math@andrews

2020 Changes—Learning Continues

The 2019-20 school year progressed fairly normally until March when, instead of students happily taking off on Spring Break for various travel destinations or visits to their families, they hurried to pack their personal belongings in order to vacate the campus. Staff and faculty soon followed, and by the end of the third week in March, only essential personnel were on campus, which remained like a ghost town until late August when many of the students, faculty, and staff returned for the Fall 2020 semester and quite a few studied and attended classes remotely. The effects of the COVID-19 protocols have touched almost every aspect of campus life, as this newsletter will reflect.

♦ None of the end-of-the-year math events took place (no Pi Mu Epsilon induction, no Senior Send-off, no Awards Ceremony, no graduation weekend gatherings in either Spring or Summer). (See page 8 for the story on the PME induction this fall.)
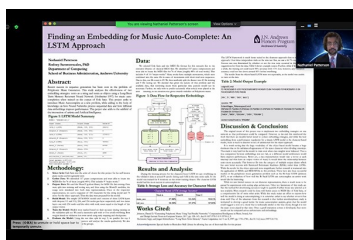
♦ Research, especially student research, suffered somewhat because all of the end-of-the-year research presentations were cancelled, and one-on-one meetings between faculty and students are discouraged. Honors students even presented their theses online. (See pages 4-5.)

♦ Faculty lost any semblance of a break as they scrambled to use the added week of Spring Break to switch to online platforms for the end of Spring semester and have since shown remarkable innovation to make the blended learning possible (using Zoom, taping lectures, experimenting with new technologies) .

♦ Masks hide most of people's faces and emotions, and social distancing limits hugs and high-fives or any personal contact.

♦ Social gatherings are limited—including club meetings and vesper and church services.

However, in spite of everything that 2020 has brought to the Department of Mathematics, our students and our faculty have shown remarkable resiliency and adaptability as we have found new ways to substitute for old methods.

♦ This fall the eigen*Vespers have been small outdoor gatherings (although, unfortunately, we could not include the usual cornucopia of good foods for students to enjoy).

♦ All department meetings are conducted via Zoom, as are the remote sections of our classes. This has had some benefits because for the first time MATH 145 is being offered entirely remotely, enabling some students who hadn't completed their mathematics requirement to do so from wherever they live.

♦ Dr. Anthony Bosman (*right*) has been able to realize his dream of building and using a light board for lectures. (See our Math at Andrews *YouTube* channel for posted lectures using the board.)

♦ This fall we were able to have the Pi Mu Epsilon induction (see p. 8) with most of the students attending. Although they were unable to have their parents or guests physically there (some attended via Zoom), the inductees were able to have some sort of ceremony to honor their achievements.

Computer Vision
Past, Present, & Future

David Krcatovich, PhD
Machine Learning Scientist
Ford Motor Company

Department of Mathematics
Andrews University

ZOOM ID:
889 5810 5069

eigen* colloquium series   FRIDAY, OCT 30, 12:30P EDT

♦ All of the eigen*Talks this semester have been presented via Zoom, so students can attend these talks either live or view them later since students are in various time zones—and people everywhere can watch as well on the links that we provide on our *Facebook* page (*search for Andrews University Department of Mathematics and subscribe so that you get notifications each week if you are interested in joining the Zoom talks*).

While 2020 has challenged us, I still have many reasons to be grateful. I am grateful for faithful colleagues who worked together to focus on teaching and mentoring students regardless of the disruptions this year. I am grateful for friends of the university that donated money to assist students and other money to assist faculty in the pandemic. I am grateful for the innovations that we've been given the opportunity to utilize. [Check out some of our teaching on our "Math at Andrews" *YouTube* channel—including many lectures given utilizing a lightboard made by **Donovan Greenley** (2020 BSE Engineering/Math minor) (*top*) with help from Dr. Anthony Bosman, **Jonathan Burn** (freshman BSE Engineering/Mathematical Studies) (*right*), and **Matthew Guy** (Senior BS Mathematics) (*left*).]

Thank you for your continued support. I pray you have developed a renewed trust in a God who knows everything about us and loves us anyway—and offers a relationship based on evidence and freedom.

Lynelle Weldon, Chair

Andrews Once Again Participates In Preeminent Math Competition

Determine all possible values of $A3 + B3 + C3 − 3ABC$ where A, B, and C are non-negative integers.

That was the first of a dozen questions on the 80th annual William Lowell Putnam Competition, the preeminent mathematics competition for undergraduate students in North America. Eight students from Andrews University joined over 4,000 students from 570 of the top universities in the United States and Canada for the six-hour exam in early December 2019. The exam questions are notoriously difficult; although the test is out of a possible 120 points, 0 is the most commonly awarded score. "Our students take the exam because they enjoy the challenge of it," says Assistant Professor of Mathematics Anthony Bosman, who coached the team. Among the 2019 AU team were **Mykhaylo Malakhov** (2020 BS Mathematics, who took the exam in Budapest where he was participating in the Budapest Semesters in Mathematics program) and **Yaser Monterrey** (4th-year BS Mathematics),

Left to right front: Yaser Monterrey, Lisa Johnston. Back row, left to right: Melody Puckett, Yosia Nurhan, Jonathan Homan, Devin Garcia, Jonathan Watson.

who both scored in the top 30% among all North American participants. Other team members were **Devin Garcia** (3rd-year BS Physics/Mathematical Studies)**, Jonathan Homan** (2nd-year BS Math/Physics Studies), **Lisa Johnston** (2nd-year BS Mathematics/Biophysics, **Yosia Nurhan** (3rd-year BS Math/Physics Studies), **Melody Puckett** (3rd-year BS Math), and **Jonathan Watson** (2nd–year BS Math/BMUS Music).

This is the third year that Andrews participated in the Putnam competition, joining Walla Walla University as the only Adventist universities to participate. "Each year our students keep scoring better. The fact that we can compete with the best universities in the nation affirms the strength of our mathematics program to train students in complex and open-ended problem solving in a faith-affirming environment," Bosman explains. We are proud of the team for scoring 188th out of 488 participating university teams, an improvement from last year when we ranked 232th.

Student Film Wins Prize *Sigma Xi*, a scientific research honor society, held their first STEM Art
and Film Festival in Madison, Wisconsin, on November 17, 2019. Three groups of Andrews University students each submitted the short film that they had created as part of the MATH 355 class in Spring 2019, and when all three short videos were accepted, the Department of Mathematics rented a van so that Dr. Bosman could transport the students to the film festival. One of their films, an animated introduction to mathematical knot theory called *Introduction to Knots & Invariants*, won the People's Choice Award, which included a cash prize. Here are the links to the films on our Math at Andrews *YouTube* channel:

https://www.youtube.com/watch?v=EBWP1POPc2A *Introduction to Knots & Invariants*
https://www.youtube.com/watch?v=13D8AbC3GNc *Magic Squares*
https://www.youtube.com/watch?v=-iD47Iq82qo&t=320s *Sharing a Sandwich Using Math – Monsky's Theorem*

2019-20 Graduates

Juliane Johnson (BS Biology [Biomedical]/Mathematical Studies; Beta Beta Beta; J. N. Andrews Scholar; Pi Mu Epsilon) is attending Loma Linda University School of Medicine this fall.

Mykhaylo Malakhov (BS Mathematics; J. N. Andrews Scholar; Pi Mu Epsilon, Sigma Xi) began working on a PhD in biostatistics at the University of Minnesota, Twin Cities this fall, albeit right now remotely. After much deliberation, he chose the University of Minnesota School of Public Health because its biostatistics program consistently ranks among the top ten nationally for its rigorous curriculum and impactful research. Best yet, he received a fellowship and is guaranteed full funding for five years.

Sara McLean (BS Mathematics Education/Secondary Certification; Pi Mu Epsilon) spent the spring semester teaching mathematics at Ozark Academy, a position that she took after she finished her student teaching at Berrien Springs High School in December 2019. She is now hired full-time as the math teacher at Ozark Academy.

Anthony Miller (BS Biochemistry [ACS]/Mathematical Studies; Gamma Sigma Epsilon; J. N. Andrews Scholar; Pi Mu Epsilon) is attending Notre Dame University, working toward his PhD in chemistry. While here at Andrews in 2019, he was the president of the inaugural group of students inducted into the newly formed Andrews University Department of Chemistry chapter of Gamma Sigma Epsilon, the Chemistry Honor Society.

Kelsey Rook (BS Computer Science/Mathematical Studies; J. N. Andrews Scholar; Pi Mu Epsilon) is attending Rensselaer Polytechnic Institute in Troy, New York, working toward her PhD in Computer Science.

Qizeng "Francis" Sun (BS Computer Science/Mathematical Studies; Pi Mu Epsilon) is working at a friend's company, doing the company website maintenance and some staff database work while he applies to graduate schools for next year.
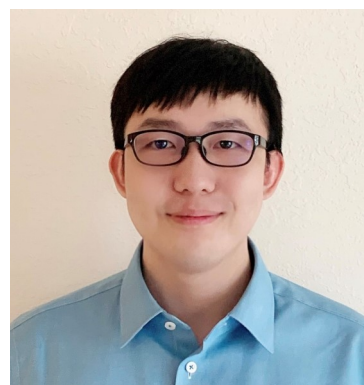
Canoe Adventure

At the start of the Fall semester, eigen* held a canoe trip down the St. Joseph River that culminated in a Friday evening vespers at the Agriculture Educational Center. Dr. Andrea Luxton, President of Andrews University, led out in the vespers after a haystack supper and a song service. Despite a number of students getting rather wet and having to spend the evening slightly soaked, the adventure bonded the students, and at least one student expressed that it was the best experience he's had at Andrews. Because of the COVID-19 protocols, a repeat adventure has been postponed until next year.

Research

*(Names in **blue and bold** are AU undergraduate students.)*

Presentations

Hanson, S. M. Presentation. "The effect of rising sea surface temperature on seabird behavior and population dynamics in the Pacific Northwest: Transients and tipping points." Annual Meeting for the Ecological Society of America, special session on Transients in Ecology, Louisville, KY, August 14, 2019.

Kang, J. H. Presentation. "Uniqueness pattern of survival of two species of animals in a domain." Joint Mathematics Meetings, Denver, CO, January 16, 2020.

Kang, J. H. Poster. "Positive solutions to a developed mathematical model." Celebration of Research at Andrews University, Andrews University, Berrien Springs, MI, October 25, 2019.

Kang, J. H. Presentation. "An elliptic nonlinear system of two functions with application." US-Korea Conference of the Korean-American Scientists & Engineers Association (KSEA), Chicago, IL, August 16, 2019.

Kang, J. H. Presentation. "Positive solution of an elliptic system with perturbed growth rates." CMS-HMS Joint Conference, Korea National University of Education, Cheongju, Korea, June 14, 2019.

Oh, Y. M. Presentation. "V^T-rectifying submanifolds." AMS Special Session on Differential Geometry and Global Analysis, Honoring the Memory of Tadashi Nagano (1930-2017), Joint Mathematics Meetings, Denver, CO, January 16, 2020.

Oh, Y. M. Presentation. "Rectifying submanifold in Riemannian manifold with canonical normal vector field." US-Korea Conference of the Korean-American Scientists & Engineers Association (KSEA), Chicago, IL, August 16, 2019.

Oh, Y. M. Presentation. "Rectifying curves in E^3 and rectifying submanifolds." ChungChung Mathematics Society-Honam Mathematics Society Joint Conference, Korea National University of Education, Cheongju, Korea, June 14, 2019.

Publications

Krzywoń, Ł., & **Oh, Y. M.** (2020). Time-like rectifying curves in Minkowski space $R^{1,3}$. *The Pi Mu Epsilon Journal*, 15(2): 99-105.

2019-2020 Student Research

Avetik Badalyan (Junior BS Data Science) worked during last school year with Dr. Tiffany Summerscales from the Department of Physics, doing BayesWave research as part of the LIGO team, which is classifying observatory data into two groups, noise and signal, using Bayesian inference in hopes of finding the probability of an event. The team uses prior knowledge of conditions related to the event to infer the waveform of a gravitational wave. BayesWave models and parameter inference are commonly implemented using a Reversible Jump Markov Chain Monte Carlo algorithm, but Avetik's ongoing research centers around training a deep neural network to learn Bayesian posteriors instead of explicitly using Bayesian inference through Markov chains.

Jonathan Homan (Junior BS Mathematics/BS Physics; J. N. Andrews Scholar; PME) is continuing his research with Dr. Jay Johnson, who teaches for both the Engineering and Physics Departments, exploring the memory contained in stellar flares. Through a mutual information analysis, Jonathan and Dr. Johnson are looking for evidence that stellar flares are affected by previous nearby flares and thus contain memory in their distribution. In addition to his work with Dr. Johnson, Jonathan is also extending the work on strong fusion that he began the year before with Dr. Bosman. The two are exploring variations of strong fusion and completing a paper on their previous results that they hope to publish in the near future.

Working under Dr. Brian Wong of the Department of Biology, **MinSeo Kang** (Sophomore BS Mathematics/Pre-medical; PME) and a small team of students is studying the chemoprevention effects on MDA157, 93A, and 93B breast cancer cells provided by herbs such as *Scutellaria Barbata*, a perennial herb used in traditional Chinese medicines. To date, the team has compared their results from the cancer cells treated with the herbs to others treated with a known apoptotic protein and to a control group. The results show that *Scutellaria Barbata* efficiently induced apoptosis of breast cancer cells. The team also successfully tested the apoptotic-inducing effects of *Scutellaria Barbata* on brain cancer and colon cancer cells.

Student Research (cont.)

Wesley Martin (Junior BS Physics/BS Computer Science/Mathematical Studies; PME) is another of the students working with Dr. Jay Johnson on a physics-related project. Wesley is looking at recent simulations of tail dynamics using the Auburn Global Hybrid Code in 3-D (ANGIE3D), and his findings suggest that tail flows are closely related to the dynamics of Alfven waves propagating from the magnetotail to the ionosphere. To understand the dynamical coupling process described by the simulation, he is considering the simulated time series of plasma sheet structures associated with tail flows and the Poynting flux into the ionosphere and creating 2-D animations showing how the ionospheric Poynting flux responds to plasma sheet parameters (such as velocity, Bz, entropy, etc.), identifying linear and nonlinear signatures in the response, including the timescale at different locations in the plasma sheet. He utilizes transfer entropy to identify causal relationships among reconnection events, tail flows, and Poynting flux into the ionosphere. Results suggest that flows in the plasma sheet are the primary driver of the Poynting flux.

Yosia Nurhan (senior BS Mathematics/Physics Studies; J. N. Andrews Scholar; PME) has been working with Dr. Jay Johnson on the ways that the solar activity cycle impacts processes ranging from the sun throughout the heliosphere. Many processes can be identified as "events" such as solar flares, geomagnetic storms, and geomagnetic substorms. The waiting times between these events are governed by a combination of external driving by the activity cycle and internal dynamics. If the events occur randomly, the process can be described as a Poisson process. However, because the magnetic activity cycle generally modulates the rate of the events, the process is better described as a nonstationary Poisson process. In their study, Yosia and Dr. Johnson are exploring the tail of various waiting times datasets with nonstationary Poisson distribution with a sinusoidal dependence. Analytically, they find that the distribution of large waiting times of such processes can be described using a power law slope of -2.5. They show that this result applies more broadly to any nonstationary Poisson process driven periodically such as solar/stellar flares, geomagnetic storms, and substorms.

Nathaniel Patterson (Dec. 2020 BS Data Science; J. N. Andrews Scholar) centered his Honors thesis research (see photo of his poster on p. 1) on sequence generation as a means of addressing the problem of polyphonic music generation. His research analyzes the effectiveness of two embedding strategies: notes as a string and notes as objects using a long short-term memory recurrent neural network (Hochreiter, 1997) for music auto-completion when trained on the corpus of Erik Satie. His project sought to introduce music autocomplete as a new problem while adding to the body of knowledge on how neural networks process sequential data and how different data embeddings improve performance. This project adds to the subfield of the intersection of artistry and artificial intelligence.

During the 2019-2020 school year, most of the rest of our student researchers were continuing their research from the year before until the protocols shut down the campus, cancelling all of the end-of-the-year research presentations and curbing the opportunity to work with their mentor professors, who were scrambling to switch to distance learning for the duration of the semester. Students in this group include **Ben Dronen** (Senior BSE Electrical and Computer Engineering/Computer Science/Mathematical Studies; PME) (*right)*, who is continuing his studies with Dr. Bosman on the effects of strong fusion on various link invariants. He, **Jonathan Homan** (see p. 4), and **Gabriel Palacios-Worley** (Junior BS Mathematics/MBUS Music; PME) have classified all links that were the result of strong fusion on links up to 9 crossings.

Other students doing research last school year were **Lisa Johnston** (junior BS Mathematics/Physics; J.N. Andrews Scholar; PME) and **Alma Navarrete Vargas** (senior BS Mathematics Education/Secondary Certification) who continued their work with Dr. Weldon on analyzing common errors that remedial mathematics students make and ways to remediate those. Dr. Oh's two research students, **Devin Garcia** (Senior BS Physics/Mathematical Studies; PME) and **Yaser Monterrey** (Dec. 2020 BS Mathematics; PME), were disappointed at not being able to present their differential geometry research at the MASAL conference in the spring.

Game Night

Not all of our interactions are academic, as attested by these pictures of our game night last fall. Game nights this year have to be virtual, but hopefully soon we can again gather together for food and fun.

Alumni News

Danielle Burton (2008 BS English Literature/Mathematical Studies; 2013 MS Mathematics & Science, PME) finished her PhD in Mathematics at the University of Tennessee, Knoxville, and is now a Van Vleck Assistant Professor at the University of Wisconsin, Madison. *(To the right is her COVID selfie.)*
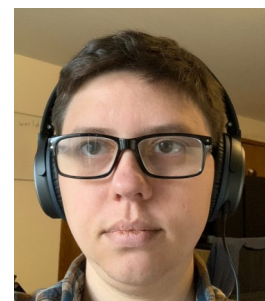
Victoria Kolpacoff (2017 BS Mathematics; J. N. Andrews Scholar; PME) is currently living in Richmond, CA, working for the CA Department of Public Health as a Research Scientist I in the Childhood Lead Poisoning Prevention Branch (CLPPB). She began working there as a biostatician in March 2020 and enjoys her work and her church family. Although COVID-19 put a bit of a damper on exploring the area, she is excited to get out more soon. *(She is pictured between her two siblings.)*

Math@Andrews found out this year that in May 2018 **Laurie Mack McHale** (2006 BS Mathematics, PME) received her PhD in Mechanical Engineering from Colorado State University. Her dissertation was "Development of Mobile Open-path Cavity Ring-down Spectrometer for Measurement of Trace Atmospheric Methane Gas." That same month her brother **David Mack** (2003 BS Mathematics) earned his MD from the University of Colorado School of Medicine. He is now in year 2 of a 4-year anesthesiology residency in Denver.

We were sad to hear that **Esther Ottley** (1954 BA Mathematics), the first woman of color to graduate from AU with a BA in Mathematics, died Feburary 20, 2020, at age 91. The funeral service for Dr. Ottley took place Sunday, March 8, 2020, at the Metropolitan Seventh-day Adventist Church in Hyattsville, Maryland, just before lockdowns began. Born in Panama to Jamaican missionaries, she later moved with the family to Jamaica, graduated from West Indian Training College (now Northern Caribbean University) with an AS in teacher education, and then came to Andrews, where she worked for Dr. Specht and completed her BA in Mathematics. After graduation in 1954, she married **Dr. Neville Ottley** (EMC class of 1953) and moved to Washington, D.C. where he completed his last two years of medical school at Howard University and she taught math at Howard while completing her PhD at American University. She continued to teach at Howard until 1975, when she became the founding associate dean of the Graduate School of Arts and Sciences, later serving several years as the interim dean before retiring in 1994. Her daughter, Dawn Ottley-Nelson-Barnes, a professor at Central Michigan University wrote a more complete story on her mother's full life in the *Andrews Agenda*. Dr. Ottley is remembered as a great speaker, administrator, church leader, teacher, family member, and friend. The world was blessed by her life.

Robbie Polski (2016 BSE Mechanical Engineering/BS Physics/Mathematical Studies; PME, Sigma Pi Sigma; Sigma Xi), now in the fifth year of his PhD in Applied Physics at CalTech, is the coauthor of a paper published in *Nature*, and his research group just got another paper accepted into *Nature*. His wife, Ashley [Reichert] (2016 BS Biology [Biomedical]), who was a member of the Seabird Ecology Team with Dr. Henson, is applying to residency programs after completing her coursework at USC's medical school, and the couple will hopefully know in February where they will live for the next four years.
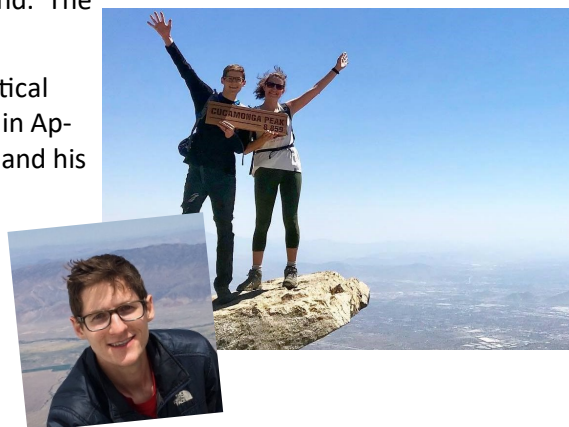
Please share your updates with us for next year's *Math@Andrews*. Just send your story and picture to math@andrews.edu so that new students and fellow alumni alike can see what happens to mathematics majors after graduation!

Mathematics Awards Ceremony—Another of the effects of the COVID-19 shutdown of the campus is that the professors in the Department of Mathematics were unable to give the 2020 awardees their certificates in person. Instead, the 56 students received e-certificates for the 71 awards given, with **Yosia Nurhan** *(right)* (senior BS Mathematics/ Physics Studies; J. N. Andrews Scholar; PME) receiving the most awards—awards for Real Analysis I, Real Analysis II, Probability Theory with Statistical Applications, Mathematical Modeling in Biology, and Differential Equations. He also received the 2020 **Weniger Scholarship Fund** award from Andrews University as well as the 2020 **Whitney Wang Watson Endowed Scholarship Award** for his excellence in mathematics and his dedication to service.

Lisa Johnston *(left)* (senior BS Mathematics/BS Physics major; J. N. Andrews Scholar; PME) was the recipient of the **Louis Ulloth Scholarship** in recognition of her consistent work for the department , especially her tutoring in the remedial classes and the Mathematics Center.

Yaser Monterrey (senior BS Mathematics; PME) was this year's recipient of the **Harold Buhalts Boyd and Jean Stewart Boyd Scholarship** for achieving excellence in mathematics while consistently working each semester.

Three students (*below left*) received the **Harold T. Jones Scholarship** for excellence in Mathematics: **Tyler Braithwhite** (Senior BS Computer Science/BS Mathematics; J.N. Andrews Scholar; PME), **Ben Dronen** (Senior BSE Electrical and Computer Engineering/Computer Science/Mathematical Studies; PME), and **Jonathan Homan** (Junior BS Mathematics/BS Physics; J. N. Andrews Scholar; PME) .
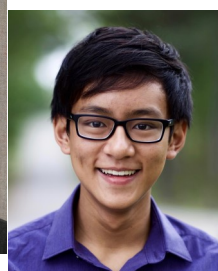
Wesley Martin (*right*) (Junior BS Physics/BS Computer Science/Mathematical Studies; PME) is the 2020 recipient of the **Edward J. Specht Endowed Scholarship Award** for excellence in mathematics and physics.

Facts Concerning the Fall 2020 Department of Mathematics Student Body

Major	Total	F	M	FR	SO	JR	SR	Dual Majors	Triple Majors	Other Majors
BS Data Science	8	3	5	2	1	3	2	2	0	1 Finance; 1 Spanish/Language, Literature, and Culture
BS Mathematics	23	5	18	3	5	8	7	14	2	I Chemistry, 4 Computer Science, 2 Music, 3 Physics, 1 Physics Studies, 2 Premedical, 2 Religion, 1 Spanish for Translation & Interpretation, 1 Theology
BS Mathematics Education	3	3	0	1	0	0	2	3	0	3 Secondary Certification
Mathematical Studies	17	5	12	1	3	5	8	11	6	1 Chemistry [ACS], 12 Computer Science, 6 Engineering, 3 Physics, 1 Physics Studies, 1 Spanish Language, Literature & Culture
Mathematics Minor	23	12	11	3	2	3	15	2	0	1 Architecture, 1 Biology/Biomedical, 1 Chemistry, 2 Computer Science, 3 Elementary Ed, 9 Engineering , 1 Finance, 1 Informatics, 1 Physics, 1 Psychology, 1 Public Health, 1 Religion, 1 Secondary Education, 1 Spanish for Teaching, 1 Theology

Andrews University
Department of Mathematics

Programs

BS in Data Science
BS in Mathematics
BS in Mathematics Education
Mathematical Studies Major
Mathematics Minor
Mathematics Education Minor
Minor in Mathematics of
  Economics and Finance

PME Michigan Gamma Chapter

*Kara Shepard, President
*MinSeo Kang, Vice President
*Tyler Braithwaite, Secretary-Treasurer
*Dr. Joon Hyuk Kang, Advisor

*eigen** Mathematics & Physics Club

*Eric Inae, Mathematics President
*Lisa Johnston, Physics President

Mission Statement

Through teaching, research, and service, the Department of Mathematics seeks to provide leadership by:

  *Preparing a diverse student body with the mathematical understanding, problem-solving skills, and dispositions that enable career excellence;

  *Increasing mathematical and scientific knowledge through publication and presentation and engaging undergraduates in research;

  *Supporting the broader mathematics education community and mentoring others for generous service through a committed Christian life.

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Top row: **Daniel Arn** (Junior Computer Science/Mathematical Studies); **Jeremy Barrett** (senior Mechanical Engineering); **Tyler Braithwaite** (senior Computer Science/BS Mathematics); **Reise Campbell** (senior Computer Science/BS Mathematics/Religion) *Middle row:* **Benjamin Dronen** (senior Electrical & Computer Engineering/Computer Science/Mathematical Studies); **Eric Inae** (senior Computer Science/BS Mathematics); **MinSeo Kang** (sophomore BS Mathematics/Premedical); **Joshua Lim Khye Shuen** (senior Mechanical Engineering); **Wesley Martin** (Junior Physics/Computer Science/Mathematical Studies) *Bottom row:* **Yaser Monterrey** (Senior BS Mathematics); Kara Shepard (Junior Physics/Mathematical Studies); **Joseph Taylor** (senior Mechanical Engineering); **Khen Tungnung** (senior Computer Science/Mathematical Studies)

Pi Mu Epsilon Induction—On September 17, 2020, the Department of Mathematics hosted the 2020 Induction to Pi Mu Epsilon, the Mathematics Honor Society. Postponed from March 26, when the University was closed because of COVID-19 protocols, the induction allowed only the inductees to meet in person (with social distancing and masks) to sign the roll book and receive their certificates and honor cords (and take separate pictures rather than a group photo). These attending members, including those who attended on Zoom, voted in the new 2020-21 officers: **Kara Shepard**, President, and **MinSeo Kang**, Vice-president. The two senior officers chose **Tyler Braithwaite** as the Secretary-Treasurer.

Four of the inductees were unable to attend: **Jasmine Carcamo** (junior Mechanical Engineering major), **Ryutaro Jacobson** (senior Chemical Engineering major), **Patricia Jennesha** (junior Computer Science/Mathematical Studies major) and **Solomon Kim** (senior Computer Science/Mathematical Studies major). Also, three seniors graduated in Spring 2020: **J.J. Briggs** (Mechanical Engineering), **Carson O'Ffill** (Chemical Engineering), and **Adam Weir** (Biology/Premedical). Congratulations to all the newest members of the Michigan Gamma Chapter of Pi Mu Epislon.