❧ Bryn Mawr Math Alumnae Newsletter ❧

Fall 2017 - Spring 2018

Welcome to this year's edition of the math alumnae newsletter! Here you'll find a selection of news and photographs from the past two semesters written by members of the Bryn Mawr Math Department. You can find additional math-related news throughout the year on our website (www.brynmawr.edu/math). While you're there, check out the alumnae profiles and keep up-to-date with math department events!

Meritorious Mawrtyrs

This year a team of three Bryn Mawr math majors competed in the Mathematical Contest in Modeling (MCM) presented by the Consortium for Mathematics and Its Applications (COMAP). COMAP's webpage describes the MCM as "an international contest for high school students and college undergraduates. It challenges teams of students to clarify, analyze, and propose solutions to open-ended problems. The contest attracts diverse students and faculty advisors from over 900 institutions around the world."[1]

Cheyenne Zhang '20, Irene Lin '20, and Sunny Qi '20 together were named "Meritorious Winner" at this year's MCM for their submission entitled "Transition to Electric Vehicles: Multi-Task Optimization of Charging Station Network."

Calling all math students![2]

After a great deal of research, exploration, and modeling, the team ultimately produced a "one-page handout written for the leaders of a wide range of countries who are attending an international energy summit."[3] They were tasked with highlighting the "key factors the leaders should consider as they return to their home country to develop a national plan to migrate personal transportation towards all-electric cars and set a gas vehicle-ban date."[4] An additional one-page summary and 20-page proposed solution were also required.

The "Meritorious Winner" honor places the Bryn Mawr team "just one step away from being a finalist in the competition" explains faculty coach Erica Graham. "They worked really hard for several days and did a great job."

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[1] www.comap.com/undergraduate/contests/
[2] Image: www.comap.com/undergraduate/contests/
[3] 2018_ICM_Problem_D.pdf
[4] 2018_ICM_Problem_D.pdf

Deriving Miss Daisy

"JOIN THE NAVY. SEE THE WORLD." The ad worked. Our latest Bryn Mawr interim math faculty member, Daisy Sudparid, spent five years with the United States Navy in Jacksonville, Florida, and aboard the USS Kitty Hawk, an aircraft carrier, before pursuing an advanced degree in applied mathematics.

Professor Sudparid[5]

It was during Professor Sudparid's military training in aviation electronics that she discovered a love of mathematics. In addition to reading schematic diagrams and soldering electrical components, Daisy studied calculus. Aboard ship she was responsible for the communication and navigational systems in various aircraft and enjoyed fixing the components that made them run, but her heart was always with the math.

After a stint spent servicing commercial aircraft for Southwest, Continental, and Hawaiian Airlines, Prof. Sudparid returned to mathematics. She graduated with a bachelor of science degree from the University of Texas at San Antonio, and began teaching algebra, geometry, and AP statistics for a nearby high school.

At first Daisy found it hard to get "buy-in" from her "squirrely" ninth graders, but then she realized they needed a teacher who cared about them personally and could make math relevant to them. To this end she collaborated with innovative colleagues to find a way to reach students. Eventually her commitment paid off, and Daisy was nominated for Teacher of the Year in her district.

A crucial turning point came when Daisy Sudparid met Erica Graham, a tenure-track member of Bryn Mawr's math faculty. (Their marriage now links Daisy to us.) At the time Erica was a graduate student in Utah, where Daisy soon relocated. Upon finishing her degree, Erica accepted a postdoctoral appointment at the North Carolina State University. At the same time, Daisy applied to their math graduate program. She was accepted, and she earned a master's degree in applied math.


USS Kitty Hawk[6]

Prof. Sudparid attributes her success in teaching to her own struggles in learning math. "Math never came easy to me," she explains. It was "addictive" though: one mathematical success led to the craving for another. Math was fun, it got her attention, and she wanted to "stay long enough to figure it out." Daisy enjoys the challenge of changing students' attitudes about math and about infecting them with the same "addiction" she felt. "The best feeling is when you see the 'aha' moment in a student's eyes and that's when you know you got 'em!"

Renovation in Park

Construction dust. Drilling noise. Hard hats. Everyone in Park has been impacted by the renovations in full swing this year. Faculty have been displaced, restrooms removed, and exits boarded over. "We're all making sacrifices" has been the mantra for the past nine months.
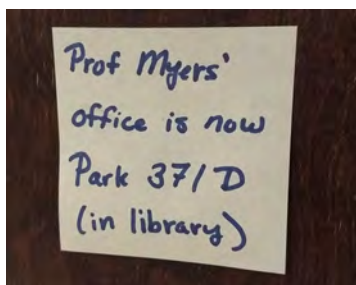
The result of our "sacrifices" will be a new glass annex covering part of the former courtyard. Park regulars look forward to increased study and social space and more natural lighting in hallways and stairwells. So far construction is ahead of schedule.

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[5]Image: North Carolina State University
[6]Image: https://en.wikipedia.org/wiki/USS_Kitty_Hawk_(CV-63)

Diversity and Mentorship in Mathematics: A Conversation with Karen Taylor

Linh C. Nguyen '18

"There is a strong need for diversity. And we need to have higher expectations," explains visiting mathematician Karen Taylor during a recent conversation at Uncommon Grounds. Prof. Taylor is spending her sabbatical doing research at Bryn Mawr. She is an Associate Professor of Mathematics at Bronx Community College, which is part of the City University of New York. She graciously agreed to share her perspectives with me on matters of diversity and mentorship, as well as professional development, in mathematics.

Karen grew up in Philadelphia. She got interested in math at a young age, and she was particularly fascinated with the concept of limit when she first encountered it in a calculus course. At the time, Karen was not sure what she could do with a math degree, but her father told her "You just keep taking math until you can't do it anymore."

Karen Taylor in the Math Function Space[7]

So she did. Prof. Taylor earned a Ph.D. in mathematics from Temple University under the supervision of Marvin Knopp. Her research interests include analytic number theory and automorphic forms. In our conversation, Karen emphasized the positive effect that her two mentors (her father and Professor Knopp) had on her career.

After earning her degree, Karen Taylor spent two years teaching at Lincoln University before accepting an offer of employment from Bronx Community College. Her experiences taught her that people skills matter most in interactions with students. Students come from all walks of life and have many different career goals. Most of the time math is not among their chosen pursuits.

"You really need to meet people where they are," Karen explains. This requires patience and understanding. It is not, however, enough to be patient and to understand. Professors must also promote diversity by helping to create better opportunities for women and other underrepresented groups to advance in mathematics.

In addition to teaching and doing research, Karen enjoys social dance classes and participating in local conferences, of which there are many in New York. While the salsa classes brings her personal enjoyment, conference participation offers the opportunity for professional development.

"It's important to get connected beyond your institutions by going to professional conferences. You need to put yourself out there and be open to different experiences," Taylor emphasizes. Conferences help Karen evaluate her current professional progress and to reflect on the social values at her own institution. These events also provide the chance to meet like-minded people, develop a support group, or find a mentor. According to Prof. Taylor, young female professionals should not underestimate the roles of mentorship and support systems. They help open doors to professional opportunities and to provide the guidance necessary to thrive in one's chosen career.

Your Correspondent: Linh Nguyen[8]

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[7]Image: Djordje Milićević
[8]Image: Linh Nguyen

Math and Writing in Perfect Harmony

Anna Finkelstein '21

"The Sound of Numbers" is the most intriguing Bryn Mawr Emily Balch seminar to be introduced this year. Named for a notable Bryn Mawr alumna, the Emily Balch seminars are writing-intensive courses that are meant to serve as an introduction to work at the college level. Professors from different departments each choose the topic of the Emily Balch seminar they'd like to teach, and students select the section they'd like to enroll in. Amy Myers of the Bryn Mawr Math Department, inspired by the work of mathematician and musician Rachel Hall[9], chose to offer a course that explores the relationship between math and music. And I, driven by my love for both subjects and my interest in a seminar that seemed unlike any other, chose to enroll in "The Sound of Numbers" last fall.

Number Sounders (author Anna is front row center)

A twist on the typical writing workshop, "The Sound of Numbers" presents basic math concepts and applies them to music and poetry. With the help of Hall's materials[10] and Myers' instruction, students analyze sine functions and the waveforms of sound, use patterns from Pascal's triangle to list possible poetic meters, employ modular arithmetic to describe rhythm, and much more. All the while, students write essays about the definitions and relationships they encounter and present their own arguments about the relationship between math and music while analyzing and defining the arguments of others.

The uniqueness of the class is amplified, too, by the diversity of students that enroll in it. Every Tuesday and Thursday of the fall semester, Park 336 was home to math-lovers and math-haters, musicians and music-listeners, and everyone in between. It might be startling at first, but "The Sound of Numbers" is interdisciplinary in a way that is surprisingly natural. "Humanities people" and "STEM people" relate to and help one another through peer-editing, brainstorming, and group discussion—bridging the divide. The focus is not on intensive reading or developing a uniform perspective on the material, but rather on making connections in reading and improving technique in writing. Within that model, there is plenty of room for diversity. And finally, in conferences with the professor, students prepare themselves for office hours and adapt to a college environment in which students and faculty work together.

"The Sound of Numbers" is the quintessential Emily Balch seminar: it builds comprehension in two beautiful subjects and does so for an unlikely community of people. In short, I'd say, it makes the transition from high school to college as eye-opening and satisfying as a good proof.

Bill is Back

Last year's edition of this newsletter included an article written by Visiting Professor of Mathematics and Research Associate Bill Dunham in which he examined the relationship between Bryn Mawr College and the eminent British philosopher Bertrand Russell. Bill discovered this relationship while browsing old math books in Collier Science Library.

This year Collier yielded another treasure. While "grazing" the collected works of August Ferdinand Möbius, Bill found a connection with something he had read in Euler's 1748 masterpiece *Introductio in analysin infinitorum*, and "Voila!" an article was born.

It eventually appeared in *Mathematics Magazine* with the title "The Early (and Peculiar) History of the Möbius Function."

"Spoiler alert: it's not what you think," says Bill.

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[9]Prof. Hall researches and teaches music and mathematics at St. Joseph's University in Philadelphia. She is a former member of the musical ensembles *Broadside Electric* and *Simple Gifts* and an author of the shape-note songbook *The Shenandoah Harmony*.

[10]https://thesoundofnumbers.com/

Sustainable Mathematics

Victor Donnay

In the spring semester of 2018, students in Professor Victor Donnay's course, Math Modeling and Sustainability, learned how to analyze problems of environmental sustainability using mathematics. This was a Praxis course in which the students worked in teams to assist a community partner in examining a sustainability problem.

Sustainable Mathematicians[11]

The Comcast Team (Ingrid Bethuel '18, Madeline Cherniack '19, Adele Hu '18, and Sohini Maniar '18) partnered with Bryn Mawr math alumna Alexandra (Allie) Wiegel '16, who now works in Comcast's Sustainability Division. The division is headed by Chief Sustainability Officer Susan Jin Davis '86, another Bryn Mawr alumna and a member of the College's Board of Trustees. Comcast's sustainability team is constantly exploring opportunities to reduce the company's impact on the environment while also improving the communities where they serve. For this project, students helped Comcast understand the financial implication of moving to a fully electric fleet. Comcast has one of the largest fleets in the country, and produces large quantities of greenhouse gases. For this project, students outlined how switching to an electric fleet, which would produce fewer harmful emissions, would also make financial sense. A key finding was that operating an electric vehicle is much less expensive ($672 per year) than a gas powered vehicle ($3,247 per year).

The EQUAT Team (Hee-Eun Kim '19, Charlotte Lin '19, Maia Rabinowitz '20, and Nithya Sivakumar '19) worked with Bi-Co alumni Ryan Leitner HC '16 and Ben Safran HC '13. "EQUAT" stands for "Earth Quaker Action Team" and is a social justice organization. EQUAT is engaged in a campaign to get the PECO energy company to increase the amount of energy that it generates from renewable sources (presently at 4%) to 20% by 2025. The students were asked to calculate the "social cost" of PECO's energy portfolio. This "cost" measures the negative impact that CO_2 emissions have on society.[12] The students estimated that if PECO does not change its energy mix (currently 31% coal, 31% natural gas, and 4% renewables, plus nuclear), then the social cost in the decade 2025–2035 will be about $6.5 billion. If, on the other hand, PECO increases its renewables to 20% and decreases the use of coal by a corresponding amount, then the social cost over that decade will drop to about $2.9 billion, a savings of $3.5 billion. Because PECO is legally mandated to provide energy using the "most economical method," these findings on social cost make a strong case for the increased use of renewable energy.

The Freight Farm Team (Leah Baker '19, Jill Li '18, Natalie Meacham '19, and Bisma Naqvi '18) worked with Bryn Mawr undergraduate Mary Cugini '20 to examine the costs and benefits of having a freight farm system on campus. A freight farm is a former shipping container repurposed to grow produce using hydroponics. The team proposed using the system to grow fresh produce for the dining halls, thereby reducing the College's purchasing costs as well as reducing its carbon footprint. Although the initial cost of the freight farm system would be high ($85,000), the students made the case that the savings over time

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[11]Image: Victor Donnay

[12]The Environmental Protection Agency estimates social cost to be roughly $40 per metric ton of CO_2 emissions.

combined with less quantifiable benefits (such as educational opportunities for students who would use the farm as a living laboratory, and raising the College's sustainability profile) would make the freight farm a positive investment.

Sustainable Project Choices [13]

The Solar Team (Shannon Fisher '20, Hezel Gadzikwa '18, Henry Nye HC '20, and Kaitlin Reese HC '20) worked with Philadelphia's Office of Sustainability. As part of the Greenworks sustainability master plan, Philadelphia is committed to reducing its carbon footprint. For this reason, the City is eager to develop more renewable sources of energy. The students' project focused on determining which City-owned buildings would be most suitable for solar panels. Interestingly, the majority of the buildings in their top-ten list turned out to be correctional facilities. They projected that solar panels on their first-choice building alone (the Detention Center) would produce a savings of $170,000 per year in electricity costs.

The Storm Water Team (Namrata Basu '19, Amelia McCarthy '19, Maria Minaya '18, and Emily Shinault '18) worked with a local environmental engineer to investigate flooding in the Chatham Glen area of Havertown. They examined whether the installation of rain gardens in residents' yards, uphill from the flood-prone region, would significantly reduce the flooding. They found that rain gardens alone, even if one were placed in every yard in the area, would not divert enough water to prevent flooding. If one combined, however, the rain gardens with mitigation efforts on Township-owned land, then the risk of flooding could be significantly reduced.

This summer Professor Donnay will continue to build on the relationships he has developed with Philadelphia's Office of Sustainability. He will work with math major Meagan Murray-Bruce '20 to carry out a cost-benefit analysis of converting Philadelphia's street lights to LED bulbs using data collected by the City's Streets Department.

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[13]Image: Victor Donnay

Alumnae Inspire Current Students

Greta Koch HC '18, Ioannis Rutledge HC '18, and Nuoya Wang '18

"A Bryn Mawr math degree has equipped me with a voice and has empowered me to succeed in a male dominated field."

So spoke Kirsten (Kiki) Huskey A.B./M.A. '06 at a panel discussion included in Bryn Mawr's annual celebration of Math Appreciation Week. Kiki had returned to her alma mater along with several other recent math major alumnae to talk about their career paths. In doing so, they advocated for math by sharing how much it has helped them post-graduation. In this article we share several of their stories.

2018 Math Major Alumnae Panel (from left to right): Sasha Bereznak '11, Elisabeth Johnson '15, Kirsten (Kiki) Huskey '06, Ziye Lin '16, Swetha Narasimhan '15[14]

Sasha Bereznak '11 works at Vanguard, where she manages quantitative equity groups and compares the relative attractiveness of securities. Her work helps Vanguard guide its decision-making process. On any given day, she manages about a dozen exchange-traded funds, and is responsible for day-to-day trading decisions. She is also involved in research; she assesses business risks and the robustness of the business models that Vanguard uses. One piece of advice that Sasha gives to current students is to take a computer science course. A big question of the evening was how being a math major at a women's college has helped each panelist. For Sasha, who entered a male-dominated career, simply being a Bryn Mawr graduate gave her a good reputation, as outsiders know that Bryn Mawr graduates have emerged from a challenging four years. Having a background in mathematics gave Sasha additional credentials, and allowed her the confidence to command respect from her peers.

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[14]Image: Lisa Traynor

Elisabeth Johnson '15 is pursuing a master's degree in mathematics at Drexel University. In addition to fulfilling her course requirements, she teaches classes and leads recitation sessions. On how math has helped her after graduating from Bryn Mawr, she explains that a Bryn Mawr math degree has cultivated her critical thinking skills, and taught her to think outside of the box. While at Bryn Mawr, Elisabeth developed a strong relationship with several faculty members, and believes that building a strong community and having connections is crucial to anyone's future success. Elisabeth highlights the importance of studying computer science, given that coding is ubiquitous in the workplace nowadays. Her advice for current undergraduate students is to network as much as possible since collaboration is so important. She also believes that if you are passionate about something, then you should pursue it with full force. You should not let yourself be discouraged, even if it seems that you may not possess all the skills required to apply for a certain job. There will always be opportunities to learn on the job. Many companies offer training for their employees, and the option of teaching yourself is always there. Elisabeth agrees with the other panelists that a math degree from Bryn Mawr has helped her to distinguish herself from others, and to build confidence. It has allowed her to be taken seriously, especially in a male-dominated field.

Kiki Huskey '06 leads the Controls, Operations, and Regulatory Compliance Team at Chatham Financial. Her day-to-day work includes managing the risk of fluctuations in interest and currency-exchange rates, negotiating contracts, helping clients comply with regulations, and serving on the recruiting team. Her job requires the ability to teach herself and to quickly take on something new. Kiki explains that the proof-writing and problem-solving skills she learned at Bryn Mawr provided a solid foundation for her career. Having worked for Chatham's recruiting team, Kiki strongly recommends that students take full advantage of the career development resources on campus to get help with resumes, cover letters, interviews, and more. She also encourages students to take as many classes that interest them as possible, and highlights the usefulness of being familiar with spreadsheet models.

Ziye Lin '16 is an actuarial developer at iPipeline.

Her work involves developing software for iPipeline's customers. She also serves as a business analyst, and manages the firm's insurance distribution policy. She ensures that her clients comply with financial regulations, and creates future projections of insurance policies. She says she learns something new at work every day. Being a math major at Bryn Mawr has helped her develop the skills needed to learn new things and to excel at work. She believes that math challenged her intellectually, and has helped her learn to think abstractly. Math has also made her adept at recognizing patterns and identifying relationships. Her advice for current students is to always have a study partner because collaboration is crucial and expected everywhere. She further recommends that students keep their options open and be flexible. That way they can find something else in the case that the first job they land does not truly motivate them. And because the job market changes over time, Ziye thinks that it is a good idea to have another option to fall back on.

Swetha Narasimhan '15 teaches at at The Workshop School, an elementary school in Philadelphia. She agrees that a math major has helped her in her career. She has applied many of the concepts that she learned at Bryn Mawr in her workplace, and her mathematical training has helped her cultivate critical thinking skills. A math major has also helped her distinguish herself from other applicants, and has helped her learn to think creatively. This is a precious skill in a workplace where there are no set rules.

Swetha echos the other panelists when she explains that majoring in math has helped her to find a voice and to be taken seriously. Her advice to current undergraduates is to be open-minded and to take any courses that interest them. She encourages students to be willing to experiment and to obtain knowledge about new things. She says you never know what you will apply to your job, or what will make you more employable.

Panelist Swetha Narasimhan (center) at Convocation 2015 with math majors Katie Fong '15 (left) and Danielle Preziuso '15 (right) [15]

Overall, the panelists gave great advice and inspiration to current students. All are outstandingly accomplished in their respective fields.

Summer 2018 Plans

Our math majors have interesting summer plans. Here is what a selection of students shared with us.

- **Junyan Duan '19** will participate in the SMALL Undergraduate Research Project, a nine-week residential summer program in which undergraduates investigate open research problems in mathematics at Williams College in Massachusetts.

- **Ruth McLeod '19** will participate in the Summer@BSME (Budapest Semesters in Mathematics Education) program.

- **Natalie Meacham '19** will participate in the Markov Chains REU (Research Experiences for Undergraduates) at The University of Connecticut.

- **Aisha Mechery '20** will attend the REU program "Summer@ICERM 2018: Low Dimensional Topology and Geometry" at the Institute for Computational and Experimental Research in Mathematics at Brown University in Providence, Rhode Island.

- **Cecilia Silberstein HC '19** will be at the REU site "Understanding the Arctic as a System" at the International Arctic Research Center at the University of Alaska Fairbanks.

- **Jwahir Sundai '19** will be an IT (Information Technology) Risk Mitigation Intern at Eaton Vance in Boston, Massachusetts.

- **Sichen (Cheyenne) Zhang '20** will participate in the IAS/Park City Mathematics Institute (PCMI) Summer Session with a research theme in Harmonic Analysis.

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[15]Image: Paola Nogueras

The Rules of Fish

Hannah Griggs '18 and Rachel Miller '18

Fish is a time-honored tradition of the Distressing Math Collective (DMC), the beloved math club at Bryn Mawr. It is played every Thursday after the weekly talk, so long as enough people stay to play. All you need are six willing participants (victims?) and a standard deck of cards. (Bonus points are awarded if the deck has owls on it, but this is not necessary.)

Set-Up: The first order of business is to divide the players into two teams of three people each. In order to choose teams, have each person draw a card from a face-down deck. The three people with the highest cards are on one team, and those with the lowest cards are on the other team. Before the game begins, remove the four 8s from the deck and shuffle the remaining cards well. By taking out the 8s, you will be left with eight half-suits, comprised of the low cards (2, 3, 4, 5, 6, and 7) and the high cards (9, 10, J, Q, K, and A) from each suit (clubs, diamonds, hearts, and spades). The goal of Fish is to collect as many half-suits as possible for your team.

DMC Student Coordinators: Rachel Miller '18 (left) and Jill Li '18 (right)[16]

Gameplay: The dealer divides the shuffled deck (without the 8s, of course!) evenly between the six players. The player who drew the highest card when choosing teams asks the first question. The goal for each player is to collect as much information as possible about what cards and half-suits are in everyone else's hands. A player may ask for another player's card if: (1) the card the player is asking for is a member of a half-suit the player already has in her hand and (2) the card is not one that the player already has in her hand.

[16]Image: Leslie Cheng

Illegal questions occur when one of the above rules is broken; oftentimes, players will get so caught up in the back-and-forth trading of cards in a half-suit that they will continue that line of questioning, despite not having a card in said half-suit. If an illegal question is asked but realized before the opponent had a chance to answer, then the asker may ask a different question. If, however, the illegal question was asked and answered and then realized, then the questioning switches to the opponent who was asked the illegal question and game-play continues as normal.

Honesty is key in this game! If a player has been asked for a card that she has, then she must give it up. One player continues asking individual players on the other team for cards until one of the opponents does not have the card she's been asked for. At this point, the question asking passes to the most recent player to be asked for a card. A player either wants to collect as much of a half-suit as possible or to pin down the locations of every card in the half-suit on her team. Once the player either collects an entire half-suit in her own hand OR knows the exact location of each of the other cards in the half-suit, that is, which of her teammates has each card, then the player can make a claim.

A claim is an assertion that a player knows not only that her team has an entire half-suit between them, but also exactly which cards of the half-suit she and each teammate is holding. Don't take claims lightly! Only make a claim when you know that the full half-suit is on your side AND when you know which person has which card. Claims may be halted up until the first card number is pronounced; as soon as you claim to have, for example, the 2 of hearts, then you must continue your claim even if partway through you realize that you have made a mistake. If, however, a player stops before saying a card number or suit, then the claim can stop and regular game play continues. If a claim is made incorrectly, then the other team gets that half-suit no matter who had the cards of the half-suit the claim was made for. Claims are how teams win or lose games. The team that has correctly claimed the most half-suits wins. Do not make a claim if you are not 100% sure that you know which team member has which card, or else you will disappoint your team with your folly.

A few other game mechanics to note are the "pause button" and the "no history" rules. The "pause button" allows players to pause the game

when they need to think through something (such as when a player needs to get her strategy in order or do some math in her head without the hustle of game play in the background). Using the "pause button" allows players a time to focus on the cards and previous questions they can recall without having to keep refocusing on the questions being called back-and-forth at the same time. Often, since we are math majors, we think we reach contradictions because someone asked an illegal question: either they had the card they asked for or they did not have a card in the half-suit they asked for. Working out when these questions have been asked (and by whom) is just another level of difficult fun that Fish will throw at its players. The "no history" rule states that the game only remembers the most recently asked question. Players cannot ask about any previous questions, not even to clarify which card was asked for or if the asker received it. Players should always be paying attention! Once the information is gone, if it isn't in your noggin, then it's gone for good!

That is just a quick roundup on how to play a favorite DMC tradition. Feel free to try it out at home! Most importantly, have fun with it!

Correspondent Hannah Griggs at May Day [17]

Senior Plans

The Class of 2018 has big plans. Here is what a selection of math majors shared with us.

- **Dina Benedetto**, a math major with a computer science minor, will work at Morgan Stanley in New York.

- **Kara Breeden**, will be a Quality Engineering for Computer Vision Grad Intern at eBay in New York City this summer. In the fall she will attend the University of Pennsylvania to continue the 4+1 Master of Engineering Program in Robotics.

- **Haowen Dong**, who had completed all of the degree requirements in December 2017, has been attending the University of Pennsylvania as part of the 4+1 Master of Engineering Program in Systems Engineering.

- **Sarah Gift** will attend Teacher's College at Columbia University.

- **Hannah Griggs**, a double major in math and physics, will start a Ph.D. program in Physics at Georgia Institute of Technology.

- **Jill Li** will go to England, France, and China as an independent traveling photographer. When she returns to the United States, she intends to work as a digital analyst.

- **Sohini Maniar** will work for Capital One as part of the Capital One Developer Academy, a boot camp–style technology learning program, where she will spend the first six months on the job in an intensive software engineering learning program that will prepare her for a professional role as a software engineer.

- **Louise Chaehyun Moon** will be pursuing a master's of public health degree in global health policy at George Washington University.

- **Bisma Naqvi**, a double major in math and economics, will be working as an analyst at JP Morgan.

- **Linh Nguyen**, a double major in math at Bryn Mawr and Economics at Haverford, will work as a financial analyst in Singapore.

- **Phuong Nguyen**, a math major with an Economics minor, will be an economic consulting analyst at Cornerstone Research.

- **Hunter Rendleman**, a double major in math at Bryn Mawr and Economics at Haverford, will start a Ph.D. program in Political Economy and Government at Harvard University.

[17]Image: Paola Nogueras

- **Ioannis Rutledge HC '18**, a double major in math at Bryn Mawr and Economics at Haverford, will be a supply chain management intern at Foray Design, a medical devices start-up company this summer. He will also help WIT Strategy with digital marketing advertising and press coverage. In the fall Ioannis will attend the University of Pennsylvania to continue the 4+1 Master of Engineering Program in Systems Engineering.

- **Virushi Shah**, a math major with an Economics minor who had completed all the degree requirements in December 2017, is a project management intern at Larta Institute in Los Angeles, California.

- **Nehel Shahid**, a math major with an Economics minor, will be a quantitative business consultant at Ernst & Young in Tysons, Virginia.

- **Yu (Julia) Sheng**, a math major with a computer science minor, will attend Columbia University to study the mathematics of finance.

- **Manroocha Singh**, a math major with an Education minor, will be attending the University of Pennsylvania's Graduate School of Education where she is enrolled in the 10–month M.S.Ed. and Certification in the Urban Teaching Apprenticeship Program.

- **Boyang Su** will start a Ph.D. program in mathematics at The University of Chicago.

- **Julian Taylor HC '18**, who had completed all the degree requirements in December 2017, has been working at Mathnasium: The Math Learning Center in Raleigh, North Carolina since January 2018.

- **Rachel Terry**, a math major with a French minor, will be moving to Paris, France to pursue a master's of science degree in international fashion and luxury management at Institut Français de la Mode.

- **Nuoya Wang** will take a gap year and then attend the University of Pennsylvania for a master's degree in systems engineering.

- **Wenqi Wang**, a math major with a computer science minor, will obtain a master of science degree in computer science at Columbia University's Fu Foundation School of Engineering and Applied Science.

- **Xinyue (Lexie) Zhang**, a double major in computer science and math, will be a software engineer at Facebook, Inc.

Graduation Day! From left to right: Math majors Dina Benedetto, Elena Broderick, Ingrid Bethuel, Phuong Nguyen, Jill Li, Hezel Gadzikwa [18]

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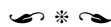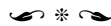
[18]Image: Ingrid Bethuel

Awards and Honors

- **Ying Yan '18**, a triple major in history of art, mathematics, and physics, was awarded the **European Traveling Fellowship**, one of the two highest academic awards given by the Undergraduate College to honor members of the graduating class for work of surpassing excellence and to support study towards an advanced degree. She also graduated from Bryn Mawr with the distinction **summa cum laude**. Ying will begin a Ph.D. program in Physics at Harvard University this fall.

President Kim Cassidy congratulating Ying at the 2018 Commencement Ceremony [19]

- **Sarah Gift '18**, an A.B./M.A. student in mathematics pursuing a neuroscience minor, received the **Anna Pell Wheeler Prize in Mathematics**. Sarah successfully defended her A.B./M.A. thesis entitled *Exploring Oscillatory Integral Operators for Functions in Higher Dimensions* on May 8. Sarah also graduated from Bryn Mawr with the distinction **summa cum laude**.

- **Boyang Su '18**, an A.B./M.A. student in mathematics, received the **Charlotte Angas Scott Prize in Mathematics**. Boyang successfully defended her A.B./M.A. thesis on *Statistics of Perturbed Laplacian Eigenfunctions* on May 8. Moreover, Boyang graduated from Bryn Mawr with the distinction **summa cum laude**.

- **Manroocha Singh '18**, a mathematics major and Education minor, obtained the **Gail Ann Schweiter Prize** awarded to a science or mathematics major who has shown excellence in both her major field and in musical performance.

- Math majors **Anna Kyle '20**, **Campbell Powell '20**, and **Haley Varnum '19**, all members of the College's Cross Country and Indoor Track and Field Teams, made the **2017 Centennial Conference Fall Academic Honor Roll** and the **2018 Centennial Conference Winter Academic Honor Roll** in recognition for their academic performance and performance on the field. Anna is pursuing a German major in addition to the math major, while Haley is a double major with chemistry.

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[19]Image: Paola Nogueras

More Awards and Honors

- Established in 2018, the **Community Building Honor Roll** honors students who have made important contributions to creating a sense of belonging, inclusiveness, and community on campus. The following math majors were on the inaugural Community Building Honor Roll: **Leah Baker '19**, **Jill Li '18**, **Rachel Miller '18**, **Manroocha Singh '18**, **Jwahir Sundai '19**, **Lia Yoo '18**, and **Koko Zhang '19**. **Math Ph.D. student Samantha Pezzimenti '18** also received this honor.

Samantha Pezzimenti being hooded at the 2018 Commencement Ceremony [20]

- **Jill Li '18**, **Rachel Miller '18**, and **Rachel Terry '18** won the **2018 Mary Louise Cookson Prize in Mathematics** in recognition of their exceptional service that has contributed to the life of the department. This prize was established in 2007 in honor of Mary Louise Cookson's extraordinary contributions to mathematics at Bryn Mawr College.

- In 1997, the last year of Mary Patterson McPherson's presidency at Bryn Mawr, the Trustees established the McPherson Fund for Excellence to celebrate the Bryn Mawr values that McPherson has personified, particularly her commitment to the entire College community. The **McPherson Awards** inspire and honor outstanding faculty and staff members, graduate students, and undergraduates. **Math graduate student Isaac Craig** won the McPherson Award for Excellence at the 2018 Convocation on May 18. This is the second year in a row that a mathematics graduate student has won this award. **Math Ph.D. student Samantha Pezzimenti** won the McPherson Award for Excellence at the 2017 Convocation on May 12. So far **Chair and Professor of Mathematics Lisa Traynor** is the only math faculty member to obtain this award (at the 2017 Commencement on May 13). Recipients are recognized for excellence and service to the community, either within or beyond the boundaries of this institution.

- **Lisa Traynor** has been elected to the **AMIAS Board of Trustees** (at the Institute for Advanced Study in Princeton).

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[20]Image: https://photos.brynmawr.edu/2018/Events/Commencement-2018/i-kkbnMkz/A

More Awards and Honors

- **Chair and Professor of Mathematics Lisa Traynor** won the **2018 Faculty Mentorship Award** at the 12th Annual Graduate Student Research Symposium on April 3, 2018. She was nominated for this award by GSAS students and the Graduate Council.

- **Instructor in Mathematics Peter Kasius** won the **2018 Christian R. and Mary F. Lindback Foundation Award for Distinguished Teaching**. This award is presented to a member of the faculty for exceptional teaching every few years. Previous members of the Bryn Mawr Math Department who received this prestigious award were **Mary Louise Cookson, former Senior Program Coordinator and Instructor in Mathematics**, in 1993 and **Professor Emeritus Helen Grundman** in 2014.

Provost Mary Osirim congratulating Peter Kasius for his award at 2018 Commencement Ceremony [21]

- **Professor Leslie Cheng** was awarded the **Rachel C. Hale Chair** at the 2018 Commencement Ceremony. This Chair was established in 1988 by the Board of Trustees, and it is awarded to a full professor in recognition of excellence in teaching and in scholarship. Professor Cheng is the second person from the Math Department to be awarded this Chair. **Professor Paul Melvin** previously held this Chair from 2000 – 2008.

- **Haley Varnum '19**, a double major in math and chemistry in the A.B./M.A. program for chemistry, is a recipient of a **2018 Barry M. Goldwater Scholarship**. This scholarship is given by the U.S. Congress to sophomores and juniors to finance the last two to three years of their undergraduate education in the sciences. This award will allow Haley to continue her research in Professor of Chemistry Sharon Burgmayer's lab. Haley is the first Bryn Mawr student to receive this scholarship since 2011. For more information on Haley, see https://www.brynmawr.edu/news/haley-varnum-19-wins-goldwater-scholarship.

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[21]Image: Paola Nogueras

More Awards and Honors

- **Kara Breeden '18**, a member of the College's Soccer and Basketball Teams, made the **2017 Centennial Conference Fall Academic Honor Roll** and the **2018 Centennial Conference Winter Academic Honor Roll** in recognition of her academic performance and her performance on the basketball court and on the soccer field. Kara is a double major in computer science and mathematics.

Kara wearing her yellow Student–Athlete stole on Commencement Day [22]

- **Rachel Terry '18** graduated from Bryn Mawr with the distinction **summa cum laude**.

- **Victor Donnay, Professor of Mathematics on the William R. Kenan Jr. Chair,** was funded by a **grant from the National Science Foundation (NSF)** to work with a group of fifteen Philadelphia high school teachers on education for sustainability. The group considered how to include topics of sustainability in their teaching through the use of place-based projects.

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[22]Image: Paola Nogueras

The News in Brief

- **Math graduate students Hannah Schwartz** and **Isaac Craig** gave "Lightning Talks" at the 12th Annual Graduate Student Research Symposium at Bryn Mawr on April 3, 2018.

Hannah talks about "How to Draw a 4-Dimensional Space" [23]

- **Math Ph.D. students Samantha Pezzimenti** and **Danielle Smiley** presented posters at the 12th Annual Graduate Student Research Symposium. Sam's poster was on "Lagrangian Fillings of Legendrian Knots," while Danielle's poster was on "A Historical Survey of Oscillatory Singular Integral Operators".

- Graduate student **Isaac Craig** successfully defended his master's thesis *On Fibering 3-Manifolds* on April 26, 2018.

- This spring's **Math Appreciation Week** included a keynote address entitled "Should You Believe It? Critical Minds in the Information Age." It was delivered by Rebecca Goldin of George Mason University and STATS/Sense about Science USA. The week also featured an alumnae panel, pi(e) party, and a game of SET tournament.

- In July 2017, **Assistant Professor Djordje Milićević** was a visiting mathematician in the USA/Canada Mathcamp at the University of Puget Sound in Tacoma, WA.

- In November 2017, **Professor Lisa Traynor** and **Samantha Pezzimenti** traveled to Lyon, France to give research talks.

- **Djordje Milićević** received tenure and has been promoted to Associate Professor of Mathematics effective Fall 2018.

- **Peter Kasius** has been promoted to Senior Lecturer in Mathematics effective Fall 2018.

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[23]Image: Paola Nogueras

The News in Brief, Continued

- **Math graduate student Samantha Pezzimenti** gave the 2018 Convocation address for the Graduate School of Arts & Sciences.

- Math major **Jill Li '18** won the Hoop Race at May Day 2018.

Jill off to a good start. She is out in front from the beginning of the race. [24]

- On September 28, 2017 the Math Department hosted a **Summer Math Experiences Panel**. Panelists included **Emily Barry '19** who was an Education for Sustainability Philly Intern, **Dina Benedetto '18** who was a technology summer analyst at Morgan Stanley in the Greater New York City Area, **Hezel Gadzikwa '18** who was a research assistant investigating "Covered Interest Rate Parity Post Great Financial Crisis" at The Wharton School at University of Pennsylvania, **Jill Li '18** who was a business development intern at OpenWater, Inc. in the Washington D.C. Metro Area, **Bisma Naqvi '18** who was a summer analyst at Melinae Inc. in the Greater New York City Area, and **Boyang Su '18**. Boyang participated in an undergraduate research program at Muhlenberg College in Allentown, PA. Her project dealt with "Research Challenges Identifying Integer Sequences Using the Online Encyclopedia of Integer Sequences (OEIS)."

- The Math Department hosted its first ever **Study Abroad Panel** this academic year. **Elena Broderick '18**, **Greta Koch HC '18**, **Hunter Rendleman '18**, and **Rachel Terry '18** were the panelists. Elena studied at Tsuda College in Japan, and she took a measure theory course in Japanese. Greta participated in the Liberal Arts and Business Program in Barcelona, Spain through IES Abroad. Hunter studied at the London School of Economics, while Rachel studied abroad in Paris, France.

- **Math graduate student Lindsay Dever** participated in the Women and Mathematics program on "Mathematics of Modern Cryptography" at the Institute for Advanced Study in Princeton, NJ in May 2018.

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[24]Image: Paola Nogueras

The News in Brief, Continued

- The Math Department conducted a **tenure-track search** for an algebraist this academic year. **Dr. John Bergdall** was hired and will begin his tenure-track position in August 2018. He is scheduled to teach a new elective on elliptic curves in the Spring 2019 semester.

- Two **new graduate students** will join the Math Department this summer. **Elsa Magness** is from La Habra, CA, and has an undergraduate degree from Seattle University. **Alfredo (AJ) Vargas** is from Bronx, NY, and has an undergraduate degree from the University of Rochester.

- **Victor Donnay** is Bryn Mawr's representative on a $1.4 million multi-institutional grant from the NSF to provide scholarships and other supports to math and science majors who want to teach in a high-needs district, specifically Philadelphia.

- **Djordje Milićević** is co-organizing and giving a lecture series in the summer school "L-Functions: Open Problems and Current Methods" at the Hausdorff Center for Mathematics in Bonn, Germany in June 2018; **math graduate student Daniel White** will be attending.

- Professors **Elizabeth Milićević** (Haverford College) and **Djordje Milićević** will serve as Director's Mathematicians in Residence at the Budapest Semesters in Mathematics program in their 2018 summer session.

- The **2017 Putnam Exam** was taken by three Bryn Mawr students. One of these students scored 12, which is impressive given the difficulty of the exam (the median score is 0). During the fall semester about three students, on average, attended the weekly problem-solving seminar run by **Instructor Peter Kasius** for practice in preparation for this exam.

- **Math Ph.D. student Danielle Smiley** will start a continuing non-tenure track position in mathematics at Villanova University in Fall 2018.

Danielle Smiley and Isaac Craig listening to "Lightening Talks" in College Hall at the 12th Annual Graduate Student Research Symposium on April 3, 2018 [25]

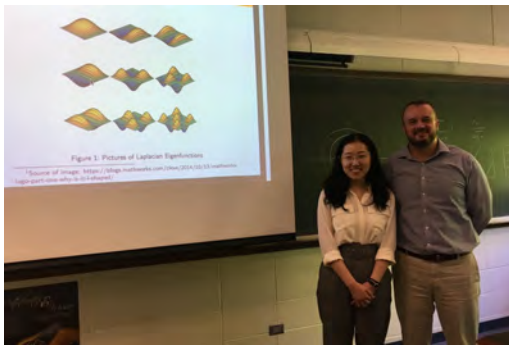[25]Image: Paola Nogueras

Photo Gallery
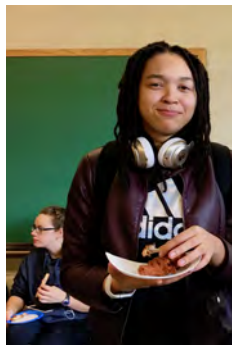

View of construction from Collier

SET tournament

Sarah Gift '18 and Leslie Cheng

Boyang Su '18 and Djordje Milićević

Meagan M.-B. '20

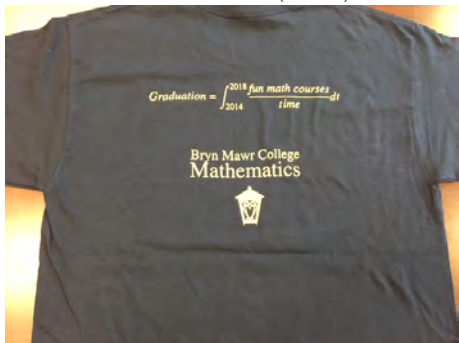Julia Sheng '18 and Djordje Milićević
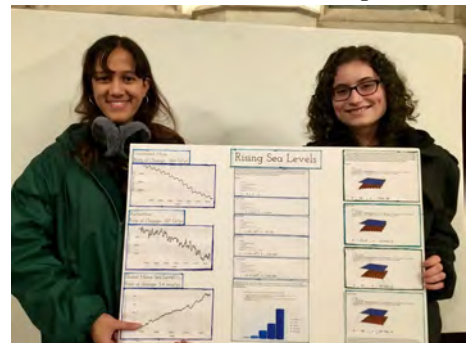

Senior T-Shirt (Front)

Mentorship Award

Dan White at Lantern Night

Senior T-Shirt (Back)

Holiday Party

Math and Sustainability

Which BMC Math Professor are you?

1. What is your dream vacation spot?
(a) Somewhere scenic with hiking
(b) Tropical beach at the end of the world
(c) Ardmore
(d) Italy
(e) Colorado
(f) Ireland

2. What is your favorite math class BMC offers?
(a) All of them
(b) Senior Conference
(c) Linear Algebra
(d) Combinatorics
(e) Differential Equations
(f) Math and Sustainability

3. What is your favorite spot on campus?
(a) Math professor's office
(b) Sunken Garden
(c) Collier Library
(d) Rhoads Pond
(e) The Gym
(f) Merion Green Hammocks

4. What is your favorite color of chalk to use?
(a) White with a little red for emphasis
(b) Purple
(c) White
(d) Yellow
(e) Combo of white and yellow
(f) Blue

5. If you were an animal, what animal would you be?
(a) Squirrel
(b) I'm not a fan of animals
(c) Small dog
(d) Butterfly
(e) Cat
(f) Puppy

6. What is your favorite type of pie?
(a) Crustless Pumpkin Pie
(b) Savory Fillo Cheese Pie
(c) Apple Pie
(d) Key Lime Pie
(e) Pumpkin Pie
(f) I'll only eat Pumpkin Pie

7. If you didn't pursue math, what would you do?
(a) Hmmmmmm, hard to know
(b) This never occurred to me
(c) Sleep
(d) Be a chef
(e) Be a piano teacher
(f) Be a community organizer

8. What is your favorite beverage of choice?
(a) At least 2 liters of water
(b) Scotch
(c) Coffee
(d) Red wine
(e) Plain water
(f) Decaf Earl Grey tea

9. What is your favorite math textbook?
(a) *The Knot Book,* Colin Adams
(b) *Understanding Analysis,* Stephen Abbott
(c) Depends on the class
(d) *Abstract Algebra,* Dummit and Foote
(e) *Calculus,* Larson and Edwards
(f) *Differential Equations,* Paul Blanchard

10. Besides math, what do you like to do for fun?
(a) Exercise
(b) Scroll through new websites
(c) Nothing really
(d) Cook, take walks, and attend art events
(e) Hike, dance, and knit
(f) Play sports and sing

Mostly (a)'s:
CONGRATULATIONS!! You are most similar to Professor Lisa Traynor. You love a nice, healthy breakfast filled with oats and fruits. Getting deliveries of fresh fruits and veggies from a local farm is one of your favorite parts of the week. You love both DMC and the colloquium, and you think your office is the best there is in all of Park. You love discussing the topics you read for homework and cannot wait for the Park classrooms to be done. On a deserted island, you would just sit back, grab some sunscreen, put on a hat, and NEVER forget your water.
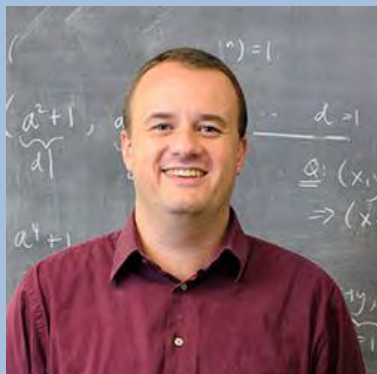
Mostly (b)'s:
CONGRATULATIONS!! You are most similar to Professor Djordje Milićević! Some of your favorite mathematicians include Hermann Weyl, David Hilbert, and Bernhard Riemann. You have enjoyed attending Bryn Mawr's colloquium since 2012. If you were stranded on a deserted island, you would bring a beach towel, sunscreen, several books, and an internet connection. Your ideal day is sunny and unstructured. You read the newspaper, do some math while strolling through the park, and then end the day by cooking dinner on the grill. You also love (proper) chocolate!
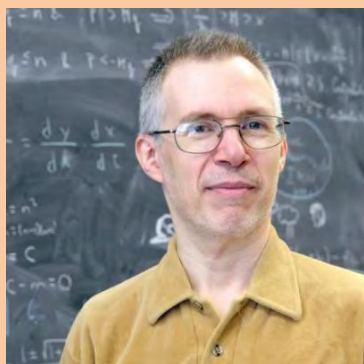
Mostly (c)'s:
CONGRATULATIONS!! You are most similar to Professor Peter Kasius! Mathematics is your true passion in life. Your ideal day would be to wake up early around 4 AM, prepare for class, review your notes a few times, teach, eat, prepare for tomorrow, and then sleep. You always do math in pen, appreciate the work of Herbert Federer, and believe all equations are special in their own way. You have been at Bryn Mawr for over 30 years and are always down for some good dim sum.

Mostly (d)'s:
CONGRATULATIONS!! You are most similar to Professor Amy Myers! You love exploring new cities, discovering interesting places, and enjoying food like tacos. You prefer to do math in pencil and have one of the nicest offices in the department. You love the work of Nicolas Bourbaki and long polynomial equations in the form of generating functions. And if you were stranded on a deserted island, the only thing you would need is a deck of cards with which to play FreeCell.

Mostly (e)'s:

CONGRATULATIONS!! You are most similar to Professor Danielle Smiley. You're the new kid on the block as far as teaching is concerned, but you love Euler just as much as any math veteran. Your biggest love outside of math is music, which makes you pretty classy. But that doesn't mean you can't be tough when you need to be -- after all, you wouldn't be caught dead on a deserted island without a knife.

Mostly (f)'s:

CONGRATULATIONS!! You are most similar to Professor Victor Donnay. You love teaching concepts visually, so you're never far from a set of pencils and lots of colored markers, and your classrooms ALWAYS involve students working in groups. Because mathematics and sustainability are extremely important to you, you want nothing more than to wake up and be Tom Pfaff. You have a soft spot for chicken wings and enjoy warm, sunny walks outside. You would never be stuck without books and sun tan lotion.

Credits

✵

❦ ❦ ❦ ❦ ❦ ❊ ❧ ❧ ❧ ❧ ❧