

# Interactions

## Message from the Chair



Welcome to the Fall 2018 issue of Interactions, the Department of Physics newsletter! There have been a number of changes in the Department over the summer, and I hope you'll enjoy reading about some of them here.

Here on the third floor, Stephen Julian has stepped down after a very successful five-year term as Chair. He'll be succeeded by Kim Strong, but since she's on leave this year I'll be spending the year as Acting Chair. Some of you may remember that I was Chair from 2004-2013, and it's good to be back working with the great staff and faculty in the department. William Trischuk's term as Associate Chair for Graduate Studies also ended this summer, and that role will now be filled by Young-June Kim.

As is traditional, in this issue we introduce you to a few of the members of the Department. We have a large experimental particle physics group, most of whom are involved in the ATLAS collaboration at CERN, and in this issue we have profiles of faculty member [Pekka Sinervo](#) as well as graduate student [Haider Abidi](#). We also introduce you to undergraduate physics and philosophy specialist [Matthew Gerry](#), as well as alumnus [Felipe Morgado](#), who discusses how he progressed from an undergraduate degree in biophysics to an MD/PhD program.

The Department continues to be heavily involved in outreach, and I hope many of you had the opportunity to visit one of our public events last year. These include the annual Welsh and Tuzo Wilson lectures, citywide events like [Science Rendezvous](#) and [Doors Open Toronto](#), as well as high school visits and the annual [Science Unlimited Summer Camp](#).

Later in the fall, the annual [Tuzo Wilson Lecture](#) will be given by Prof. Sara Seager from MIT, who will be speaking about "Exoplanets and the Search for Earth 2.0" - all are welcome at this free public lecture, and I hope that many of you will join us. It promises to be a great event.

Yours Sincerely,



Michael Luke

## Science Unlimited Summer Camp 2018



Science Unlimited Summer Camp took place August 13-17, 2018

Please see page 12 for more details.

## Upcoming Events

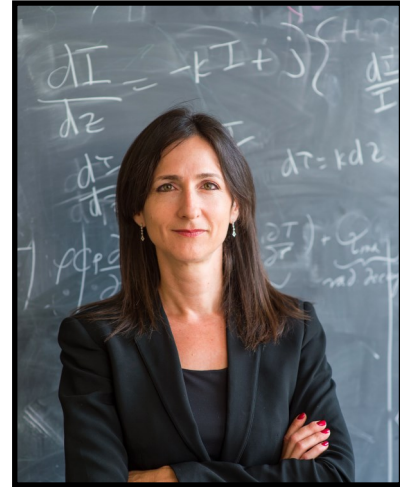
# Tuzo Wilson Lecture

## November 20, 2018

Sara Seager, MIT

**Exoplanets and the Search for Earth 2.0**

Sara Seager is an astrophysicist and planetary scientist at MIT. A University of Toronto alumna (9T4), her research focuses on theory, computation and data analysis of exoplanets. Her research has introduced many new ideas to the field of exoplanet characterization, including work that led to the first detection of an exoplanet atmosphere. Professor Seager also works in space instrumentation and space missions for exoplanets. She has chaired the NASA Science and Technology Definition Team for a “Probe-class” Starshade and telescope system for direct imaging discovery and characterization of Earth analogs as well.



Sara Seager (photo credit: saraseager.com)

All are welcome to attend this free  
lecture.

Tuesday, November 20, 2018

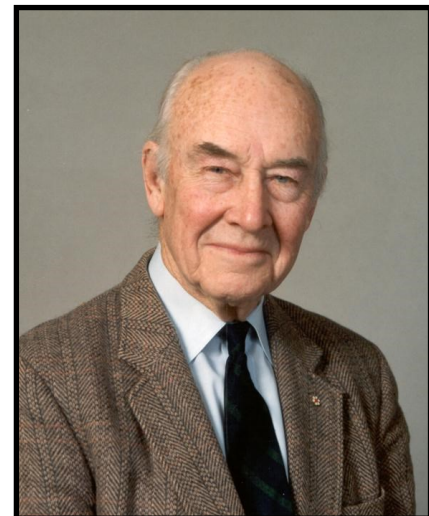
7:30-9:30pm

Location: ***Isabel Bader Theatre***

93 Charles St W

Toronto ON M5S 2C7

The annual Tuzo Wilson Lecture commemorates the life and work of J. Tuzo Wilson (1908-1993), one of the great earth scientists of his time, and one of the founders of Geophysics in Canada. Wilson made decisive contributions to the revolution in the Earth Sciences brought about by the establishment of the plate tectonics paradigm in the '60s and '70s. In his later career, he served as Principal of Erindale College and the first director of the Ontario Science Centre.



## Faculty Profile

### Pekka Sinervo

Professor

Experimental High Energy  
Physics



#### Why did you decide to pursue physics?

I chose to become a physicist because it gave me the chance to understand this awesome world better. But it wasn't a completely straight path. Having been interested in both mathematics and physics in high school, I came as an undergraduate to the University of Toronto and entered the Math and Physics program. I frankly didn't know what I would really pursue. After second year, it was clear to me that I enjoyed physics much more, especially some of the laboratory work. By the time I finished third year, I was sure of that choice. By that time, I knew I was most interested in particle physics! The rest is history.

#### What are your research interests?

My research interests are in the area of high-energy particle physics, bordering on some cosmological questions. I have been trying to understand the heaviest forms of matter in our world. This led me to the search for the top quark, which has turned out to be the heaviest form of matter we know about. More recently, I was involved in the discovery of the Higgs boson, which turns out to be the second-heaviest particle we are aware of.

#### You are currently doing measurements at CERN, can you tell our readers about that?

CERN has the world's most energetic particle accelerator, the Large Hadron Collider or LHC. As its name suggests, it creates collisions of protons at energies that would have occurred in nature around the time of the Big Bang. Our collaboration has built a large detector, called ATLAS, to observe and measure the properties of these collisions. We have used these collisions to create Higgs bosons, which we first conclusively observed in 2012. The LHC is also a "top-quark factory", as it produces top quarks at the rate of about 10 top quark pairs per second.

#### What is it like working with such a large international collaboration like ATLAS?

Because we work in a collaboration of 3,000 authors coming from over 40 countries, it means that we are a collaborative bunch with many shared values and goals. It is like a small village, where everyone seems to know everyone else. It is also like a small business, where we have organized ourselves into various groups, each with specific responsibilities. Given that the detector required decades to build, we got used to working together before we ever had any data from the LHC. It also means that we work to be respectful to our collaborators, even when we disagree. Leadership matters in such a loosely-knit collaboration. We have had some outstanding colleagues helping move us forward over the years.

#### Why are you interested in the top quark?

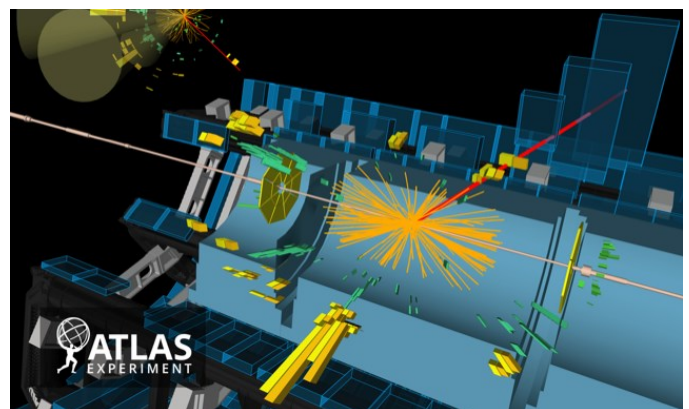
My interest in the top quark arose about 30 years ago, when as a fresh Ph.D, I joined an experiment just starting to look at high-energy collisions (2 TeV!) of protons and antiprotons. At that point, there were theories that suggested that the top quark should exist. Not knowing any better, I got involved in the search and that quickly became my full-time job. We finally "bagged" the top quark in 1995. It turned out to be much heavier than we ever thought possible—at least 4 times heavier than any of the early predictions and about as heavy as the nucleus of a gold atom.

#### Why is it significant?

Because of its large mass, the top quark is unique among quarks. It decays right so we can accurately measure its mass. Because it's the heaviest thing around, many predictions of new particles and forces depend on this mass, like the properties of the Higgs boson.

#### What is new and exciting in your research group?

We are now finishing a four-year data-collecting run at CERN this year, followed by several years of work upgrading the detector. Our group is now very involved in building the next-generation charged-particle tracker for the ATLAS detector. This project will keep us busy while we wait for more data to come from the LHC.



Right: Atlas  
Detector

## Graduate Student Profile

### Haider Abidi

PhD

High Energy Particle  
Physics



*Haider Abidi*

Haider was inspired to pursue physics by his high school physics teacher, Sarah Torrie. She instilled a deep sense of curiosity that still continues to be the basis of his motivation and work. After sensing that Haider was inquisitive and had questions that were not covered by the standard curriculum, she organized and held physics club meetings where these topics were discussed. With her, all questions, even the crazy ones, were taken seriously and debated fervently. This openness to being curious led Haider to continue the path down to physics. Another inspiration for Haider are his parents, who both are engineers. Given that, he completed his undergraduate degree in Engineering Science, with a specialization in Engineering Physics, at the University of

Toronto. Afterwards, he decided to pursue a PhD in High Energy Particle physics.

Around the time when Haider was applying for graduate school, the ATLAS group at UofT was starting to develop silicon sensors for the ATLAS inner detector upgrade in 2026. Due to the long timeline of experiments, students in particle physics very rarely get the chance to work on developing a detector from scratch. This, combined with the strong ATLAS group contributing to Higgs boson physics research, made the choice of going to UofT a very simple one for Haider.

Haider's current research, with Prof. Richard Teuscher, focuses on measuring the properties of the Higgs boson and developing a new silicon strip tracker for the ATLAS detector.

In 2012, the ATLAS and CMS collaboration discovered a new particle. Initial measurements showed that it was consistent with the Standard Model (SM) Higgs boson. However, due to the limited data, the measurements did not pin down the exact nature of this particle. Working in collaboration with experimentalists from around the world, Haider's research now aims to use a dataset 5 times larger

to further probe the properties of the new particle. This, coupled with combining results from other measurements, will either further establish the SM-like nature of the Higgs boson or lead to hints of new physics.

To continue improving the physics potential of the LHC program, the accelerator will undergo a significant upgrade. This will increase the amount of data delivered to the ATLAS detector by an order of magnitude. To efficiently collect data in the harsher radiation environment, the ATLAS inner tracker will be upgraded. Haider's research involves setting up large scale manufacturing and QA/QC processes with Celestica, a multinational electronics manufacturing company.

Additionally, Haider is working on understanding the impact of radiation damage on silicon sensors and making sure that the new detector will still work after being bombarded with an unprecedented level of radiation at the LHC.

When he is not working, Haider enjoys reading, TV shows, movies and learning random skills. The most interesting thing he is working on is making a Pepekura Iron Man helmet.

## Undergraduate Student Profile

### Matthew Gerry

Physics and Philosophy Specialist



*Matthew Gerry*

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

Coming out of high school, I asked myself what it was that I enjoyed the most. I always looked forward to my physics class more than any other. A huge reason for that was my teacher, Mr. Mildon, who brought lots of enthusiasm to class, and taught difficult concepts in rewarding, elegant ways. I developed in those classes a strong mental association between physics and joy, which just hasn't gone away!

#### What do you enjoy most about the physics program?

I've never taken a physics class that I didn't enjoy, so certainly there is something about the subject matter that keeps me coming back. But it's hard to say that what I enjoy most about the program is anything other than the community. PhySU is the best course union at U of T, and my experience here would not have been the same without all the hours up in the lounge, getting to know people whose interests overlap with mine.

I'm having the most fun when we're all putting our heads together to work out a tough problem, or debating some obscure topic from theoretical physics.

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

I was a TA for a philosophy course—Modern Symbolic Logic—all last year, which was an awesome experience. I also participated in the Physics [Mentorship Program](#) last year, which I would recommend to anyone in third or fourth year. Besides that, you can always see me hanging around at PhySU events!

#### What are your research interests?

Right now, I'm excited about getting started with a project looking at non-linear effects in viscous fluids. In the future, who knows? One topic that I keep coming back to in my spare time is the behaviour of systems far from equilibrium, and how that relates to the large-scale evolution of the universe and perhaps also to the emergence of life on Earth, so maybe I'll try and engage with that stuff in a more serious capacity. I've also been captivated lately by the connections between statistical mechanics and information theory, and I'd love to learn more about how those concepts manifest in quantum mechanics.

#### What is your favourite course and why?

I would have to say that Advanced Classical Mechanics (PHY354) has been my favourite course so far. A physics education often seems to consist in learning some facts, but only developing a deep understanding of them upon revisiting them a few years later with a more general, theoretical approach. 354 really emphasized this latter part of the process with its treatment of how symmetries give rise to laws, introducing a whole new way to think about physics.

#### What are your future plans?

I definitely want to go to graduate school for physics. I could see myself pursuing a Ph.D. I'm looking forward to spending the next few months exploring all the options that are out there.

#### Where do you see yourself in 10 years?

Hopefully still learning physics, some way or another!

#### Tell me something interesting about yourself.

The day my friends and I had our first PHY151 lecture was also the day they first detected gravitational waves at LIGO. Just when the world of physics began opening up to me, a new world of questions and possibilities was opening up in physics!

## Alumni Profile

### Felipe Morgado BSc Biophysics



*Felipe Morgado*

At first, I had no plans to pursue physics - I was going to study pharmacology. But after taking a seminar course by Dr. Sajeev John in the first year of my Bachelor's, I knew I was excited by physics much more than by anything else I was studying. I chose to pursue a Specialist in biophysics because I am fascinated by the fundamental laws of nature and how they play out in complex and messy biological systems.

Currently, I am in the combined MD/PhD program at U of T. Through my training, I will be able to pursue a career in "bench-to-bedside" medicine. What I learn from my patients will motivate the research I pursue, and the products of my research will hopefully benefit the lives of my patients. My PhD is in neuro-stimulation therapies for Autism Spectrum Disorder. Under the supervision of Dr. Jason Lerch at The Hospital for Sick Children, I want to identify what are the brain regions

that are the most associated with phenotypes of ASD, such as stereotyped behaviour and social communication deficits. In mouse models, I will then study how various stimulation technologies, such as deep brain stimulation and transcranial magnetic stimulation, can help suppress these behaviours in severe manifestations of ASD. Many people with autism can live rich, full lives and do not require these therapies. However, severe ASD can be debilitating, and these stimulation technologies could help provide the relief these patients need.

My BSc in biophysics has changed my approach to science, and there are lessons I have carried over to studying medicine. I have a deeper appreciation for the mechanics of the human body than I would otherwise, and this has helped me understand concepts from gas diffusion in respiration to the waveform of an electrocardiogram. I also have a deeper appreciation for broad concepts in the study of medicine, such as how phenomena at different scales relate to one another. Medicine can be approached from the biomolecular, cellular, or the gross anatomical scale, and it is important to know how concepts at one level relate to concepts at another.

My other interests and involvements at U of T include being a mentor with the PhysCAP [Mentorship Program](#) for the past three years. I enjoy coaching undergrads through preparing

themselves for life after the BSc, be it by helping them apply to grad school or otherwise. I was also a Program Leader with the [Science Unlimited Summer Camp](#) at the Department of Physics for two years. Over a week in the summer, I helped organize a camp for high-school students interested in science, in which they participated in activities across many departments. I love helping students discover which areas of science excite them.

At the Faculty of Medicine, I co-founded the Artificial Intelligence in Medicine Student Society. We have a speaker series in which clinicians, scientists, c-suite executives, ethicists and others come to tackle the topic of AI in medicine and highlight what are the cutting-edge breakthroughs, applications, and challenges. Follow us on Twitter at [@aimss\\_uoft](#) to learn more!

Outside of school, I love music, travelling, and of course food. Concerts, restaurants, hiking trails and beaches are where you can find me most of the time.

## Outreach in Action - Science Rendezvous 2018

Science Rendezvous at the University of Toronto (St. George Campus) took place on May 12, 2018 and featured numerous demonstrations and activities that integrated science, technology, engineering, mathematics, and human ingenuity. The event offered visitors of all ages a chance to meet with world-class researchers, conduct hands-on experiments and, above all, have fun while discovering science in a whole new way.

More information here:

<http://www.sciencerendezvousuoft.ca/>

At the Physics Department, guests were treated to a variety of demos, talks, tours and an art exhibit called “Cell Cave” by artist Radha Chaddah.



*2018 Photos by Ben Olsen*

Check out the YouTube video made by a very talented student Clement Zhou! Physics dominoes and superconducting train are featured!

<https://youtu.be/TCABsyE6oAs>

## Outreach in Action - Doors Open Toronto 2018

The Physics Department participated in Doors Open Toronto for the first time on May 26 and 27, 2018.

Over 1500 guests saw the lecture hall where Good Will Hunting was filmed as well as newly renovated teaching facilities. There were a variety of physics demonstrations for children, parents, and curious people of all ages.

The event was organized by Professor David Bailey with the help of our technicians and a number of volunteers from the Department.

David Bailey said his favorite part was *"That so many people came and seemed to have enjoyed themselves! It would be tough to pick a favourite display or demonstration. How do you choose between the 15th floor Balcony, the giant dominos, our new Infrared camera, or learning about the films made here?"*

More information on Doors Open can be found [here](#).

 **GREAT GULF**  
**DOORS**  
**OPEN**  
MAY 26 & 27, 2018



Photos by student Winston Chan



## Outreach in Action - Inspiring Future Physicists!

### School Visits

As part of the Department's ongoing Outreach initiatives, the Outreach Committee continues to offer visits for high school students. Usually, Physics teachers from high schools across GTA contact the department to arrange a visit for an entire class. The visits typically consist of a talk about the Physics Department, tours and/or workshops.

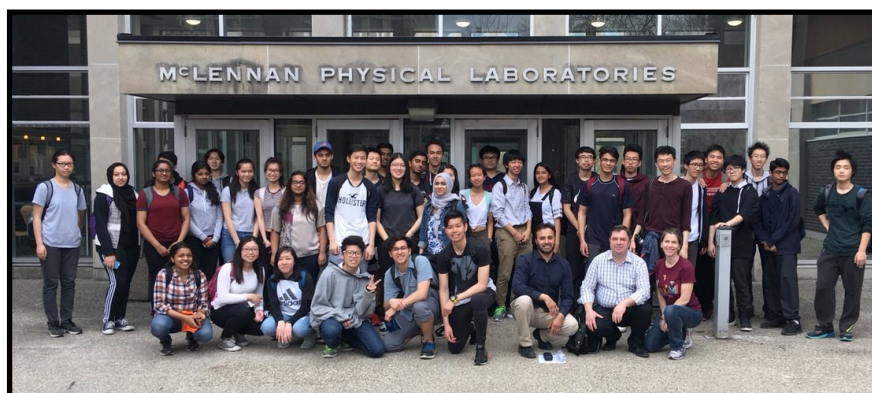
### Leaside Highschool - March 9, 2018 Grade 12 Students



### Leaside Highschool - April 30, 2018 Grade 11 Students



### Albert Campbell Collegiate Institute - May 30, 2018 Grade 11 Students



## Past Events

### Mentorship Program Closing Party

The Mentorship Program Closing party was held on March 27, 2018. It was an opportunity to say thanks to our mentors and mark the close of another successful year.

This year, the program had 53 mentor - mentee matches. Our mentees were third and fourth year physics students and our mentors consisted of alumni, grad students and faculty.

Mentees got advice on careers, grad school, resumes and on life after graduation from their mentors.

#### Mentees had positive things to say about the program, one mentee said:

“One of the biggest resources available are other people. A lot can be learned from talking to someone more experienced than you, even if they can't directly help you, there's a good chance they would know someone else to refer you to, to help you.”

#### Mentors also enjoyed the experience:

“I think that it is important to provide guidance to our students as they figure out the next steps in their career path”

“Hoping to share my experience with other physics graduates to help them make good decisions as they embark on their careers.”

“I find it useful when other people share their experience with me and I wanted to do the same and help someone else out in their journey. “

“I know that I would have appreciated a program like this one when I was doing my undergraduate degree so I wanted to help out!”

“I graduated from U of T and I thought then that there was no support for people not continuing on in academics. I wanted to help students wanting to transition to industry.”

“I would have benefitted greatly from having a mentor when I was an undergraduate.”

#### If you would like more information or want to be involved in the program:

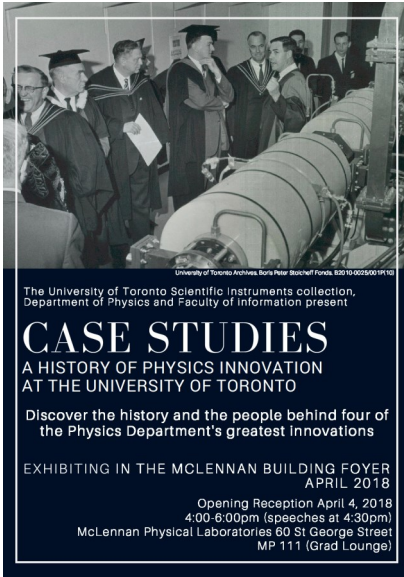
Email - [mentorship@physics.utoronto.ca](mailto:mentorship@physics.utoronto.ca)

Visit - [uoft.me/physicsmentorship](http://uoft.me/physicsmentorship)

Sponsored by:  
**mbna**



*Group photo from the closing party*



## Case Studies Opening Reception

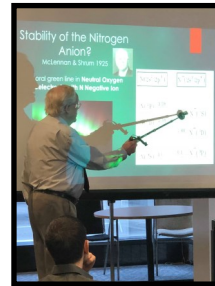
On April 4, 2018, students Erin Beaubien and Daniel Rose from the [U of T Museum Studies](#) program had an opening reception for their final project. The project was displayed in the McLennan lobby and was titled: A History of Physics Innovation at The University of Toronto

In conjunction with the [University of Toronto Scientific Instruments Collection](#), the University of Toronto Physics Department and the [Faculty of Information](#), the exhibition presented four instruments and processes that were developed at the Department to illustrate the university's impact on physics research and the scientists behind the inventions.

The reception was well attended and had remarks by Ted Litherland, Norman Evensen and Stephen Morris.



*Erin Beaubien and Daniel Rose in front of their display*



*Ted Litherland*



*Norman Evensen*

## 2018 Welsh Lectures in Physics

The 2018 Welsh Lecture were held on May 3, 2018. The colloquia were held on May 4, 2018.

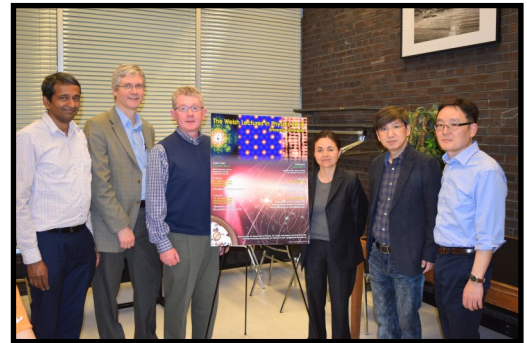
The speakers were:

Prof. Seamus Davis (Cornell University) - "Visualizing Quantum Matter"

Prof. Ana Maria Rey (University of Colorado) - "Quantum clocks: the greatest rulers of time"

For more information visit:

<https://www.physics.utoronto.ca/~welsh/>



*Arun Paramekanti, Stephen Julian, Seamus David, Ana Maria Rey, Yong-Baek Kim and Young-June Kim*

## Kids' Passport

As part of the 2018 Alumni Reunion, the Department participated in Kids' Passport for the third year in a row on June 2, 2018. Over 200 children and parents were treated to demos that were organized by Carolyn Sealfan with the help of volunteers. Our guests learned about energy and took home little motors.



## 2018 Emeritus Brunch

The fourth annual Emeritus Reunion Brunch took place on June 2, 2018. Our emeriti had brunch, reconnected with colleagues and got updates on the department from current faculty.



*Back Row left to right: Henry Van Driel, Una Rowe, Rashmi Desai, Hope Springman, Phillip Kronberg, Kimberly Strong, Richard Bailey, Stephen Julian, David Bailey, John Perz, Ron Farquhar, Stephen Morris and David Dunlop*  
*Front Row left to right: Christine van Driel, Kappu Desai, Ken Norwich, David Rowe, Ted Litherland, John Moffat, Patricia Moffat, Jennifer Code, Malcolm Graham and Fraser Code*

## Science Unlimited Summer Camp 2018

"It blew my mind!"

"It was really fun and cool "

" I learned a lot in a fun way"

"We saw absolutely incredible things "

"The experiments are cool"



Science Unlimited Summer Camp took place August 13-17, 2018. 50 high school students took part in workshops put on by the Departments of Astronomy, Physics, Earth Sciences, Math, Computer Science, Chemistry and the School of the Environment.

Interested in giving your grade 10 or 11 child an unforgettable educational experience? Find out more at: <https://sites.physics.utoronto.ca/summercamp>

## People

### Faculty Changes

#### Kimberly Strong

Of the Earth, Atmospheric, and Planetary Physics group will be the next Chair of the Department of Physics.

*Prof. Strong will be on leave next year and Prof. Michael Luke, former Chair of the Department, and member of our Theoretical High Energy Physics group, will be Acting Chair from July 1, 2018 to June 30, 2019.*



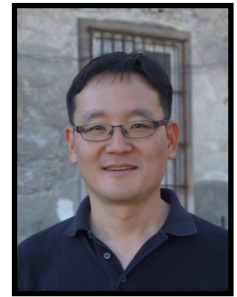
*Kimberly Strong*



*Michael Luke*

#### Young-June Kim

Professor Young-June Kim of the Condensed Matter Physics group will be our next Associate Chair for Graduate Studies. He follows Professor William Trischuk, who will step down after four years of outstanding service to the students and faculty members of our Department.



*Young-June Kim*

### Staff Changes

#### Pius Santiago

Has joined us in the position of Learning Services Specialist in the Undergraduate Labs.

#### Jingju (Daisy) Yuan

Will be working in the Physics Library as the new Library Technician .

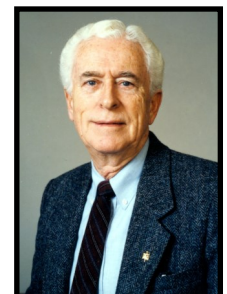
### Anniversaries - *Celebrating 25 Years*

Although the University formally recognized Aloma Namasivayam's 25th anniversary this year, she actually started with the Physics Department in a casual roll in 1991. She has had an opportunity to provide administrative support in several areas, including the VAX Consortium (now PCS), the High Energy Physics Group, and in the main office. She started as purchasing clerk in 1994, and has continued to develop her skills in procurement administration since then. She puts considerable effort into maintaining a deep knowledge of the many different procurement rules and regulations that our funding agencies impose on us, and has the rather unenviable task of insisting that we all follow them. Thankfully her calm, patient and friendly manner makes this easier for all of us. When away from work, Aloma likes to spend time with her family, and especially with her new grandson.

### In Memory

#### Donald G. Ivey

[Professor Emeritus Donald Ivey](#) passed away on Monday, June 25, at the age of 96. He was Professor of Physics from 1949 to 1992, and was Principal of New College from 1963-1974. Well known outside the physics community as the first host of CBC's "The Nature of Things" and for his appearance with his colleague Patterson Hume in the classic film "[Frames of Reference](#)". As asteroid called the "[HumeIvey](#)" was named after him.



*Donald G. Ivey*

# Awards

## 2017-2018 Staff Awards

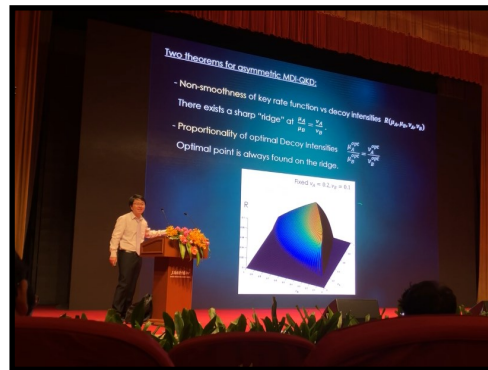
Administrative Staff Award - Lisa Jefferson  
Technical Services Staff Award - Gurmit Besla

## QCCrypt 2018 Student Paper Award

Professor Hoi-Kwong Lo's PhD student, (Mike) Wenyuan Wang, won the Best Student Paper Award at the QCCrypt conference (August 27-31, 2018) - the largest scientific conference in quantum cryptography.

Wenyuan's paper was titled: "Enabling a Scalable High-Rate Measurement-Device-Independent Quantum Key Distribution Network: theory and experiment." Professor Lo's group also took home this award in 2014. Congratulations!

More information on QCCrypt can be found here: See <http://2018.qccrypt.net/>



Wenyuan Wang

## 2017-2018 Van Krandendonk Award

The [Van Krandendonk Award](#) is given every year to four graduate students who have done the best job as Teaching Assistants during the current year.

### The 2017-2018 recipients are:

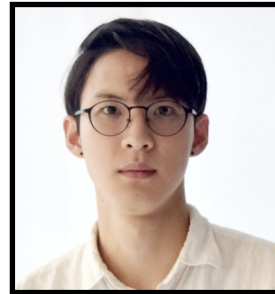
Andrei Catuneanu  
David DeMarco  
Kyle Hwangbo  
Thomas Morrison



Andrei Catuneanu



David DeMarco



Kyle Hwangbo



Thomas Morrison

## Awards continued....

### Loudon-Hines Gold Medal and Scholarship in Physics The 2017-2018 recipient is: Xin Yu (Charles) Zheng

The inaugural *Loudon-Hines Gold Medal and Scholarship in Physics* was established in 2018 through the generosity of two anonymous donors.

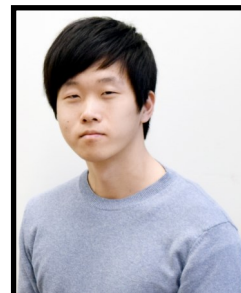
Awarded by the Faculty of Arts & Science on the recommendation of the Department of Physics, the *Loudon-Hines Gold Medal and Scholarship* will be presented annually to the graduating student in the Specialist or Major program in Physics with the highest cumulative grade point average and who also demonstrates creativity and a clear promise in the discipline of physics.

This preeminent undergraduate award is connected to a long-standing history at the University of Toronto. The original James Loudon Gold Medal was a gift of the Toronto Committee of the American Association for the Advancement of Science in 1890, in recognition of the valuable services of James Loudon, M.A., LL.D., Professor of Physics. The late Professor James Loudon was President of University College (1892-1901) and President of the University of Toronto (1892-1906).

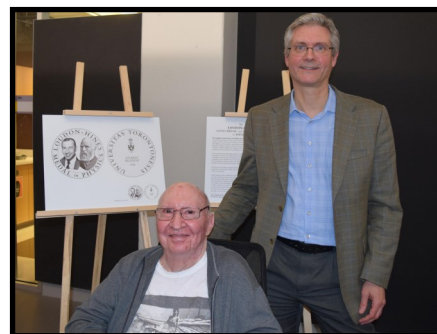
Over the past 128 years, the gold medal has been awarded to celebrated and esteemed physicists including Colin Hines, Ph.D., Professor of Physics, after whom this new medal is co-named.

Thanks to the creativity and vision of our two anonymous donors, this prestigious gold medal has been given new life, and is accompanied by a generous financial award.

The Loudon-Hines Gold Medal and Scholarship in Physics will honour both Professor James Loudon and Professor Colin Hines, and celebrate the best and most promising young physicists who will carry on an important legacy.



*Charles Zheng*



*Prof. Colin Hines and  
former Chair Stephen Julian*

### George Luste Prize in 1st Year Physics

This prize was set up by the late Professor George Luste to recognize and support undergraduate physics students of merit. Professor Luste always believed in financially supporting higher education.



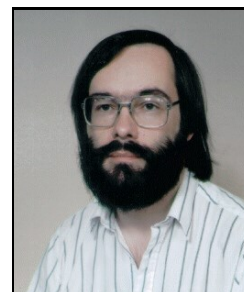
*George Luste*

**The 2017-2018 recipients are:**

Abdul Arif  
Matthew Bub  
Hugh Goatcher  
Juliette Lee  
Daniel Venn  
Yushen Zuo

### Bryan Wayne Statt Memorial Scholarship

This award was established in 2005 by the family, friends and colleagues of the late Bryan Wayne Statt. It is awarded, on basis of academic merit, to up to 4 undergraduate students enrolled in the 2nd, 3rd or 4th year physics laboratory courses. Financial need was also considered.



*Bryan Wayne Statt*

**The 2017-2018 recipients are:**

Bitu Behrouzi  
Elliot Jarmain  
Andrew Tan

## 2018 CAP University Prize Examination

The [2018 CAP University Prize Examination](#) was coordinated by the Department of Physics at the University of Toronto and was held on March 13, 2018.

The examination was written by 86 students from 15 universities/colleges.

The first place prize was awarded to Hanzhen Lin from Engineering Physics at U of T. Also, four of the students in the top 10 were our Arts and Science students.

4th place: Hiromitsu Sawaoka, Physics Specialist 1T8

Tied for 5th place: Andrew Gomes, Mathematics and Physics Specialist 1T8

Tied for 6th place: Stefan Divic, Mathematics and Physics Specialist 1T9

7th place: Anqi Mu, Physics Specialist 1T8

**Students who score in the top 10 nationally on this CAP Exam are also eligible for the George Luste CAP Prize Exam Award, awarded annually by the Faculty of Arts and Science at U of T**

Congratulations to all the winners!

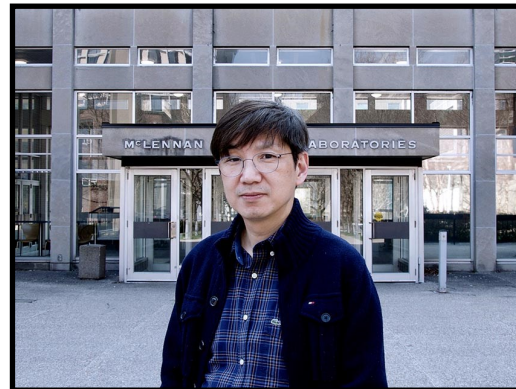
## Yong-Baek Kim awarded Killam Research Fellowship

Professor Yong-Baek Kim has been awarded the prestigious Killam Research Fellowship for his research on Topological Phases of Correlated Quantum Materials.

The fellowship is for two years and during this time, Professor Kim plans to study quantum spin liquids. In some quantum materials, spins constantly fluctuate because of extreme quantum effects. In such states, completely new kinds of particles appear and they have been proposed as a possible platform for fault-tolerant quantum computations.

We asked Professor Kim what this fellowship means to him, “It’s a great honour to be recognized with a Killam Fellowship. This support gives me an exciting opportunity to expand my research, think creatively, and explore unknown research territories”.

In 2017, Professor Kim was also the recipient of the Brockhouse Medal from the Canadian Association of Physicists for his contributions to condensed matter and materials physics.



Yong-Baek Kim (photo credit: U of T news)

*Physics Flashback: In 2014, Professor Sajeew John was the recipient of the 2014 Canada Council Killam Prize for his work on the localization of light and the invention of new Photonic Band Gap (PBG) materials.*

## New Federal Funding for the Canadian Contribution to the LHC Upgrade

University of Toronto Physics Professor Peter Krieger was part of the recent announcement of federal funding for a Canadian contribution to the upgrade of the Large Hadron Collider at CERN. This announcement was made in Vancouver on June 25 by the Minister of Science, the Honourable Kirsty Duncan.

Krieger serves as the spokesperson for the ATLAS-Canada collaboration, which comprises 39 faculty-level investigators at ten Canadian institutions (McGill University, Universite de Montreal, Carleton University, University of Toronto, York University, University of Alberta, UBC, Simon Fraser University, TRIUMF and the University of Victoria) as well as



*Left to Right: Prof. Michael J. Roney, Prof. Peter Krieger, Prof. Arthur B. McDonald, Joyce Murray, The Honourable Kirsty Duncan and Anne Louise Aboud*

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LHC continued...

about 30 postdoctoral researchers, 80 graduate students, and technical and computing staff. Canada is a founding member of the ATLAS Collaboration. Canadian researchers built significant parts of the ATLAS detector, as well as one of the ten “Tier-1” computing centres needed to process and analyze the data. The group plays key roles in the management and operation of the experiment, as well as in the science it produces, including the 2012 discovery of the Higgs boson.

The \$10M to be provided by the federal government, combined with a \$2M in-kind contribution from TRIUMF, Canada’s national laboratory for subatomic physics and accelerator science, which will manage the project, will be used for the construction of cryo-modules to house the “crab cavities” that are at the heart of the luminosity upgrade of the collider, which will see the rate of proton-proton collisions increase by a factor of up to 7.5 times the original design value. Over about a ten-year period starting in 2026, this will enable ATLAS to accumulate a data sample ten times the one that will be collected by the end of 2023, which will mark the completion of the originally envisaged LHC experimental program. This large data sample will enable more precise studies of the Higgs boson and provide improved sensitivity for ongoing searches for physics beyond the Standard Model, for example Dark Matter.

The upgrade of the collider will also require upgrades to the experiments, and Canadian groups across the country, including at U of T, are already contributing to both Phase-1 (2019-2020) and Phase-2 (2024-2026) detector upgrades via funding provided by the Canada Foundation for Innovation in the 2015 and 2017 Innovation Fund competitions.

For more information on the recent announcement, see:

<https://www.utoronto.ca/news/canada-gives-12-million-boost-power-large-hadron-collider>

## University of Toronto Aerospace Team (UTAT) Space Systems Division

Since 2016 the Physics Department has donated lab space in the basement of McLennan for [UTAT's Space Systems Division](#).

The Space Systems division of the University of Toronto Aerospace Team is a student-funded design team building small satellites in MP 099 in the basement of McLennan Physical Labs. The HERON Mk II biological CubeSatellite is currently slated for launch in India, early 2020, onboard the Polar Satellite Launch Vehicle (PSLV). The payload will conduct biology experiments on the common gut microbe *Candida Albicans*, studying its real-time genetic expression and drug resistance in response to the microgravity environment. They compete in the Canadian Satellite Design Challenge, comprised of 15 university teams across Canada building small satellites.

UTAT Space Systems Division will be the first undergraduate-funded team in Canada to perform a satellite launch. Their funding comes from in-kind partnerships with industry and a levy from the University of Toronto Students’ Union. All registered, full-time undergraduate students contribute roughly \$3 each semester from their tuition to pay for the launch. The levy expires after two years, and they hope to renew it in order to establish an ongoing undergraduate satellite program at UofT.

The satellite is designed to the requirements in the 3U CubeSatellite Design Standard developed by California Polytechnic (CalPoly). This standard is widely used and enables our satellite to integrate with a standardized CalPoly P-POD deployer, incorporated as a secondary payload on many launches. The satellite design is open source and readily available to the public to build upon.

Throughout this process, these students have actively engaged with the broader community to share the team’s journey and progress. They have presented to high school students, demonstrated at design fairs, participated at media events and showcased at the Canadian National Exhibition in August.



*Qualification testing in Ottawa at David Florida Laboratory (June 2018)*

### Contact Us

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### Physics Funny

**What is the name of the first electricity detective?**

*Answer: Sherlock Ohms*

## YES, I would like to make a gift to the Physics Departmental Trust at U of T!

Your gift will support the Department's areas of greatest need and help advance our reputation for excellence and innovation.

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To give online, visit: [donate.utoronto.ca/physics](http://donate.utoronto.ca/physics)

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