Goodsell Gazette

Carleton College *1 June 2018*

Northfield, MN 55057 *The newsletter for the Carleton mathematics and statistics community.* *Vol. 37, No. 17*

Congratulations, Seniors!

It has been an exciting year in the Math and Stats Department -- we've had exciting guest lecturers, math competitions, departmental bananagrams contest, and classes taught by and taken with some of the coolest students and professors on campus.

While some members of this department are returning to campus in September, our seniors will be graduating and heading out into the world in just a few short weeks. Spending four years with this year's graduates has been a truly wonderful experience. Take some time below to find out what some of this year's seniors have planned for life after graduation, their favorite memories with the department, and advice to future math or stats seniors!. Congratulations on a job well done, seniors!

Post-Graduation Plans

"I will be briefly moving to South Korea." (Dane Birkeland)

"I'm going to be student teaching at Southwest High School in Minneapolis with a 9th grade class. I'm getting my 5-12 Minnesota Math teaching licensure. After I get my license (hopefully) by the end of November, I'll probably be transferring it to Illinois and teaching there." (Ben Clark)

"After graduation, I will be working as a data analyst for the New York Yankees. Long term, I will likely go to grad school for statistics." (Logan Crowl)

"I will be trying to relax a bit before applying to grad school." (Nathan Dalaklis)

"I will be working for NOAA in Boulder, Colorado

"Next year I will be working as a software developer for Epic in Madison. Longer term, things are less clear but I'm considering CS grad school in a few years." (Anna Meyer)

"I will be attending UC Berkeley next fall to get my masters in statistics." (Aidan Mullan)

"Next year I will be working at Analysis Group in Boston with a number of other former Carleton math majors, and spending a considerable amount of time deciding if and when I want to go to graduate school." (Eli Orvis)

"I will be pursuing a PhD in Physics at Northwestern University." (John Scott)

"I will be going to Georgetown Law School. I am hoping to be a civil rights lawyer (or something comparable)." (Yukihiko Segawa)

"Next year, I will be working at NORC doing social

after graduation." (Lynn Daniel)

"I will be attending Boston University as a PhD candidate in biostatistics!" (Sophia Gunn)

"This fall I will start the math PhD. program at the University of Wisconsin-Madison. I don't yet know what I'll specialize in, but I expect it to be something algebraic. I don't have firm long-term career plans, but so far I have been a lot more interested in math than anything I am aware of in industry, so I am currently most intrigued by academia." (Will Hardt)

"Next year I will be working at Kraft Analytics Group (KAGR) as a Data Scientist on the their Analytics team. I will be working on projects in all realms of sports business but especially trying to make predictions." (Emily Kaegi)

"Post-graduation I am moving to DC to be a Research Analyst for an Economic Consulting firm called The Brattle Group." (Clara Livingston)

"Next fall I'll be starting a math PhD program at Caltech. I'm not sure what I will do long-term, probably try to work in academia or in industry research." (Neeraja Kulkarni)

"I'll be doing a PhD program in Math (logic) at Carnegie Mellon University next year." (Shilin Ma)

policy statistical analysis." (Annie Shapiro)

"I'm moving to Cambridge, England to work at Arm Research, where I'll be exploring the use of formal verification and virtualization to make computer systems more secure." (Nick Spinale)

"Next year, I will be a math teaching fellow at the Conserve School. I will be spending my time teaching 16 year olds Algebra 2 and Pre-Calculus as well as doing a lot of hiking, canoeing and exploring in the forests of northern Wisconsin. After that, I hope to land in a PhD program working in the intersection of math and ecology." (Martha Torstenson)

"Short-term: I will be working at UMD as a summer researcher. Long-term: I will be applying to grad schools." (Yuhao Wan)

"I'm heading to Cornell University in Ithaca, NY, for graduate school in computer science theory." (Tegan Wilson)

Favorite Memories!

"I enjoyed watching this video in our fractal geometry reading group: https://www.youtube.com/watch?v=pCpLWbHVNhk" (Maya Banks).

"My favorite memories are Bob Dobrow's tangents during class." (Dane Birkeland)

"I would say going to BSME, but technically that wasn't Carleton, but I'm still gonna plug that anyway. As for Carleton, I just presented my comps a couple days ago as of this writing and it went really well, so giving my presentation in front of my peers and friends was a really (surprisingly) fun time. I also had a lot of fun pretending to be an

"Group projects. They provided good opportunities to learn math on our own (i.e., without the professor), and also to get to know other people in the class." (Will Hardt)

"My favorite Carleton math/stats memory is either many great conversations with my fellow female math majors and Liz during SWiMS meetings or setting up our COMPs experiment in the Recreation setting when we were throwing cotton balls everywhere!" (Emily Kaegi)

"There are too many! Hearing a sketch of the proof of Fermat's last theorem in Rafe's elliptic curves class, problem solving contests with Will and Peter, and one time when someone was trying to figure out partial derivatives in the skills center and asked

obnoxious 7th grader in Steve's Teaching Math class last year during microteachings!" (Ben Clark)

"I remember this one time when someone made an awful pun during Mark's Abstract 1 class, and then Mark threw a piece of chalk at them. Then he said he didn't know what came over him. It was a moment." (Ben Clark)

"I received an email from Steve Kennedy giving me some information about the Field of Dreams Conference because he thought I might be interested in grad school. I could not believe that one of my toughest profs thought I could be a candidate for graduate school. Him believing in me made it easier for me to believe in my self." (Maria Brise Martinez)

"All female upperclassmen who had been involved in SWiMS were invited to Liz's house where not only did she give us some delicious brie cheese pastry, but also have a sense of community and a platform where our voices could be heard and where we could plan how to make a change and keep our community of female and non gender binary student growing!" (Maria Brise Martinez)

"Rob invited Lynn, Quimeng, and I to an MAA conference. The conference was great! We got to see a lot of cool talks, including Rob and his many ways to cut a doughnut! We also got to visit Rob's former advisor, explore his cool funky house, and eat some delicious food! At the time I hadn't taken a class with Rob, but he reached out to me, and had so many other times so that I get to be more involved in the math community, which has made me grow so much as a math major!" (Maria Brise Martinez)

"I loved carving pumpkins this past fall in the CMC. Katie's son Henry volunteered his services as the designer of our pumpkin and then promptly picked it as the winner once he was asked to judge. After we finished carving them, Russ let us display them in the skills center. They rotted very very quickly!" (Logan Crowl)

"I wasn't a fan of ODEs but a friend of mine and I had a lot of fun creating a model for the class where conversationally why 'Eric was writing his 'd's funny.'" (Neeraja Kulkarni)

"My favorite Carleton math/stats memory is working with my comps group in general. It was so cool to work with such smart people for such an extended amount of time to solve a problem. At the beginning we did not know each other well, but by the end we were great friends (zeebs). I also really appreciate the community that was built through SWiMS. It was amazing to get to know all the other women majors as much as we did and create such a great environment in the major." (Clara Livingston)

"Working and doing homework with friends in the Math Skills Center." (Shilin Ma)

"I enjoyed getting to hold office hours for classes I was grading for." (Anna Meyer)

"I really enjoyed Andy Poppick's Time Series class. It was an added bonus that all the variations of ARIMA models are fun to say." (Aidan Mullan)

"During MATH 251, Stephen Kennedy abruptly commenting that 'there is no word for the opposite of envy!'" (John Scott)

"Cantor's diagonal argument was really cool. I also really enjoyed Ken Ono's short lecture in Mark's Number Theory class." (Yukihiko Segawa)

"My favorite memories from the math/stats department have been the SWiMS events." (Annie Shapiro)

"Comps (the whole thing)." (Nick Spinale)

"Giggling in the back of Helen Wong's multivariable calculus fall term freshman year with Alice was a delight. We were having a ton of fun thinking about visualizing 4 dimensions and it turned out to be the beginning of a really wonderful math friendship! The mathematical giggles have not really stopped since!" (Martha Torstenson)

"My favorite moments are in the classes of Advanced Linear Algebra, Abstract Algebra, Stochastic Processes, and History of Math." (Yuhao Wan)

"When I took math structures here at Carleton, I

we introduced an absurd amount of variables that were all related, partly to over complicate the problem, partly to see what number Mathematica's manipulate function would stop working at during the change to a single value. If I remember correctly; it was around 27ish" (Nathan Dalaklis).

"My favorite memories from the Carleton math department are not exact memories, but rather how welcome and supported I feel when I am there. Especially from the people I took classes with." (Lynn Daniel)

"One funny memory is when another major and I were discussing a difficult proof for Real I in the rec mid-workout. I began drawing on the white board to illustrate a point and the monitor asked if he could take a picture of us he found it so ridiculous!" (Sophia Gunn)

Advice for current for future math & statisticsmajors

"Believe in yourself!" (Dane Birkeland)

"Get involved, you'll have a lot of fun and hang out with some really cool people!" (Maria Brise Martinez)

"Go to Math at the Cow. I went for the first time my senior spring and realized, wow, it was actually fun, and I got to hang out with other majors, which I don't usually get a chance to do outside of class." (Ben Clark)

"Get to know your classmates. Math/Stats classes don't always force you to talk to the people around you, so you have to make an extra effort to get to know them. Life's better when you can walk through the CMC and see friends." (Logan Crowl)

"It is a lot easier to want something than it is to make it happen and wanting alone doesn't really get you anywhere. On the other hand, if you choose to make an attempt, you won't be able to make everything work out all the time, but sometimes the struggled through the class a bit, but it was also the first time I felt like I knew what math truly is. When I went to my professor's office to talk about problems on homework or the tests, she occasionally got sidetracked by telling me about the next proof we'd cover. I always enjoyed that." (Tegan Wilson)

"If you are thinking about graduate school (in pure math), take Abstract I and Real I as soon as possible. Many people told me topology is also very important. But topology is offered less frequently at Carleton, so if you plan to take it, it's a good idea to watch out for it or take it in Budapest if you can go." (Neeraja Kulkarni)

"Do not be turned off from math or stats if you take a class that isn't for you. There is so much math to be studied and it is really easy to get bogged down by a bad grade or topic you do not like. Stick to it because it is totally worth it." (Clara Livingston).

"Hang out in the MSC, go to BSM, eat well and sleep well." (Shilin Ma)

"Go to office hours or ask classmates for help when you're stuck! Work as a tutor in the Math Skills Center because tutoring is fun and it helps you to gain a better understanding of things you've studied in the past." (Anna Meyer)

"My advice to future majors would be to fully explore all the various fields of mathematics that are taught. You never know which classes will become

act of failing will teach you more than you think it will. So if you are trying to avoid anything, don't explicitly avoid failure, just avoid lack of action." (Nathan Dalaklis)

"Feel confident in your own preferences! People can be very opinionated about classes and what's worthwhile and what isn't. Don't listen to them and take classes that you know you will enjoy!" (Sophia Gunn)

"My advice for current and future majors is to always ask for help. Don't be afraid to reach out to the department. They are amazing people and the connections that I have built with them I will treasure for the rest of my life. Also reach out to anyone you have questions for, whether or not they are graduates, or just a year above you, or have just taken different classes than you. Oh! And also, never be afraid to be wrong. Everyone is wrong so much, that's how we learn. Don't hesitate to ask questions." (Lynn Daniel)

"Read the textbook/your notes outside of class. (For me, I've recently discovered, this works best in bed, where it doubles as a method for putting me to sleep. But I understand if you think that's a little crazy.) It's especially helpful to ask yourself natural questions that arise from what you're reading and then try to answer them and/or try to reproduce in your head what you have just read." (Will Hardt)

"If you're interested in math and/or math research, apply to REUs, no matter what year you are in! While REUs do tend to be competitive, they're not all looking for people who know as much math as possible. For instance, a few of them are particularly interested in students who have shown interest in math but don't yet have a lot of experience. Regardless of how far along you are, you/your advisor may be able to find programs that you have a reasonable chance of being accepted to." (Will Hardt)

"Take Data Science! This course is one of the coolest courses at Carleton that will be very helpful not only in your other statistics courses but in work post Carleton that uses R. Also, get to know the other majors in your year. Find people to work on your favorites." (Aidan Mullan)

"My advice for current and prospective majors is to spend time in the Skills Center and become friends with the other majors! Finding people you enjoy working with makes all the difference in a tough class." (Eli Orvis)

"Try Problems of the Fortnight; they are really fun. (Yukihiko Segawa)

"Don't wait to take 300-level classes, even if they sound scary. You may not have space in your schedule the next time they're offered." (Nick Spinale)

"Invest in being part of the community in the department. This can mean so many things. Work on your problem sets with classmates, join SWiMs, go to colloquium talks, get to know the person sitting next to you in class! For one, your math friends are probably the only people who will actually laugh at your math jokes or be genuinely interested in the sequence you found on the OEIS. Also, showing up is the only way to encounter those serendipitous moments that can inspire a research interest, career path or just continued love of mathematics." (Martha Torstenson)

"Try BSM! And visit office hours more often." (Yuhao Wan)

"Remember to take care of yourself! Carleton can be a stressful time, so don't forget to spend time relaxing and with friends. Get a full night's rest. Don't be afraid to tell your professor if you're having a hard time and need either more help or an extension. The math or stats major is only one of many great things you'll accomplish here." (Tegan Wilson)

Goodbye to the Seniors!

problem sets with and if you are a female or non-binary student, join SWiMS." (Emily Kaegi)

Comps Distinction!

Congratulations to the following students who received Distinction in Math/Stats Comps this year: Alana Danieu, Nick Fredrickson, Will Hardt, Peter Illig, Emily Kaegi, Clara Livingston, Aidan Mullan, Eli Orvis, and Nick Spinale.

Congratulations to Steven P. Galovich Prize Winners

Each year the Mathematics and Statistics Department awards the Steven P. Galovich Prize to the graduating senior or seniors who best embody the personal qualities of the former faculty member for whom the award is named. Steve Galovich taught in this department from 1974 to 1991, and he brought to his work enthusiasm and love for mathematics, a zestful joy for life, a great sense of humor, and compassion for others. The Galovich Prize was endowed by an alumnus, William Lang '74, who was affected by Steve's teaching and mentorship. This year the department is pleased to name Maria Brise Martinez, Martha Torstenson, and Qimeng Yu as the recipients of the prize. Congratulations, Maria, Martha, and Qimeng!

Problems of the Summer

Having trouble seeing the problems of the summer? Try enabling images for this message!

For obvious reasons, this is the last *Gazette* of the academic year. And for me as the "problems editor", it is actually the last *Gazette* of the calendar year as well, because I'll be on leave this fall (don't worry, there should still be Problems of the Fortnight). As it doesn't seem to make sense to offer you two "regular" problems whose deadline would not be until January, here is something a little different: an open-ended problem that you might enjoy investigating, perhaps over the summer. (I have no idea what you might find, and I would be interested in any substantial progress you make. Most of the time between now and January, the easiest way to communicate with me will probably be by e-mail, but there may be some delay before I have a chance to respond.)

You may recall that the first problem posed May 18 - for which, incidentally, no student solutions have arrived yet - read as follows: "Suppose we start with the number 6 and we make a series of "moves", where a "move" is defined as follows: If you have a number N that is the product of two positive integer factors m, n with $n > 2$, then you can replace N by the new integer $(m+1)(n-2)$. For example, from the number 15 you can move to 26 (using $m = 1, n = 15$), to 12 (using $m = 3, n = 5$), and to 6 (using $m = 5, n = 3$). Starting from 6, can you reach every integer that is at least 2 (in finitely many moves)? If so, show why; if not, find the set of integers ≥ 2 that cannot be reached from 6 in a finite number of moves." The open-ended problem is to see what happens if the integers $1, 2$ in the above are replaced by particular positive integers i, j, and 6 is replaced by a possibly different starting integer S; more specifically, to make whatever progress you can on the following question:

Suppose we start with the number S and we make a series of "moves", where a "move" is defined as follows: If you have a number N that is the product of two positive integer factors m, n with $n > j$, then you can replace N by the new integer $(m + i)(n - j)$. Starting from S, under what conditions on S, i, and j can you reach every integer that is at least $i + 1$ (in finitely many moves)?

So far, solutions to both problems posed May 18 have arrived from John Snyder in Oconomowoc. Any student solutions that arrive before the solver(s) leave(s) campus for the summer will still be considered for possible prizes from the B.B.O.P. Best of luck on your end-of-term projects and finals, and for those of you who are graduating, best wishes for a bright future!

- Mark Krusemeyer

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