I became interested in this language when I worked with Chinese students at UTM.

With the help of my son I am continuing to delve into topics of interest using my computer.

Anything else you would like us to know or share?

I really enjoyed my research on the quantum properties of solid methane by Nuclear Magnetic Resonance, the optics of liquid crystals, and the development of NMR measurements of trace fluorine impurities in the bones of living human index fingers. The latter research was done in collaboration with the late Kenneth McNeill to investigate nutritional methods of treating osteoporosis.



Fraser Code in Muskoka (credit: Jennifer Code)

Alumni Profile

Sarah Torrie

HBSc 2002 - Astronomy and Physics Specialist



Sarah Torrie is a high school physics teacher at Victoria Park Collegiate Institute in Toronto. She is a graduate of the Astronomy and Physics Specialist Program as well as the Education Program at the University of Toronto. Sarah is the winner of the 2022 Prime Minister's Award for Teaching Excellence in STEM and the 2019 Canadian Association of Physicists Award for Excellence in Teaching High School Physics (Ontario).

Why did you choose Physics?

Admittedly I didn't start my university degree with a physics-centred plan. In high school, I took and enjoyed a variety of courses, and I continued to take both arts and science courses once I started university. However, by my second year I had narrowed in on the Astronomy and Physics Program. I think I chose physics because I liked the challenge it presented. I liked tackling difficult problems and I enjoyed the comradery of working with classmates on those problem sets. I have fond memories of making observations using the telescope in the McLennan building and driving the departmental Astro van up to the David Dunlop Observatory for an evening of data collection. It was here that I discovered the frustration and thrill of doing science.

It is difficult for me to separate my decision to major in physics and my choice to explore a career in education. In my second year I saw a flyer advertising the Early Teacher Program (ETP). This program, spearheaded by Professor Charles Dyer, allowed physics students to gain experience in Ontario science classrooms before entering the education program at OISE. One year into this program I knew that teaching physics was for me. Thanks to the support of the Department of Physics and the mentorship of Professor John Percy I was able to write an astronomy outreach manual as part of my final research project.



Sarah Torrie at CERN

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How did physics help you in your teaching career?

Physics was not easy, but I value the experience of the challenge it presented - and appreciate how it informed my perspective on learning. It made me a more confident, resilient, and empathetic teacher. Physics helped me recognize how much discussing ideas with others makes us better learners and teachers. Being a physics educator is one of the best jobs in the world. Making physics accessible, inclusive and fun is very rewarding. The physics teaching community is a supportive, creative, and dedicated group of people. Collaborating with other physics educators has taken me to the Canadian Light Source, Perimeter Institute, Institute of Quantum Computing and CERN. These experiences have expanded my knowledge base, connected me to the greater physics community and have ensured my teaching remains relevant for students.

I have also enjoyed staying connected to the U of T Department of Physics through their Outreach Program. Over the years my students have benefited from department members volunteering their time to run workshops, give tours, run contest preparation, and deliver lectures. Thank you for your continuous support of our young scientists.



Sarah Torrie making a bubble chamber at CERN

Research Spotlight

Professor Hae-Young Kee - Quantum Condensed Matter Physics

"Evolution of interorbital superconductor to intraorbital spindensity wave in layered ruthenates" published in May 2022 in Physical Review Research

Authors: Austin W. Lindquist, Jonathan Clepkens and Hae-Young Kee



We spoke to graduate students Austin W. Lindquist and Jonathan Clepkens about this work.

What are the layered ruthenate materials that you've studied and why are they a topic of interest?

The strontium ruthenate family that we study refers to a class of materials in which a variable number of layers of ruthenium atoms surrounded by oxygen atoms are stacked on top of each other. The material where the individual layers are well separated, which we refer to as the single layer material, has long been thought to host an exotic form of superconductivity. However, even after 25 years of intense studies, the superconducting state is still not well understood. Furthermore, when two layers are stacked directly on top of each other, referred to as the bilayer material, it exhibits a magnetic ordering at low temperatures in a magnetic field. This adds another puzzle piece to the longstanding mystery: why does a simple stacking of two layers change the physical state from an exotic superconductor to a magnet?

What was the purpose of this work?

The purpose of this work is to help us better understand strontium ruthenate, both the single layer and the bilayer. While many recent publications have focused on the single layer only, here we consider both systems and explore a theme that can unify the two. We wanted to show that our model could simultaneously explain the experimental observations of superconductivity in the single layer, as well as the magnetic ordering in the bilayer.

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Can you describe the Kanamori Hamiltonian used for this work?

The Kanamori Hamiltonian is an equation that describes how electrons interact within orbitals around an atom, in the materials we consider these are ruthenium atoms. We use it to describe the Coulomb repulsion and fermionic exchange among electrons. These interactions between electrons can give rise to phases of matter such as superconductivity or magnetism. What's interesting about the superconductivity from this model is that it actually occurs between electrons in different orbitals, in contrast to more conventional routes to superconductivity which occur between electrons in the same orbital.

What were the results of the work?

We found that we can unify the superconductivity and magnetic order in the single layer and the bilayer within a single framework. While both systems have very similar models overall, the addition of the second layer modifies the pairing between different orbitals and destroys the superconductivity, while also placing the system very near a magnetic instability, allowing order to form once a magnetic field is applied. We think that being able to explain both of these systems simultaneously means that we are closer to understanding the origin of superconductivity.

What is next for Hae-Young Kee's group?

The puzzle of superconductivity in the single layer strontium ruthenate is still incomplete. We've proposed a new type of spin-triplet superconductor, and its elementary excitations are yet to be explored. We would like to understand the nature of the excitations, as the presence of Majorana fermions inside of vortices are critical for the application of this material to topological quantum computing proposals. We've also proposed an experimental route to increase the transition temperature of superconducting strontium ruthenate. We hope that this can be confirmed by experimentalists, both to provide validation of our theories, but also because increasing superconducting critical temperatures is always desirable.

Read the full paper here:

https://journals.aps.org/prresearch/pdf/10.1103/PhysRevResearch.4.023109

More on Professor Hae-Young Kee's Group here:

https://kee.physics.utoronto.ca/

June 2022 PhD Graduates

Congratulations to our June 2022 graduates!

Ciungu, Bianca Monica - Studies of the Higgs boson Properties in \sqrt{s} = 13 TeV pp Collisions. (Supervisor P. Sinervo)

Daoud, Hazem - Theoretical and Experimental Advances in Studying the Ultrafast Dynamics of Atoms and Molecules. (Supervisor D. Miller)

Inglis-Whalen, Matthew - Power Corrections and Rapidity Logarithms in Soft-Collinear Effective Theory. (Supervisor M. Luke)

Jeffery, Paul Sydney - Water Vapour and Ozone: Measuring Key Trace Gases in Challenging Regions. (Supervisor K. Walker)

Pen, Ue-Yu - An Automated Tabletop Continuous Culturing System with Multicolour Fluorescence Monitoring for Microbial Community Eco-evolutionary Experiments. (Supervisor S. Goyal)

Wilson, Matthew James - A New Search for Low-Mass Dark Matter and an Examination and Reduction of the Uncertainty due to the Photoelectric Absorption Cross Section using a Cryogenic Silicon Detector with Single-Charge Sensitivity. (Supervisor M. Diamond)

Yang, Bernard - Physical Processes in Ice-covered Lakes. (Supervisor M. Wells)

Zhong, Xiaoqing - Experimental Quantum Communication based on Sagnac Interferometers. (Superviors H.K. Lo & L. Qian)



McLennan Physical Laboratories and Lash Miller Chemical Laboratories from Ursula Franklin Street (credit: Matthew Gerry)

Announcements Professor Nicolas Grisouard



Professor Nicolas Grisouard was promoted to Associate Professor on July 1, 2022.

Professor Debra Wunch



Professor Debra Wunch was promoted to Associate Professor on July 1, 2022.

Professor Brian Wilson



Dr. Brian Wilson accepted the position of Assistant Professor, Teaching Stream in Undergraduate Physics Education on July 1, 2022.

Professor Matt Russo



Dr. Matt Russo began a parttime term appointment as an Assistant Professor, Teaching Stream on July 1, 2022.

Christopher Lee



Christopher Lee began a continuing parttime appointment as Assistant Professor on July 1, 2022.

Also on July 1, 2022, SNOLAB scientists Jeter Hall, Andrew Kubik, and Silvia Scorza were appointed as Adjunct Professors and Anatole von Lilienfeld (Professor & Clark Chair of Advanced Materials in the Department of Chemistry and the Department of Materials Science & Engineering) began a non-budgetary cross-appointment in Physics.

Student Awards

Richard E. Azuma Undergraduate Summer Fellow Gabby Gelinas

The Richard E. Azuma Fellowship commemorates renowned TRIUMF and University of Toronto physicist Dr. Dick Azuma, who was instrumental in establishing the field of experimental nuclear astrophysics in Canada. Dick played an integral role in advancing Canadian nuclear physics for all and contributed to many topics and initiatives, including the well-known "Red Giant" experiment, which



laid the foundation for TRIUMF's ISAC and ARIEL facilities and rare-isotope science program. In addition to his leadership for Canadian science, Dick was a passionate educator, a fierce defender against prejudice and discrimination, and a valued mentor to a generation of emerging science leaders.

The Fellowship seeks to honour his legacy and support promising Canadian undergraduate students with diverse backgrounds who are considering a career in research fields associated with TRIUMF science.

Gabby Gelinas was selected as one of the inaugural recipients of the Richard E. Azuma Undergraduate Summer Fellowship. She is a third year Honors Physics student minoring in Mathematics at the University of Calgary.

More:

https://www.physics.utoronto.ca/news-and-events/news/physics-news/triumf-welcomesinaugural-richard-e-azuma-undergraduate-summer-fellow-gabby-gelinas/

Loudon-Hines Medal 2021-2022 Samuel Jinglian Li

Awarded by the Faculty of Arts & Science on the recommendation of the Department of Physics, the Loudon-Hines Gold Medal and Scholarship is presented annually to a top graduating student in the Specialist or Major program in Physics who also demonstrates creativity and a clear promise in the discipline of physics.



Samuel simultaneously completed both a Math Specialist and a Physics Specialist program, including taking a number of graduate courses in both departments. Over his final year he was a member of Prof. Amar Vutha's research group, where he worked on R&D for a potential new approach to eEDM measurements, resulting in a paper entitled "BaF molecules trapped in neon ice". As of fall 2022, Samuel is a PhD student at Princeton University. 19

2022 Canadian Association of Physicists Lloyd G. Elliott University Prize Exam

The 2022 prize exam was held on March 22, 2022 and University of Toronto students had stellar results, taking 3 of the top 10 spots.

2nd – Samuel Li



3rd (tie) – Amirali Atrli

6th (tie) – Tony An



"When I found out I had achieved the 3rd place in the CAP exam, it felt good; as if I was harvesting a fruit of my studying and being interested in physics since I was a child. I am glad that I am in this path and that I am getting closer to my goals." - Amirali Atrli

More:

https://www.cap.ca/programs/medals-and-awards/prizes-students/university-prizeexam/2022-cap-university-prize-exam-results/



Clouds rolling in over campus (credit: Darya Zanjanpour)

Van Kranendonk Awards

The Van Kranendonk Award is given every year to four graduate students who have done the best job as Teaching Assistants during the current year, based on nominations from undergraduate students.

Named in honour of U of T Physics Professor Jan Van Kranendonk, who was the recipient of many awards (including the 1976 Gold Medal for achievement in physics awarded by the Canadian Association of Physicists) but who was also renowned as an excellent teacher.

Nicholas Anto-Sztrikas PHY131, PHY252

"Nick was a great TA and I always enjoyed attending his practical. I felt that Nick did a good job of explaining concepts, which he did through the use of engaging comparisons. Nick went beyond the assignments and gave us "scientific life advice," such as how we should interpret data and how we should compare new data to the current model, which I found to be very useful. He was always encouraging towards students and gave us many chances to succeed."

Daniel Schultz PHY293, PHY354

"A great teacher, and very considerate. Clearly very knowledgeable about the material, but always patient when explaining/trying to relate to concepts we were familiar with. Offered additional office hours, helped us review for exams, made us cookies. Amazing TA."

Sreekar Voleti PHY131, PHY252, PHY293

"Amazing job at explaining difficult concepts in relativity/waves, very friendly, funny, and kind, went out of his way to provide office hours before tests. All around great guy and great TA."









Suzanne Wong PHY131 (Dept. of Biomedical Engineering)

"Suzanne Wong is an excellent TA and certainly deserves recognition. She is very caring towards her students and an excellent communicator. She has made herself available outside of practical time....Her feedback is always detailed, targeted, constructive, clear, and well-communicated. Overall, she is a caring and conscientious teaching assistant that is punctual, hardworking, accommodating, supportive, fair, and clear."



Faculty Awards Physics Student Union (PhySU) Teaching Awards

The PhySU Teaching Award is an annual award started in 2021 to recognize exceptional pedagogy in undergraduate Physics courses. The award is given to two individuals (one per semester) at the end of each academic year. The winners are selected by the PhySU Executive based on student nominations.

Fall 2021 - Paul Kushner - for exceptional pedagogy in PHY151

"Professor Kushner is extremely nice and organized. He is very accessible outside of class to answer questions and always encouraged me to pursue physics. Entering my first-year studying physics was extremely daunting but [he] always made me feel welcome in physics. He is a fantastic professor and it is clear that he really cares about his subject and his students."



"His passion for physics is evident in the way he teaches, and it's amazing how well he has organized the synchronous/asynchronous lecture format."

Winter 2022 - Michael Luke - for exceptional pedagogy in PHY354

"Professor Luke introduced course concepts in a way that was incredibly intuitive and satisfying. He took questions with patience and clarity, and is clearly one who enjoys teaching what he teaches."

"Great in-person physical demonstrations, an excited/interested mood towards the material that helped engage the students, and an ability to answer questions with great detail."

"Shared [fascination] with subject in a way that made students fascinated, great insight into fundamental laws, always improves lectures with student input."



2022 Jacques Solvay International Chair in Physics awarded to **Professor Juna Kollmeier**

The Solvay Institutes have selected Professor Juna Kollmeier, Director of the Canadian Institute for Theoretical Astrophysics (CITA) as its 2022 Jacques Solvay International Chair in Physics. Professor Kollmeier is the first scientist from Canada to receive this honour, whose past 16 recipients have included two Nobel Laureates.

More:

https://www.physics.utoronto.ca/news-and-events/news/physics-news/professor-junakollmeier-has-been-honoured-as-the-2022-jacques-solvay-international-chair-in-physics/

2021 Patterson Distinguished Service Medal awarded to Professor Kimberly Strong

At a virtual ceremony in June 2022, Professor Kimberly Strong was awarded the 2021 Patterson Distinguished Service Medal by the Meteorological Service of Canada. The medal is presented annually to recognize outstanding contributions in the field of Canadian meteorology.

More:

https://www.physics.utoronto.ca/news-and-events/news/physics-news/kimberly-strongawarded-2021-patterson-distinguished-service-medal/

Professor Yong-Baek Kim is one of five Arts & Science scholars named Fellows of the Royal Society of Canada

Professor Yong Baek Kim was named a Fellow of the RSC in September 2022. This honour is in recognition of his significant contributions to theoretical understanding of emergent quantum phenomena in strongly spin-orbit coupled quantum materials, which include guantum spin liquids and novel guasiparticles.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/professor-yong-baek-kim-among-arts-science-scholarsnamed-fellows-of-the-royal-society-of-canada/





Professor Kimberly Strong receives the Royal Society of Canada's Willet G. Miller Medal

Professor Kimberly Strong has been awarded the 2022 Willet G. Miller Medal from the Royal Society of Canada for her contributions to atmospheric science. She notes that this award "is not just for me, it's for my group as well, as my research is highly collaborative. When I think of all of my graduate students, postdocs, and other group members over the years, this award is a reflection of their cumulative accomplishment."



More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/professor-kimberly-strong-receives-the-royal-society-ofcanadas-willet-g-miller-medal/

Staff Awards

Faculty of Arts and Science Distinguished Long Service Award

April Seeley - First Year Undergraduate Assistant, Department of Physics

April Seeley been a pillar of our undergraduate program for more than 30 years. Over this period, she has been largely responsible for all of the administration associated with our large first-year Physics courses, tirelessly supporting both faculty and our students in numerous ways. Although her primary responsibilities are in administrative support, she has broadened her skillset by adopting new technologies for her own purposes, as well as gaining the expertise to be a resource for others, particularly instructors. This has included maintaining advanced skills in desktop and internet publishing, various database and student results management tools and University Learning Management tools. She has also contributed in substantial ways to the life of the Physics Department, whether organizing our annual December Holiday Party or supporting our Joint Health and Safety Committee. We were delighted that April was recognized with one of the 2022 A&S Outstanding Staff Awards.

More:

https://www.artsci.utoronto.ca/news/2022-outstanding-staff-awards

Department of Physics Staff Awards

2021-2022 continued to be a complex year for Department operations. All staff members have worked hard and smart, literally working overtime to keep everything running despite the many challenges created by the pandemic.

As a result it was more difficult that normal to choose from the many nominations, but one technical, and two administrative staff members deserve special recognition:

Administrative Staff Award

Beata Kuszewska, PTS Financial Assistant and Graduate Office



"Every year Beata communicates with hundreds of applicants from all around the world helping them apply for our graduate program. She tirelessly points to correct sources of information, explains admissions requirements, and procedures. This year was especially challenging for admissions as the universitv implemented a new online process. Beata showed great determination in liaising with programmers, staff at the School of Graduate Studies and other members of the graduate office to implement the new procedures, resolve discrepancies and improve user manuals. Although always cheerful and seemingly carefree, her persistence resulted in improvements that will benefit our program well into the future."

Chris McGugan, Administrative Assistant to the Chair



"In an unprecedented recruitment year for the Department, Chris was responsible for managing six faculty searches, including posting the job ads in many venues, making all the application materials available to the search committees, scheduling multiple search committee meetings for very busy members, and scheduling two-day visits for 21 candidates. He also dealt with collecting and organizing documents for an interim review, a continuing status review, two promotions, and two tenure reviews. This all involved a huge amount of communication and coordination with many people. Chris kept things on track and was unfailingly good natured throughout."

Continued on next page.

Technical Staff Award

Larry Avramidis, Senior Learning Services Specialist



"For many years Larry has enabled physics learning at the highest level. He is extremely generous with his time, supporting students, teaching assistants, and course instructors, and his technical abilities have been described as "magic" because they appear to be above and beyond what anyone else can do. He is always calm and understanding, and infinitely patient. During the pandemic Larry has been the anchor for advanced lab operations, working on site to support online teaching, sourcing and assembling kits for students to use from home, and rearranging rooms and equipment to met distancing requirements. His contributions are exemplary."



Rainbow over MP (credit: Andy Jiao)

Special Staff Excellence Award Peter Hurley, Chief Administrative Officer

At the June End-of-Year Party, a Special Staff Excellence Award was given to Peter Hurley In recognition of his outstanding leadership and exceptional level of commitment to advancing the work of the Department over many years.



As CAO, Peter is responsible for the administrative, financial and operational management of the Physics Department, which includes about 50 faculty, 35 technical and administrative staff, and more than 200 graduate students. Peter is deeply engaged in keeping the Physics Department running well so that we can achieve our teaching and research goals.

During the pandemic when nearly everyone was working from home, Peter almost single-handedly looked after operations from his office on the third floor. No task was too great or too small.

He is a consummate professional, knows the workings of the Department inside and out, and works tirelessly to deal with the myriad issues which arise every year in a Department as large and complex as Physics, including the many new issues associated with the pandemic.

Peter's association with the Physics Department goes back to his undergraduate days, when he was a BSc student here. October 2021 marked Peter's 30th anniversary as a staff member.

Here are just a few of the comments that were received about Peter:

• "He actually knows more about education than most professors." [Note: Peter has a B.Ed. and a M.Ed., as well as his degrees in Physics]

• He has a "constantly surprising comprehension and grasp of the policies -- and their implications -- that we operate with, at the University of Toronto"

- "I can honestly say that Peter is the best supervisor I have ever had."
- "Peter's excellence is not in the grand gestures but in those unnoticed and taken for granted moments of going above and beyond in every thing he does."
- "He is ALWAYS kind. And I know kindness is not in the job description, but it contributes to the culture in the department and sets the tone for interactions."
- "In every interaction he was kind, erudite and helpful. He just does whatever needs doing."
- "He is a fountain of knowledge when it comes to what is best for our department."

Congratulations to all the award winners. See the next page for pictures of the awards ceremony at the End-of-Term Party on June 23, 2022.



Left to right: Van Kranendonk Award recipients Sreekar Voleti, Nicholas Anto-Sztrikas and Daniel Schultz with Associate Chair Undergraduate Studies Peter Kreiger



Left to right : Physics Student Union (PhySU) Teaching Award recipients Professors Paul Kushner and Michael Luke



Left to right: Kimberly Strong with Special Staff Excellence Award recipient Peter Hurley

Employee Anniversaries

Steve Butterworth, Manager, Physics Computing Services

Celebrating 20 years at the Department of Physics

Steve oversees the overall operation of Physics Computing Services (PCS) in the Department and he manages the PCS group that includes Julian Comanean, Galina Velikova and Gregory Wu.

His specialty knowledge in IT is driven by the latest developments in the field and he serves as a great resource for the department.

Some of his many responsibilities include taking care of IT project development (mail, software provisioning and virtual hosting), the procurement of hardware and other large scale IT projects. He keeps stakeholders informed and is in constant communication with the Department, ITS and other members of the University of Toronto community.

He established a network security monitoring system, identifies threats and investigates and troubleshoots IT security incidents in the department.

His team considers him more of a colleague than a manager and he serves as a mentor to them. They say he is always approachable, easy to work with and he makes their experience in the department a valuable one.

Congratulations Steve!



MP undergraduate wing and Lash Miller in the summer (credit: Sheela Manek)

PhysCAP Recap

Updates from the Physics Career Accelerator Program.

Physics Mentorship Program

The 2021-2022 Physics Mentorship Program wrapped up on April 5, 2022 with a virtual closing event. The program had almost 50 mentormentee matches. Mentors consisted of alumni, faculty and graduate students and student mentees who were 3rd and 4th year undergraduate students.



Selected mentee comments:

"I learnt so much about both academia and life outside in the industry. I feel like I have a much stronger holistic foundation going into graduate school."

"The most important thing I gained is the insight on what the life in a career related to physics feels like. For example, what the difference between private and governmental hiring, or what kind of job are you expecting on the daily basis. I was also able to learn what kind of mindset you are suppose to have going into the field."

"I have a better idea of what courses I should take if I consider grad school in the future. More importantly, more diverse resources and information were provided by my mentor and she has been very very very supportive and caring which means so much to me especially in the situation that I am struggling from and dealing with personal issues. Thank you very much for the arrangement and I really appreciate all the efforts the mentors and the panel put."

Selected mentor comments when asked what they liked best about the program: "Meeting and getting to know a bright young student who is in a similar position as I was years ago, and being able to offer my insights and experiences!"

"I liked seeing the active change in my mentee's confidence as they learned more and started seeing their efforts pay off."

More information on the Physics Mentorship Program can be found here: <u>https://www.physics.utoronto.ca/undergraduate/physics-career/mentorship/</u>

Outreach in Action Pursue STEM

In the Spring Newsletter, we told you about how Pursue STEM would be taking two spots at the Canada Wide Science Fair (May 16-20. 2022). Grade 11 students Gigi Adentunji and Shornelle Halstead presented their Smart Mask and Imani Reid and Amina Hassan presented their COVID Risk Investigation projects at the science fair.

Also, this past year, the grade 10 students took part in virtual workshops and activities from the Departments of Statistics, Earth Sciences and Physics and the School of the Environment. On May 28, 2022 students participated in their first in-person workshop from the Department of Chemistry. Students had the opportunity to do "Kitchen Chemistry" in a lab at Lash Miller, they met faculty from the Department of Chemistry and met each other in person for the first time.

On June 4, the grade 11 students went on a field trip with the Departments of Chemistry and Earth Sciences and School of the Environment. They visited Old Mill, Crawford Lake and Borer's Falls to test surface water and bedrock chemistry. Students learned how the underlying geology and amount of urban activity affect the water chemistry, they met U of T faculty, Pursue STEM staff and each other for the first time since starting the program in 2021.

You can read more about the field trip here:

<u>https://www.physics.utoronto.ca/news-and-events/news/physics-news/pursue-stem-</u> <u>chemistry-earth-sciences-and-environment-field-trip/</u>



Pictures from the May 28, 2022 chemistry workshop.



Pictures from the June 4, 2022 field trip.

The closing event for both cohorts was held on June 18, 2022 and included a keynote talk from Dr. Kevin Hewitt, U of T alumus and Professor in the Department of Physics and Atmospheric Science at Dalhousie University. Dr. Hewitt spoke to students about his career path in STEM.

Grade 10 students presented their capstone projects and the winning projects were about the realism of superheroes and anime characters, measuring how much you like a song and recording and simulating feats of fictional characters.

Thank you to the Departments of Astronomy and Astrophysics, Chemistry, Computer Science, Math, Earth Sciences, Physics, Statistics and the School of the Environment for another successful year.

Pursue STEM provides high-achieving Black high school students with the opportunity to participate in STEM workshops. The program is a joint effort between U of T Physics, U of T Office of Student Recruitment, and Leadership by Design.



Pictures from the June 18, 2022 closing event.

More on Pursue STEM:

https://www.physics.utoronto.ca/physics-at-uoft/outreach/pursue-stem/

Outreach in Action Office of Student Recruitment School Visit Program

The Department of Physics partnered with the Office of Student Recruitment again to provide virtual visits to high schools. Activities from the Departments of Physics, Earth Sciences and Mathematics were provided.

PhD candidate from the Department of Physics Mohamed Shaaban ran his "Experimentally Probing the Dark Universe" activity for Markville Secondary School.

We asked Recruitment Officer Stephanie Convery about her experience working with the Department of Physics for the last two years:

"I would say that my experience working with you (Sheela Manek) and the professors has been wonderful! The students are very responsive to the sessions and it's great to see high school students engage with the university in an interactive way!"

We look forward to working with the Office of Student Recruitment on future visits.



U of T Physics School Visit Program

On June 29, two grade 11 physics classes from Victoria Park Collegiate Institute participated in virtual school visits. One class had a workshop on ocean thermodynamics from Professor Nicolas Grisouard and graduate student Fabiola Trujano Jimenez. The other class participated in a workshop on dark matter from Mohamed Shaaban. The physics teacher Sarah Torrie is a U of T Physics alumna and the Department is always happy to welcome her classes to the Department for visits.



Outreach in Action

On September 16, 2022 grade 12 students from Victoria Park Collegiate Institute came to the Department for a tour of Professor Ziqing Hong's Dark Matter Lab.





Are you a high school teacher that wants to bring your class to the Department for a visit or participate in a virtual visit? For more information visit: <u>https://www.physics.utoronto.ca/physics-at-uoft/outreach/school-visits-students/</u>

Outreach in Action Girls sySTEM

The Department of Physics participated in workshops for Girls sySTEM again this year. This program is for girls grade 7-12 interested in STEM. This year, the following workshops were provided: Experimentally Probing the Dark Universe with Mohamed Shaaban and A Visit to the Polar Environment Atmospheric Research Lab with Professor Kaley Walker's group.



Science Rendezvous

A virtual Science Rendezvous was held on Saturday, May 7, 2022 and there were 500 people registered and over 65 presenters. Professor Miriam Diamond represented the Department of Physics by providing a virtual tour of SNOLAB, Canada's deep underground research laboratory, located near Sudbury, Ontario.



Doors Open

The Department's first large public event in more than 3 years was <u>Doors Open Toronto</u>, held on May 28 and 29, 2022. Doors Open Toronto is a city-wide event that invites the public to explore the city's most fascinating buildings and sites.

The last time the Department participated in Doors Open was in 2019. This year, more than 1800 people of all ages came through the doors of McLennan Physical Labs to see physics demos, look at research posters, see the view from the roof and look through telescopes.

The theme this year was "Renewal". Universities are sites of constant renewal and new knowledge is constantly being generated that allows the renewal of science, technology, and society. The Department of Physics had both old and new science on display and students were there to answer questions about physics demos and research. The Department of Astronomy and Astrophysics provided guests with access to the 15th floor balcony where they could look at the sun through the telescopes.

We asked Chair of the Outreach Committee David Bailey what his favorite part of the event was:

"In this age where so many outstanding physics demonstrations are available online, I loved seeing people of all ages get so excited seeing even relatively simple demonstrations in person. I particularly remember a bunch of 20-something friends almost jumping up and down with excitement when they first noticed the real image of a light bulb magically appearing."

This event was made possible by the hard work of over 20 student volunteers from the Departments of Physics and Astronomy and Astrophysics.



Photos from Doors Open 2022 (credit: Darya Zanjanpour)

Science Unlimited Summer Camp

Science Unlimited Summer Camp was back in person after two years and took place August 8-12, 2022.

50 high school students participated in workshops from the Departments of Astronomy and Astrophysics, Chemistry, Computer Sciences, Earth Sciences, Math, Physics and School of the Environment. Students learned about gravitational waves, atmospheric science, nanotechnology, computer vision and more. They panned for gems, looked through telescopes, went on a campus tour, shot angry birds plushies out of a cannon, made new friends and met U of T faculty and graduate students. Students wrapped up the week with a pizza lunch and presentations of their design challenge projects.

Students commented that they enjoyed the hands-on activities, seeing the U of T campus and working on the design challenge with their groups. They also enjoyed meeting new people:

"My favourite part of the camp was meeting like-minded people who had a passion for STEM. I found that it was really easy to talk to many people because of the shared passion. Making new friends and connections was really enjoyable and a break from the typical "school setting" or summer camp" – 2022 Science Unlimited Summer Camp participant.

We look forward to camp next year and are grateful to the departments who made this week possible.

More information on Science Unlimited can be found here:

https://summercamp.physics.utoronto.ca/



Physics News

U of T Physics and Astronomy Alumna Katharine Hayhoe Receives an Honorary Degree from Wycliffe College

Katharine Hayhoe won't say that the climate crisis is insurmountable, but she will say that solving it depends on convincing people it's a problem that affects them. That includes those in politically conservative communities in the U.S. where opinions often lean toward climate skepticism over climate action.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/u-of-t-physics-and-astronomy-alumna-katharine-hayhoereceives-an-honorary-degree-from-wycliffe-college/

Toronto Startup Xanadu Achieves Quantum Computing featured in The Globe and Mail

Xanadu has close ties to the Department of Physics. A number of former post-doctoral fellows, PhD students and undergraduate students are affiliated with Xanadu and Xanadu continues to work with U of T Physics faculty through the MITACS Program.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/toronto-startup-xanadu-achieves-quantum-computingfeat-the-globe-and-mail/

Astronomers Make the Music of the Cosmos, by Turning Data into Sound

Matt Russo of the Department of Physics translates data captured by telescopes into music.

More:

<u>https://www.physics.utoronto.ca/news-and-events/news/physics-news/astronomers-make-the-music-of-the-cosmos-by-turning-data-into-sound/</u>





Physics in the Time of COVID-19

A group of undergraduate students worked on a research project to look at the effects of COVID-19 on the U of T physics community.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/physics-in-the-time-of-covid-19/

Pursue STEM – Chemistry, Earth Sciences and Environment Field Trip

Grade 11 students study how geology and urbanization affect water quality in southern Ontario.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/pursue-stem-chemistry-earth-sciences-and-environmentfield-trip/

Symposium in Memory of Professor David Rowe

On Saturday, June 4, 2022 a symposium was held in memory of Professor David J. Rowe who passed away in May 2020.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/symposium-in-memory-of-professor-david-rowe/

The Hunt is on for New Breakthroughs in Physics

Professor Pierre Savard discusses the ATLAS detector in the Globe and Mail.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/the-hunt-is-on-for-new-breakthroughs-in-physics/









27th International Conference on Atomic Physics (ICAP 2022)

The Department of Physics was the proud host of the 27th International Conference on Atomic Physics (ICAP 2022), from 17 July to 22 July.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/27th-international-conference-on-atomic-physics-icap-2022/

INSPIRE Scholars Drug Discovery Program Celebrates Summer Launch

A new interdisciplinary program is inspiring the next generation of researchers and entrepreneurs in interdisciplinary biophysical science.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/inspire-scholars-drug-discovery-program-celebrates-summerlaunch/

Science Straight Up featuring Prof. Anton Zilman

Tiny Gatekeepers of the Nano Universe: How Nuclear Pores in our Cells Separate Friend From Foe

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/science-straight-up-featuring-prof-anton-zilman/

Up a creek without a paddle? Try gunwale bobbing: U of T study

Stand up in a canoe and you'll probably find yourself in the water before too long. Jump up and down on the upper edges of the sides of the canoe, and you'll likely end up in the drink as well. But get the balance right and you'll be able to move yourself along by as much as one metre per second, according to a study published in Physical Review Fluids examining gunwale bobbing.

More:

<u>https://www.physics.utoronto.ca/news-and-events/news/physics-news/up-a-creek-without-a-paddle/</u>









SuperCDMS (Cryogenic Dark Matter Search) Experiment Meeting

The Physics Department hosted the collaboration meeting for the SuperCDMS (Cryogenic Dark Matter Search) Experiment from August 3-5, 2022.



Nearly 50 collaboration members attended the hybrid-format meeting in-person, with another 50 attending virtually. The collaboration includes dark matter hunters from across the world, including Canada, United States, Germany, Spain, India, and UAE.

More:

https://www.physics.utoronto.ca/news-and-events/news/physics-news/supercdmscryogenic-dark-matter-search-experiment/

Dark matter hunt and ocean monitoring top list for Ottawa's \$628-million science funding boost

Professor Miriam Diamond quoted in the Globe and Mail.

More:

https://www.physics.utoronto.ca/news-andevents/news/physics-news/dark-matter-hunt-and-oceanmonitoring-top-list-for-ottawas-628-million-science-fundingboost/

Summer Abroad students probe the subatomic universe at CERN, the world's largest particle physics lab

Thanks to the Summer Abroad program, two physics undergrads worked at the historic Large Hadron Collider at CERN in Switzerland, the site of the breakthrough discovery of the Higgs boson.

More:

<u>https://www.physics.utoronto.ca/news-and-</u> <u>events/news/physics-news/summer-abroad-students-</u> <u>probe-the-subatomic-universe-at-cern-the-worlds-largest-</u> <u>particle-physics-lab/</u>





The 'sonification' of structures in the universe

Matthew Russo of Physics explains his work on a NASA project to CBC's As it Happens.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/the-sonification-of-structures-in-the-universe/

Quantum information conference brings together experts on technologies shaping the future

For a week in August, the University of Toronto became the quantum research capital of the world.

More:

https://www.physics.utoronto.ca/news-and-events/news/physicsnews/quantum-information-conference-brings-together-expertson-technologies-shaping-the-future/

Researchers identify mechanism responsible for temperature and salinity 'staircases' in Arctic Ocean

Researchers at the University of Toronto have identified the mechanism responsible for the formation of temperature and salinity "staircases" in the Arctic Ocean.

More:

https://www.physics.utoronto.ca/news-andevents/news/physics-news/researchers-identify-mechanismresponsible-for-temperature-and-salinity-staircases-in-arcticocean/

Pueblo Science Hackathon for Science Education on September 23-25, 2022

Students from the Department of Physics participated in the Pueblo Science Hackathon for Science Education on September 23-25, 2022.

More:

https://www.physics.utoronto.ca/news-andevents/news/physics-news/pueblo-science-hackathon-forscience-education-on-sep-23-25-2022/











University of Toronto Campus in the Winter (credit: Aephraim Steinberg)

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