# in the loop

ISSUE 1 | OCTOBER 2014

## Welcome to *in the loop*!

The 2014/15 school year will be the sixth for McMaster's Integrated Science (iSci) program. The incoming Class of 2018, with 58 students, is our largest cohort yet, and we are incredibly excited by all of the progress that has allowed the iSci program to reach this point. On June 12, 2014, our second cohort of iSci students graduated. As both our student body and pool of alumni continue to grow, we decided that it was time to establish an Integrated Science newsletter to keep everyone "in the loop".

*In the loop* is a collaborative effort between the staff, students, and alumni of the Integrated Science program to share updates on anything and everything to do with iSci. In this first issue, we will follow some of our recent alumni on their journey to new and exciting places, meet some of the recent additions to our instructional team, and give a virtual introduction to the state-of-the-art Integrated Science Laboratory. On behalf of the *in the loop* team, I would like to welcome you to our first issue. Join us to stay in the loop about all of the latest news from McMaster's flagship Honours Integrated Science Program!

Grand Venture September 20/21, 2014: Inaugural canoe trip and overnight stay on the Grand River.

## Director's Commentary

Greetings from iSci. We hope that this newsletter will help us stay in touch with alumni, keep all of our in- program students informed, and introduce new students to the many happenings in the iSci family. A huge 'thank you' to David Yun (and Lauren Oldfield) for designing and putting this issue together - we're very proud of it and hope you will enthusiastically contribute materials to publish in future editions (look out for your next *in the loop* newsletter in the spring!).

This past year was another successful year for iSci. We welcomed 58 incoming students in the fall and we graduated our second cohort (Class of 2014) in the spring. iSci students (and alumni) are now infiltrating institutions far and near, as research assistants, graduate students, and employees in a broad range of disciplinary and interdisciplinary fields. We opened our brand new, Integrated Science lab in September and many thanks are due to Russ (and Genevieve) for an amazing job designing and managing this incredible space. Congratulations are also due to Chad and Sarah S on gaining 'permanency' as Teaching Track faculty and to Sarah R on winning a prestigious President's Award for Outstanding Service. We have also experienced somewhat of a baby-boom this summer - Sarah R welcomed her baby girl Lillian Jeanne (Lily) on July 9 and Andrew welcomed his baby boy Anson Fitzgerald on August 12. Class of 2032 in the making!

These are just a few of the wonderful events we enjoyed this past year - many more are reported here in the newsletter. Our latest cohort of iSci students who arrived in September are settling in well - we offer them a warm welcome to the iSci family and hope they enjoy the challenges and rewards of being a part of this wonderful learning community. We also welcome new staff members Janice Penney-Gibbs (our iSci Administrator while Sarah is on leave), and Vanessa Killinger, our new Program Advisor. We wish everyone the very best for the 2014-15 session!

Best wishes, Carolyn

## IMPORTANT DATES

OCT 21 — iSci Coffee House

1st Fall Preview Day — OCT 25

OCT 25 — iSci Paintball

2nd Fall Preview Day — NOV 15

**iSci 2013 Alumni:** Watch email for a new survey coming soon.

# Welcome to the iSci Lab!

Fresh off its inaugural academic year, the Integrated Science Laboratory is back and better than ever. The lab was custom-designed to fit the needs of our multi-disciplinary science program. The open-concept design facilitates group work and allows teaching assistants to move between students. The lab features energy-efficient ductless fumehoods, a flexible configuration to meet the needs of all disciplines, storage space for student belongings, and a SMART Board® and white boards for teaching.

Located on the first floor of the General Science Building, the iSci Laboratory is used for the majority of ISCI 1A24 and 2A18 lab experiments. The lab benches have capacity for up to 32 students at a time, meaning that we will be well equipped to handle our incoming class of 58 students in two lab sections. Regardless of a student's scientific interests, the Integrated Science Laboratory is a place to explore.

# Peer Review

*An exclusive interview with **Sarah Drohan**, iSci 2014 grad and President's Award winner*

*Sarah Drohan graduated from the Integrated Science program in May 2014. She completed her senior thesis in the field of mathematical epidemiology under the supervision of Dr. David Earn. She will be continuing her work in this field under Dr. Simon Levin and Dr. Bryan Grenfell as a PhD student at Princeton University in September.*

***How did you decide on Princeton?***

It just felt like the obvious choice to me. My supervisors are experts in the field and very warm, nice people and the graduate program has a lot of freedom and flexibility. In fact, what really made my decision for me was the same way I decided on McMaster four years ago - when I visited the campus and talked to students and staff I just had a feeling it was the right place for me.

***What is your dream career?***

Probably being a math professor or, failing that, working for the Centers for Disease Control (CDC). At this point I'm open to all sorts of possibilities and really only worrying about the next four years.

***What is your favourite memory of the iSci program?***

As cliché as it is, probably the friendships. I can't really pinpoint a specific moment, but it is an amalgamation of the nights before deadlines and the accompanying hysterical laughter.

***What advice would you give to new iSci students?***

Don't sweat the small stuff. Not to say don't do the small things, you should absolutely try and do well, but if you let every CAPA and Mastering Chemistry stress you out you are going to miss out on the big picture. Lastly, you are going to encounter a lot of smart people – don't try and compare yourself to everyone. Everyone has his or her strengths and weaknesses – own yours.

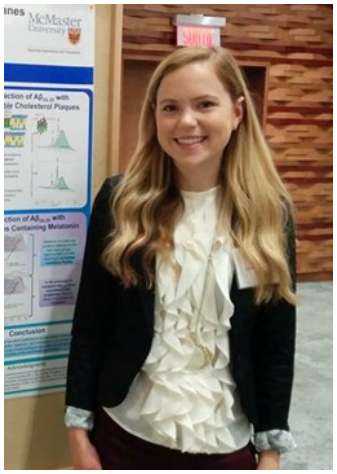
***Which of your accomplishments are you most proud of?***

I'm proud of my thesis as I feel I've actually contributed significant results to my field. I could never have done it without outstanding supervision and mentorship from Dr. Earn over the past two years. I'm also really looking forward to attending Princeton next year.

***What problem in math is the most exciting to you?***

My thesis on synchrony in childhood infectious disease spread was pretty exciting to me, but I'm probably a little biased. For the past few years my little hobby math project has been a question in number theory called congruent numbers, which is tied to one of the Millennium Prize Problems. I encourage anyone interested to Google it as it is an interesting problem that is very easily and simply explained, but with a surprisingly complicated solution.

# Where are our alumni now?



## Hannah Dies Class of 2014

After finishing her Integrated Science degree with a concentration in Physics, Hannah spent her summer working with her undergraduate thesis supervisor, Dr. Maikel Rheinstädter, in the Department of Physics and Astronomy. Hannah's research involved studying cell membranes through X-ray diffraction in order to understand the structure and interactions of the Alzheimer's protein with biological molecules such as cholesterol. She recently published her thesis work as a first author paper in PLOS ONE, and presented her findings at the QENS/WINS 2014 Conference in Grenoble, France. This year, Hannah is beginning an MD/PhD degree at Queen's University. Her thesis project, in the Department of Chemical Biomedical Engineering, will involve developing optical microfluidic devices with biomedical applications as sensors for small molecules.

When she wasn't splitting time between the classroom and her lab, Hannah served as the President of the iSci Society. In her spare time, Hannah enjoys performing at iSci Coffeehouses, running half-marathons, and being an identical twin.

## Rodrigo Narro Perez Class of 2014

Rodrigo's time in the iSci program and at McMaster has been defined by student involvement. Rodrigo has conducted field research in the School of Geography & Earth Sciences under the supervision of Dr. Carolyn Eyles. He then completed his thesis with Dr. Eyles and has worked for two years as the teaching assistant for the Earth science component of ISCI 1A24. Though already successful in research, Rodrigo decided to take a year off from school to pursue another passion of his: student government. Rodrigo held positions on both the McMaster Science Society and the Student Representative Assembly during his undergrad, and he channelled those experiences to win the election for Vice President Education of the McMaster Student Union (MSU).

As VP Education of the MSU, Rodrigo is one of four members on the MSU Board of Directors. His position requires him to work alongside McMaster faculty and administration to improve the education received by McMaster students. He also has plans to work on a new Student Success Policy in the upcoming year. Even though Rodrigo continues to achieve great things, we will always remember him for his salsa dancing, soccer goalkeeping, and hair combing.

## Adam Pantaleo Class of 2013

Adam graduated from the Integrated Science program in 2013 with a concentration in Chemistry. He then began graduate studies in Chemistry at the University of Toronto in September of 2013. Under the supervision of Dr. Datong Song, Adam is studying the reactivity of unique transition metal complexes with small molecules such as dinitrogen and carbon dioxide. Using these complexes, he hopes to discover novel and interesting ways to convert these abundant yet unreactive molecules into more valuable substrates such as ammonia and methanol. Though he is still a student, Adam is also very excited to have students of his own: he currently supervises three undergraduate students completing summer research projects in Prof. Song's lab. He is also a Teaching Assistant for a first-year undergraduate chemistry course. Adam is looking forward to completing his M.Sc. degree this fall after an eventful academic year. Although his future after graduate school is not yet certain, he is excited to explore possible careers in teaching or in the chemistry industry. Outside of the lab and the classroom, Adam enjoys swimming, biking around his hometown of Mississauga, and reading things other than chemistry textbooks. He also regularly volunteers at a homeless shelter and is a proud member of the Knights of Columbus, a Catholic charity organization dedicated to supporting those in need and providing for the less fortunate members of our community.

## ISCI 3IS3— Land of Fire & Ice

ISCI 3IS3 was an exciting new addition to the Integrated Science course offerings for the Spring 2014 term. Cross-listed in the Faculty of Science and Arts & Science program, students in ISCI 3IS3 participated in a 10-day interdisciplinary field course in picturesque Iceland. The course was led by Drs. Carolyn Eyles and Chad Harvey of the Integrated Science program, as well as Dr. John Maclachlan from the Arts & Science program. Between lessons from the 3IS3 teaching team and field guide Dr. Kristinn Guðjónsson, the students conducted their own research on topics varying from the geology of Iceland to Icelandic folklore. The class travelled along the southern coast of Iceland, visiting such geologic landmarks as the Eyjafjallajökull volcano (source of the 2010 eruption), Vatnajökull (the largest ice cap in Europe), and the Blue Lagoon. When the students weren't busy writing in their research notebooks and studying for the final exam, they put on an original play about Iceland and entertained the locals with rousing karaoke performances of Canadian hits like Avril Lavigne's "Sk8er Boi" and Nickelback's "How You Remind Me".

STUDENTS IN THE ISCI 3IS3 ICELAND COURSE BRIDGE THE GAP BETWEEN THE NORTH AMERICAN AND EURASIAN PLATES

## ISCI 3IE1— Kentucky Caving Fieldtrip

In October 2013 (and recently October 2014), Drs. John Maclachlan and Chad Harvey made their long-awaited return to the Bluegrass State with eleven adventurous undergrads in tow. Over the course of a weekend, the students explored three of Kentucky's most popular and scenic caves, including Mammoth Cave, Hidden River Cave, and Cub Run Cave. Course participants studied the karstic landscape that allowed the formation of the Kentucky cave systems, the history of the Kentucky caving industry, and, of course, the cuisine of the Southern United States.

## ISCI 3IE1— Egyptian Hieroglyphs

Though the subject may lie beyond the realm of traditional scientific topics, the Integrated Science program is lucky to have a resident Egyptian hieroglyphs expert in Dr. Sarah Symons. In the Egyptian Hieroglyphs installment of the experiential courses, students received introductory lessons in writing, reading, and interpreting hieroglyphs. To conclude the course, the students took a trip to the Royal Ontario Museum in Toronto to see some Egyptian artifacts firsthand. A teaching professor in the iSci program, Dr. Symons conducts her research in the field of archaeoastronomy, combining her passion for both archaeology and astronomy.

# Under the Microscope

*An interview with Dr. Rob Cockcroft, iSci physics and science literacy professor*

*Dr. Rob Cockcroft teaches both physics and science literacy in the Integrated Science program. He has had an interesting career path, which has included a PhD in observational astronomy, two years teaching English in Japan after his undergrad, and his current research in archaeoastronomy. He is also the manager of the McCallion Planetarium at McMaster.*

DR. COCKCROFT GIVES A PRESENTATION IN THE McCALLION PLANETARIUM

***What are some of the highlights of your academic career thus far?***

I've had and continue to have the privilege to work with many great people; both expert colleagues and friends, and students in my classes. I obviously love physics and astronomy, but I wouldn't have continued this far in academia without them. My work has taken me to places I might not otherwise have visited, for example the Mauna Kea telescopes in Hawaii where I obtained my PhD data, or the tombs and temples in Egypt to study the history of astronomy. I love being able to share scientific knowledge, so the opportunities while working at McMaster's astronomy outreach facilities - the McCallion Planetarium and Origin's 3D Theatre - have been wonderful.

***How was your experience teaching in Japan and what did you take away from it?***

My experience in Japan was amazing... I initially only went for one year between my bachelors and masters degrees, but stayed for two because I enjoyed it so much. I left Japan with a deeper appreciation not only of Japanese culture and language, but also a better understanding of my own. I learnt that an effective teacher should simultaneously be a good student; I could relate well to my English students as I studied Japanese.

***What are some of your teaching philosophies? What teaching methods do you bring to the classroom?***

Teaching for me is helping students re-engaging with the 5-year-old's mentality of always asking why. As an instructor I want to act as the catalyst, facilitating students' inquisitiveness and inspire the awe in the Universe that it deserves. I think it's important not only to acquire knowledge, but also to build that knowledge into a robust framework of expertise - and constantly check and reflect on one's own learning. To these ends, I think an interactive classroom is essential for physics, and so I make use of clickers and lots of resources on the web.

DR. COCKCROFT (FAR RIGHT) WITH HIS ISCI 1A24 PHYSICS CLASS AFTER THEIR WORLD RECORD PAPER AIRPLANE ATTEMPT

***What are you looking forward to about teaching in the iSci program?***

Again, the people I am fortunate to have the opportunity to work with are amazing, and one of the major aspects that I look forward to continuing with iSci teaching. We have a team that fosters student learning in an incredible way. I wish that when I was an undergraduate I could have enrolled in a program like iSci.

***Anything else that you think might be interesting***

I have worked with Sarah Symons on a number of projects, and over the last two years we have worked on the history of astronomy - focusing specifically on ancient Egyptian astronomy. One of our major goals is to make this field more accessible to a wide range of scholars, historians, Egyptologists, astronomers, and educators around the world, and we are doing that by creating an online scholarly database: aea.physics.mcmaster.ca. We have also created a local network of people on campus who are interested in history of science; the network is called HISTReENet or History of Ideas, Science and Technology Research and Education Network: www.physics.mcmaster.ca/HISTReENet. Students, staff and faculty alike are all welcome to join this network, which meets roughly once per month during the fall and winter terms.

# Societal Norms

Updates from the Integrated Science Society students

"The Integrated Science Society is the student government of the iSci program. The iSci Society serves iSci students in several facets of student life: communicating academic feedback to instructors, planning social events, facilitating transitional programs for first-year and exchange students, and offering academic mentorship. We have a lot planned for the upcoming year, **and we wanted to take the time to highlight some of our big projects." – David Yun, iSci Society President**

Contact us: iscisociety@gmail.com

## Big Sib Program

One of our favourite traditions in the iSci program (although borrowed from Arts & Science) is the Big Sib program. Incoming students complete a questionnaire before being matched with a second-year "big sib" to help ease their transition into university. Some "families" partake in such activities as cooking, baking, family photos, textbook exchanges, and coffeehouse performances. Stay tuned for the release of the Big Sib family tree featuring all six cohorts of iSci students.

## Peer Mentoring

The small class sizes in iSci and our Thode study space (iStudy) have always allowed students to help each other with school work. The iSci Peer Mentoring program is a more formalized version of what the students have been doing on their own. Students (usually in upper years) volunteer as academic mentors, specifying which subject areas they are comfortable peer tutoring. Any student in the program can then request assistance from these volunteers for one-on-one help or pre-test review sessions.

## Intramurals

We may not always be the most coordinated bunch, but at least we can have fun trying. Last year the iSci students put together intramural teams for soccer, volleyball, inner tube water polo, and ice hockey. We hope to expand our selection even further this year to prove once and for all that iSci is a force to be reckoned with. In all seriousness though, our teams are mainly just for fun and exercise.