

Bryn Mawr Math Alumnae Newsletter

Fall 2015 - Spring 2016



Welcome to this year's roundup of news from the Bryn Mawr Math Department. We have articles contributed by students in Lisa Traynor's Senior Conference, photos shared by mathematics faculty and graduate students, and much more. We hope you enjoy it!

Helen Grundman Announces Retirement

Amy N. Myers

After 25 years of service at the College, Professor Helen Grundman has announced that the spring semester of 2016 will be her last. From here she moves to the American Mathematical Society (AMS) as the new Director of Education and Diversity. Along with a change in position comes a move to AMS headquarters in Providence, Rhode Island. Helen is "psyched" for her new position and for the "potential it has for significantly improving the diversity in advanced mathematics."



Commencement in 2014 ¹

Professor Grundman leaves behind a wealth of good memories and a legacy of engaging students and inspiring them to do their best work. President Kim Cassidy describes her as "committed to making math fun." Many students recall good times with Helen at the Distressing Math Collective or the Mathematics Shakespeare Reading Group. At the same time, Helen expected nothing less than the best from students,

and insisted on a high level of rigor in all her courses. Erica Graham '04 recalls the *Transition to Higher Mathematics* course that she took from Helen:

I was in Helen's Transitions class during the second semester of my first year at Bryn Mawr. What I remember most about that class was how hard I worked for it and how much I had learned by the end of the semester. Once or twice during the semester, Helen collected our notebooks to make sure that we were "reading" the text/course notes properly, *i.e.*, with pencil and paper at the ready. Upon returning my notebook to me, she simply looked at me and asked, "Erica, you're going to be a math major, right?" I replied yes, she may have responded with a simple nod of the head or "Good" (that part I don't remember), and that was pretty much it. I think the reason I actually remember this is that I recall how at the beginning of that semester I was really nervous about taking two (!) math classes in one semester. I had always planned to be a math major, but this very quick exchange let me know that I had chosen correctly.

Professor Leslie Cheng describes Grundman as

the “phenomenal teacher” of 1157 students, and Professor Paul Melvin adds that she is the “quintessential teacher-scholar.” Helen won both the Graduate Faculty Mentorship Award from the Bryn Mawr College Graduate School of Arts & Sciences in 2011, and the Lindback Award for Distinguished Teaching in 2014.

Helen Grudman has contributed much to the College and to the profession of mathematics during her time at Bryn Mawr. Provost Mary Osirim describes her as an “incredibly productive scholar” with nearly fifty publications. Not only does Helen produce her own research, but she also encourages young mathematicians on the way to making their own contributions. She has guided many Bryn Mawr undergraduate and graduate students through original research, and served as a mentor for national networks of young people including Project NeXT (New

Experiences in Teaching), Association for Women in Mathematics Young Mathematician’s Mentorship Programs, and EDGE (Enhancing Diversity in Graduate Education). Helen’s contributions to mathematics will be recognized with a Special Session in her honor at the next Joint Mathematics Meetings.

For evidence of Professor Grundman’s commitment to College traditions, one needs to look no further than her office in Park. Twenty-four May Day scrolls adorn the walls—she’s only missed one May Day celebration in her 25 years at the College. At a retirement party hosted by the College, President Cassidy presented Helen with her very own Bryn Mawr College lantern. Perhaps no other Bryn Mawr faculty member has ever been more deserving of this honor.

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Math Meets Bio: Erica Graham '04 Joins the Ranks

Sarah Moustafa '16, Yaxuan Wen '16, and Vanessa Wang '16



Erica Graham '04 ²

Last September mathematical biologist Erica Graham '04 joined the Bryn Mawr mathematics faculty at the rank of Assistant Professor. With her background in mathematical biology and mathematical modeling, Prof. Graham brings exciting new courses and opportunities for Bryn Mawr students. After graduating from Bryn

Mawr with a math major, Erica earned a PhD from the University of Utah, and held a postdoctoral research position at North Carolina State University.

Prof. Graham was drawn to mathematical biology because it enabled her to “see math in action.” Her dissertation focused on modeling cellular and molecular mechanisms in the progression and development of type 2 diabetes. Erica’s postdoctoral work focused on female hormone regulation and the effects of steroid production in the ovaries. She also worked on a project concerning how blood flow affects anticoagulants that prevent clotting. She currently researches the relationship between sleep and diabetes susceptibility.

After graduating from Bryn Mawr, Erica spent a few years exploring different career paths, and found that a graduate degree in mathematics could combine her

passions and strengths. Having done research in mathematical biology with Professor Victor Donnay during her senior year at Bryn Mawr, she decided to apply to PhD programs in that area. At the University of Utah, Prof. Graham found magic in thinking mathematically about biology, and became interested in the modeling of cellular and molecular physiology. Her postdoctoral teaching experiences in Raleigh, North Carolina convinced her to apply her knowledge in academia rather than industry because she enjoyed both research and teaching. As an undergraduate, Erica experienced the advantages of a math department that values both teaching and research. The supportive and dynamic atmosphere has not changed since she graduated. She is very excited about her new role at Bryn Mawr, and looks forward to introducing students to the world of

²Image: www.brynmawr.edu

mathematical modeling.

The first course Prof. Graham taught at Bryn Mawr was Calculus 2 last fall, which, coincidentally, was also the first math course

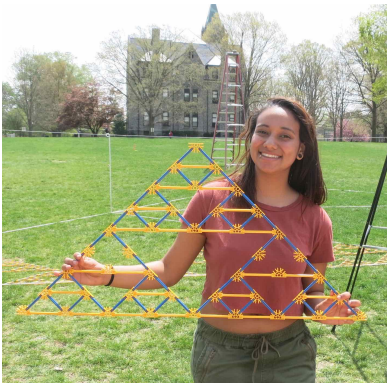
she took here as a student. She also taught an elective math course called computational modeling in the spring semester. Erica hopes to teach a mathematical biology

course in the future. There is some really interesting math intertwined with the field of biology, and Erica looks forward to sharing her perspective.

World Record Set

On Sunday, April 24, 2016, Professor Victor Donnay oversaw the building of the world's largest Sierpinski Triangle built entirely out of K'NEX pieces—some 30,000! A “pre-build” happened on Merion Green at Bryn Mawr College the previous Thursday. The world record was set at the Wagner Free Institute of Science in Philadelphia as part of the Philly Science Festival. There are beautiful pictures of the event, both at Bryn Mawr and at the Wagner, at the college web site: <https://www.brynmaur.edu/news/building-record-breaking-triangle>.

You can also hear Professor Donnay being interviewed on NPR's The Pulse talking about the event and math education: <http://www.newsworks.org/index.php/thepulse/item/93323-high-failure-rates-spur-universities-to-overhaul-math-class>.



Nori Cubias '17 (left) and other Bryn Mawr students (right) build a Sierpinski Triangle on Merion Green. ³

Surprise!

This spring the math graduate students organized a surprise bridal shower for fellow math graduate student Danielle Smiley. Ms. Smiley entered the Math Function Space expecting a professional development seminar, but she found cake, gifts, and cheering friends instead.



Faculty and students (left) attend a surprise bridal shower for math graduate student Danielle Smiley (right). ⁴

³Images: Amy N. Myers

⁴Images: Amy N. Myers (left) and Samantha Pezzimenti (right)

Memory Lane:

Photos Contributed by Helen Grundman



With Eva Goedhart PhD '15 and Wen Gao AB/MA '07 at a meeting of the Fibonacci Association

Helen as a May Day worthy



With Jackie Lang AB/MA '09 and Amanda Hittson AB/MA '09 following their thesis defenses

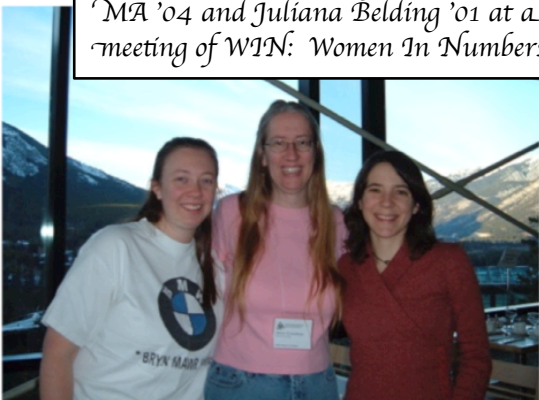


Kerstin Baer '11, Eva Goedhart PhD '15, and Laura Hall-Seelig AB '01 and MA '04 play Fish at the Joint Meetings

Study break at the Grundmans: To Good '11, Becca Rebhuhn-Glanz AB/MA '11, and Adele Mirbey '11



With Laura Hall-Seelig AB '01 and MA '04 and Juliana Belding '01 at a meeting of WIN: Women In Numbers



Katherine Engelman AB/MA, '14 Freda Li AB/MA '14 and "The Algebra Puppy"



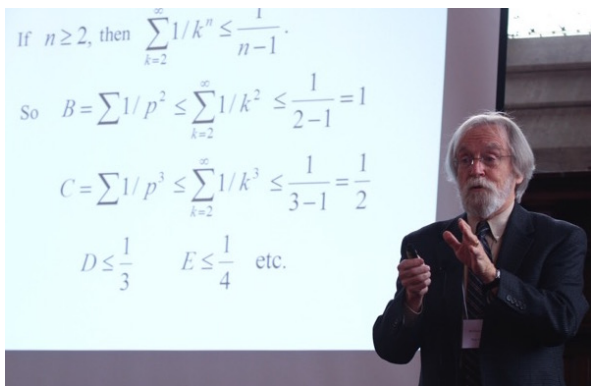
Bryn Mawr Hosts Math Conference

Leslie Cheng

Bryn Mawr's Department of Mathematics hosted the second annual Philadelphia Undergraduate Mathematics Conference on March 19, 2016. This mathematics undergraduate conference series is a collaborative effort of the Mathematics Departments at Bryn Mawr College, La Salle University and Temple University, and has as a goal to provide professional opportunities and exposure to undergraduate students from the Philadelphia area interested in Mathematics.

This year's conference featured a plenary talk by William Dunham, Truman Koehler Professor Emeritus of Mathematics at Muhlenberg College and Research Associate in Mathematics at Bryn Mawr College; a mini-course on coding theory by Kathryn Haymaker '07, Assistant Professor of Mathematics at Villanova; a poster session; undergraduate research presentations including one by Maddie Hanson-Colvin '16; and a professional development session.

Conference Photo Highlights:



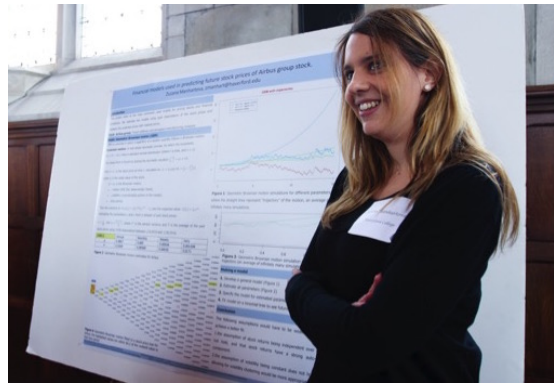
Bill Dunham presents reciprocal primes⁵



Katie Haymaker '07 discusses coding theory⁶



Paula Sun '16 presents her poster⁷



Zuzana Manhartova '16 with her poster⁸

⁵Image: Paola Noguerras

⁶Image: Paola Noguerras

⁷Image: Paola Noguerras

⁸Image: Paola Noguerras

A Notable Math Alumna

Meredith Cobb '16

You've likely heard a lot about famous alumnae from Bryn Mawr, but can you name one who went on to work in a STEM field? To find one, you need look no further than the College's own Board of Trustees: Fern Y. Hunt '69, Trustee Emerita, earned her AB in Mathematics at Bryn Mawr, and has gone on to study and work in respected programs across the country.



Fern Y. Hunt '69⁹

Although she was very bright and worked hard for her place at the top of her class, most teachers in Hunt's integrated New York City school did little to encourage her passions or support her studies. It wasn't until high school that she finally had a black teacher, her ninth grade science teacher Charles Wilson, and it was from him that she received the encouragement she needed to thrive. He was the "proof that a career in science for a black person was possible." Wilson urged Hunt to participate in Columbia's Saturday program for kids interested in science, and also to apply to the Bronx High School of Science. After exhausting the pure science courses at Columbia's Saturday Science Program, Fern Hunt reluctantly began a course in mathematics. She found that math beyond the scope of that taught at her school was fascinating, and discovered a true love of math. While she considered a long list of possible colleges, Dr. Hunt eventually chose to enroll at Bryn Mawr because of its Seven Sisters status and the rigorousness of its academics.

Bryn Mawr gave Dr. Hunt many exceptional experiences and an exposure to people and ideas she would not have otherwise found. It also, however, brought many challenges. Dr. Hunt was a black woman at a predominantly white institution, and her peers were much more affluent. She also had a different approach to math than members of faculty at that time. She believed that creativity was required to do mathematics, while her professors preferred more traditional methods. They did, however, admit that her unusual style produced results. Fern Hunt also admits to not being the most diligent stu-

dent in college, not dedicating herself fully to her studies until graduate school. When applying to graduate schools, Professor Martin Snyder suggested she apply to the Courant Institute of New York University, from which he had recently graduated. Dr. Hunt earned her master's and doctorate degrees from the Courant Institute, but this road was also difficult. She lost her fellowship at Courant when she received a B on her qualifying exam, and although she earned her office back, and found scholarships and jobs to pay for her studies, this was one of many trials that taught her that failure was an inevitable part of learning.

After attaining her doctorate, Dr. Hunt briefly taught at the University of Utah before being recruited to teach at Howard University. She taught at Howard until 1993, at which point she left to work at the National Institute of Standards and Technology's Computing and Applied Mathematics Laboratory. Dr. Hunt has also worked at the National Institute of Health's Laboratory of Mathematical Biology, the National Bureau of Standards, the GRE Mathematics Advisory Board, and the Biological and Environmental Research Advisory Committee of the Department of Energy. She has also been a strong advocate for underrepresented groups in STEM fields, working with several programs to recruit and retain students in STEM fields. Fern Hunt became a member of the Bryn Mawr Board of Trustees in 1992, and retains her title as Trustee Emerita. In 2000 she earned the Arthur S. Fleming Award for Outstanding Federal Service. Dr. Hunt's research focuses primarily on mathematical biology and dynamical systems. Her graduate thesis was on differential equations on population genetics, and she has since published three different papers on the mathematics behind genetics. Some of her other work includes sequence alignment, fluid flow, and modeling high gloss surfaces.

While the first American woman to earn a PhD in mathematics was Winifred Edgerton Merrill in 1886, just one year after Bryn Mawr was founded, the first black American woman to earn a PhD in math was Euphemia Lofton Haynes in 1943. Dr. Hunt is among the first 25 black American women to earn a PhD in mathematics. There was, and still is, a good deal of pressure placed on her as one of the few black women in mathematics at a doctorate level. She is without doubt an accomplished mathematician and incredible woman, but she is also relatable for Bryn Mawr students on a more personal level. She didn't have a straight shot into mathematical stardom: she struggled and failed, but most importantly she learned to get back up again. With Bryn Mawr's constant demand for excellence, from peers and faculty and from oneself, it is important to remember that it is still possible to achieve and make a difference even when we fail or flounder.

⁹ Image: www.brynmawr.edu

The (Not So) Distressing Math Collective

Seppo Niemi-Colvin '16

For the past four years I have participated in a Bryn Mawr club known as the Distressing Math Collective (DMC), and for the past three years I have helped to coordinate it. DMC has been a highlight of my experience in the Bryn Mawr Math Department, and has provided me with me an informal place to learn math and to bond with other mathematicians outside the classroom.

Club meetings start at 7 PM on Thursdays in the Math Seminar Room, or whenever we decide to begin, which is typically between 7:10 and 7:15 PM. At that point the speaker presents an interesting math topic, whether it be a result from their own research, or something they are learning about in class. The audience is encouraged to ask questions and to make comments on points ranging from the math involved in the presentation to the shape suggested by a particular knot diagram (for example, a bunny, a cat, a tuxedo, a Crystal Gem... the possibilities are endless). Talks do not have to be polished, and in fact, it is assumed that the speaker has not had much time to prepare.

DMC has three rules: (1) If it is a presenter's first time speaking, then the audience should keep the interruptions and snark to a minimum. (2) If somebody comes in late, then the presenter has to give a quick recap. (3) No throwing things. After the speaker finishes, a card game commences. The traditional choice of DMC is Fish, which is like Go Fish, but is more complicated and more fun. We even have special DMC cards with owls on the back, and a cloth card holder with a Fish-related diagram on the inner flap. Because Fish requires exactly six people to play, we sometimes break out a second deck for additional people to engage in a second game, or we switch to a game for five people known as Dahimi. In any case, DMC is a relaxing way to spend a Thursday evening, and it provides participants with something to look forward to during the week.

I attended DMC throughout my freshman year before I was invited to help coordinate the club. During my sophomore year I simply asked each speaker for both a serious and a funny title for their talk, and then emailed the titles to the math department and anyone else interested in the club. During my junior and senior years, I also took up the job of tracking down speakers for upcoming weeks. Given that talks are done on a volunteer basis, and students at Bryn Mawr and Haverford are not known for their copious free time, this was not always an easy task, but it certainly was not impossible. Students have given talks on summer research, articles read for senior conference, papers written for classes, thesis work, and

results pulled off of the Internet.

I am far from the only person involved in DMC. Professor Helen Grundman has provided guidance and advice to the club since its inception. She appreciates the fact that the club provides a space for students interested in mathematics to meet each other. She also enjoys the casual environment in which students can practice public speaking skills.



Seppo Niemi-Colvin with AB/MA Thesis Advisors ¹⁰

Last year Prof. Grundman was on medical leave, so other faculty pitched in to keep the club running. In the fall of 2014, Professor Paul Melvin filled Helen's role as faculty supervisor. He had not participated in DMC before agreeing to cover for her, but he quickly found the talks interesting and fun. He also became fond of the card games. Unfortunately, in the spring semester, another commitment required his attention, so Professor Isabel Averill took his place. Isabel not only delights in listening to the talks, but also in finding interesting snacks, including teas and a different type of Oreo cookie almost every week. Meanwhile, Rose Kaplan-Kelley '17 rose to the occasion as a fellow student coordinator, occasionally sending out emails and helping recruit speakers. She says DMC was a deciding factor in choosing to come to Bryn Mawr College because it showed how Bryn Mawr supports its students in mathematics outside of the classroom. Her interest in mathematics initially inspired her attendance, and being able to learn new topics and meet new people has kept her coming. She enjoys the close community and relaxed atmosphere that make the club unique.

¹⁰Image: Lisa Traynor

Math Pictionary

Among other events, this year's Math Appreciation Week featured a lively game of Math Pictionary. At the suggestion of Professor Amy Myers, graduate students Samantha Pezzimenti and Hannah Schwartz designed and refereed a close match.



Math students and faculty play Math Pictionary to celebrate Math Appreciation Week ¹¹

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A Short History of the Bi-Co Math Colloquium

Hongling Chen '16 and Ziyi Lin '16

Bi-Co math students can explore a wide range of mathematics beyond that which is taught in their courses through a weekly math colloquium, whose location alternates between Bryn Mawr and Haverford Colleges. For this opportunity, we owe thanks in part to Professor Paul Melvin, who joined the faculty in 1981, and proposed the idea of a math colloquium at Bryn Mawr in that same year.

In the beginning, Prof. Melvin invited faculty from local institutes and universities to Bryn Mawr to give talks. Then in the late 1980s, the Bryn Mawr math faculty invited their Haverford counterparts to work with them in establishing a joint lecture series. In this way, the Bryn Mawr math colloquium was reborn as the Bi-Co math colloquium.

How do the math colloquium lectures come together? Each year the math faculty members at both Bi-Co institutions appoint professors to co-organize the weekly event. Typically younger faculty members are preferred for this role since they may have fresh ideas and wider connections with new scholars eager to share their work. This year the coordinators are Professors Erica Graham and Leslie Cheng from Bryn Mawr, and Gabriel Feinberg from Haverford. The coordinators strive to keep the topics covered by lectures diverse and accessible to undergraduate students. This year's colloquium series included talks on signal processing, lattice modeling, control theory, and more.

Inviting scholars to give talks can be both challenging and fun. As Prof.

Melvin pointed out, the hardest part about organizing the colloquium is to persuade speakers to come. Usually guest speakers are considered based on their reputation. Typically a colloquium organizer will "just cold call or email the ones that we feel an urge to invite" adds Prof. Feinberg. The Math Department pays for speakers' travel, takes them out for dinner, and provides a \$150 honorarium.

Over the years the Bryn Mawr Mathematics Department has come up with a variety of ideas to encourage students to attend the colloquium. For example, Professor Mary Louise Cookson (who taught at the College from 1988 to 2007) asked students to write reports on the colloquium, and counted them as homework.

¹¹Images: Amy N. Myers

What Do Math Majors Do After Graduation?

Shuhong (Paula) Sun '16, Tina Xu '16, and Ziyi Yan '16

As we plan for our lives after graduation, we wonder about the paths taken by other math major alumnae. We met with three recent graduates, and asked them how their experiences at Bryn Mawr prepared them for further education and careers. Danqi Luo '15 is a PhD candidate in Operations Research at Stanford University, Lipika Ramaswamy '15, is a staff analyst at Ernst & Young (EY), and Zhen Xu '15 is pursuing a master's degree in finance at John Hopkins University (JHU).

How does mathematics connect with their current occupation? All three alumnae make extensive use of mathematics in their study and work. Many of Danqi's core courses are in mathematics, and Lipika uses mathematical and statistical models daily. Zhen added that many of the concepts she learns about are based on mathematical models.

How did their math experience at BMC prepare them for their current work? Danqi believes that being a math major helped her develop the ability to think logically, and prepared her to use mathematical models in her graduate courses. Lipika performs statistical sampling and creates reports for clients. The quantitative analysis skills she gained from her Bryn Mawr education have helped her on the job at EY. Zhen cites the opportunity to read and present interesting math articles in Senior Conference as particularly useful to her—they opened a window to re-

search, and enabled her to develop an interest in finance.

What were their favorite math classes at Bryn Mawr? Danqi most enjoyed Real Analysis 1 and 2, Graduate Analysis, and Senior Conference. She appreciated Prof. Milićević's oral exams because they allowed her to hone her presentation skills. Both Zhen and Danqi enjoyed Senior Conference because they had the opportunity to choose papers on topics they were interested in, and would meet again in graduate study. Zhen also appreciated that Prof. Milićević was approachable, and always willing to talk about anything, mathematical or otherwise.

What was their favorite thing about being a math major at Bryn Mawr? Danqi loved the people. The professors were friendly and prepared, and valued the progress made by each individual student. She also enjoyed the opportunity to study pure math at an advanced level, and found that the theoretical concepts prepared her for further study.

What advice do they have for current math majors? Danqi encourages students to make full use of the resources offered at Bryn Mawr, and to choose the classes they love and enjoy, while also learning something new. Zhen suggested that students focus on developing their fields of interest, and not to be shy to talk to professors. She also recommends that they try to enjoy life beyond studying.

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Mathematical Memories

Alice Somers '16

As we near the end of our time at Bryn Mawr, we pause to look back on our experiences as math majors. I asked several seniors to share their favorite memories, and to tell us what they will miss most about the math department. The students I asked all appreciated the support and dedication of the mathematics faculty members. Paula Sun '16 explained that the department "is super friendly and supportive, and will guide you through whatever trouble you have." Her sentiment was echoed by Yaxuan Wen '16, who agreed that

the department is filled with "supportive faculty members who are dedicated to teaching and advising." Another wonderful characteristic of the Bryn Mawr math department is the sense of community. Sarah Mustafa's favorite memory from her time studying mathematics is "meeting new people at the teas." Yaxuan enjoyed "spending hours with classmates to prepare for senior conference presentations." Students also agreed on what they will miss most after graduation. Both Sarah and Paula will miss friends and professors, with

Paula adding that "it may sound kind of cliché, but who doesn't like nice and supportive people around them?" Yaxuan will miss "the purity and logic of the discipline. The focused mentality of math people is so rare outside of college!" As our time in the math department begins to wind down, we would like to thank the faculty and staff for everything they have done for us. We are grateful their dedication, and we will miss the community they have created.

Photo Gallery



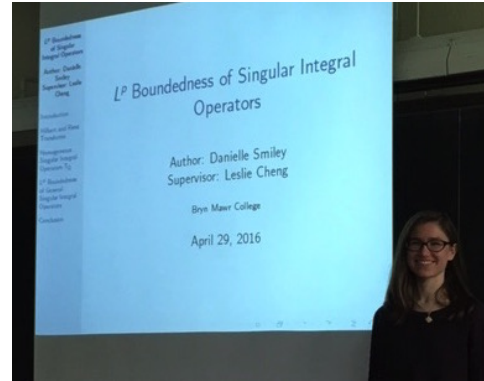
Maddie Hanson-Colvin AB/MA '16 wins the Senior Hoop Race ¹²



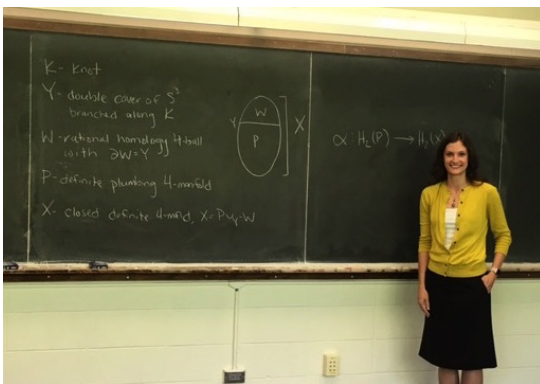
Spring foliage on campus ¹³



Sam Pezzimenti (in blue) leads a math knitting circle ¹⁴



Danielle Smiley MA '16 defends her thesis ¹⁵



Kathryn Bryant PhD '16 defends her thesis ¹⁶



Math graduate students ¹⁷

¹²Image: www.brynmawr.edu

¹³Image: Amy N. Myers

¹⁴Image: Leslie Cheng

¹⁵Image: Kathryn Bryant

¹⁶Image: Kathryn Bryant

¹⁷Image: Kathryn Bryant

Credits

Editor-in-Chief: Amy N. Myers, Senior Lecturer and Program Coordinator for the Math Department

Editors: Leslie Cheng, Erica Graham, Helen Grundman, Victor Donnay

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The math department in 2015: Peter Kasius, Paul Melvin, Greg Schneider, Helen Grundman, Djordje Milićević, Lisa Traynor, Isabel Averill, Amy Myers, Leslie Cheng, and Tina Fasbinder. (Not pictured: Victor Donnay.)