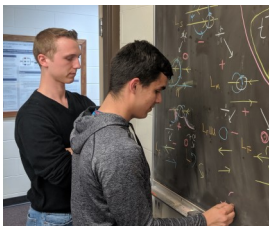
Andrews University
Seek Knowledge. Affirm Faith. Change the World.

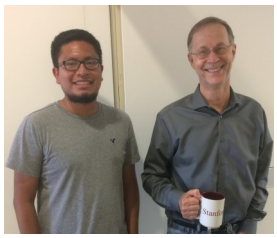
Fall 2019
Volume 16
K. Johnson-McWilliams, Editor

math@andrews

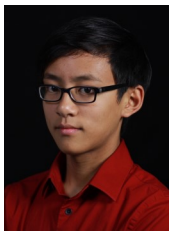
2018-2019 Student Research



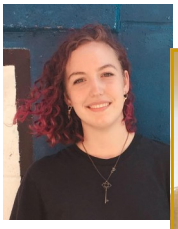
Ben Dronen (Junior BSE Electrical and Computing Engineering/Mathematical Studies) and **Gabriel Palacios-Worley** (Sophomore BS Music/BS Mathematics) are working with Dr. Bosman on a project dealing with knot theory. Entitled "Effects of Strong Fusion on Links," this project is an attempt to determine the exact effect of strong fusion on several link invariants including the HOMFLY polynomial and the Q polynomial. Ben and Gabe have begun classifying which links are the result of strong fusion, tabulating all such links with up to nine crossings.

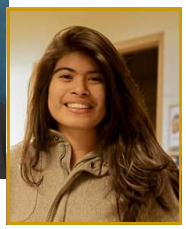


Devin Garcia (Senior BS Physics/Mathematical Studies; PME; Sigma Pi Sigma) spent his summer interning at Intelligent Fiber Optic Systems (IFOS) and working with the Digonnet group at Stanford's Ginzton Laboratory. IFOS is a company in Silicon Valley that specializes in "advanced system solutions and products using fiber optics." He helped to build acoustic sensors for an IFOS-Digonnet collaboration under the guidance of Behrad Afshar, a PhD candidate. Afterwards, he modeled backscattering noise for a laser-driven fiber optic gyroscope under the mentorship of Michel Digonnet, a Stanford research professor, (with Devon at right) and two PhD candidates: Therice Morris and **Jonathan Wheeler**, an Andrews alumnus. The model determined the optimal bias depth at which to modulate incoming photons from the laser when given the fiber optic coil length and laser linewidth to minimize backscattering noise. He is grateful to **Mateja** (2014 BS Mathematics/Physics Studies) and **Jonathan Wheeler** (2016 BS Physics/Mathematical Studies/BSE Electrical Engineering; J. N. Andrews Scholar; PME, Sigma Pi Sigma; Sigma Xi) for their support and mentorship this summer. This fall he continues to work with Dr. Oh on their project regarding the involutes of curves in Minkowski space.

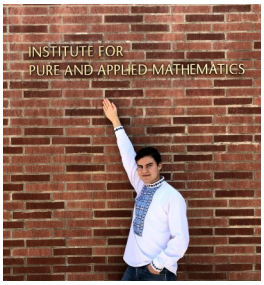


Jonathan Homan (Sophomore BS Mathematics/Physics Studies; J. N. Andrews Scholar; PME) is working on two research projects. For one project, Jonathan is working with Dr. Jay Johnson on analyzing the waiting times of stellar flares by looking at the time between flares of different stars in order to show that the distributions of the flares are not random. For the other, he is working with Gabriel Palacios and Ben Dronen under Dr. Bosman to create a table of links that can form through strong fusion (see above).





Lisa Johnston (Junior BS Mathematics/Biophysics; J. N. Andrews Scholar; PME) (right) is working with Dr. Weldon and **Alma Navarrete Vargas** (Senior BS Mathematics Education/Secondary Certification) (lower right) to identify which mathematical misconceptions are prevalent in remedial math classes by reviewing the penultimate and ultimate exams from Andrews University's remedial math courses. In the first phase of the research, Lisa and Alma read relevant literature, reviewed the results of Lisa's preliminary research from last summer, and set up a framework for data collection based on this preliminary research. The second phase involved collection and analysis of data from around 400 exams. The data collection involved reviewing student work on specific problems and tallying the data using the framework. The final data analysis identified the most commonly held misconceptions and tabulated these results. The most prevalent misconceptions found in their research so far are misunderstanding of computations involving positive and negative signs, disconnect between mechanics and concepts when graphing a linear system, bewilderment with respect to direct and indirect proportional relationships, and multiple gaps in understanding the fundamental concepts of operations involving variables. These results will help with ongoing improvements to the remedial courses taught at Andrews.



Mykhaylo Malakhov (Senior BS Mathematics; J. N. Andrews Scholar; PME; Sigma Xi) spent his summer with the Research in Industrial Projects for Students program at the Institute for Pure and Applied Mathematics at UCLA, where students worked in teams on real-world projects proposed by corporations and government agencies. Mykhaylo was appointed project manager for the Air Force Research Laboratory (AFRL) team, which also included three other undergraduates, academic mentor An Do (Claremont Graduate University), and sponsoring mentors, Robert Martin and Dan Eckhardt (AFRL). Mykhaylo and his colleagues employed dynamical systems theory, optimal transport theory, and information theory to develop novel techniques for attractor reconstruction and model calibration. In particular, the team successfully reconstructed the time series of all species in a hydrogen-oxygen combustion reaction and inferred correct rate coefficients from knowledge of just one observable. Their approach provides a robust tool for studying noisy, nonlinear systems for which complete data are unavailable and will facilitate development of next-generation spacecraft propulsion technologies. Mykhaylo's team plans to publish their results in a peer-reviewed publication and present at the 2020 Joint Mathematics Meetings in Denver.

Note from the Chair

Dear Friends of the Math Department,

This year we are excited to have our first official Data Science majors in this new collaborative program with the Department of Computing! Please spread the word far and wide about this unique opportunity available at Andrews. Students earning a BS in Data Science are prepared to combine a knowledge of data analysis and programming to chart out new directions and evidence-based solutions in any field. They will have experience in applying their knowledge in one application area (such as Behavioral Sciences, Public Health, or Marketing), but will have a depth of preparation that will allow them to work on a team in any area.

For those looking for an enhancement of another major we also offer a Data Science minor (for routine analysis and talking to Data Scientists).

Thank you for your continued support of the math department in mentoring amazing students to have a positive impact on this world.

Lynelle Weldon, Chair

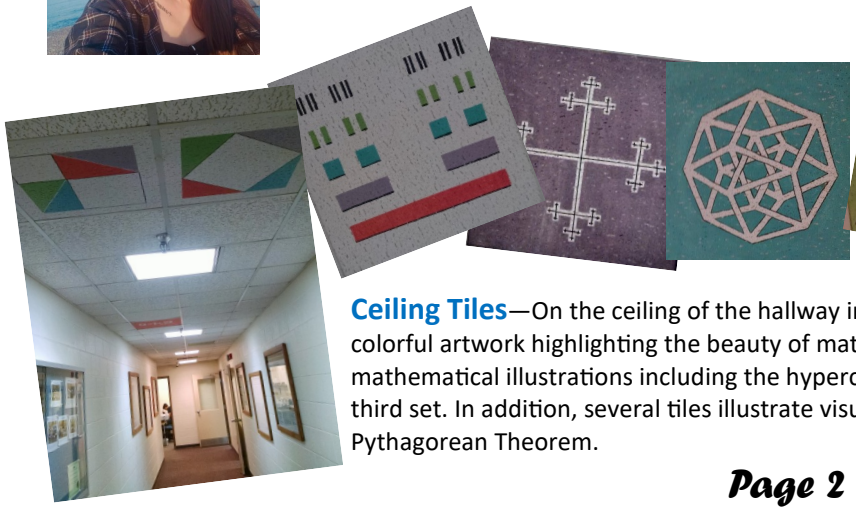
Student Research (cont.) **Lucinda Ford** (2019 BS Mathematics; Phi Kappa Phi; PME) continued her research with Dr. Kang before graduating in the spring. After proving the existence of a positive solution to a general partial differential equation predator-prey system with combined self-limitation and competition, Lucinda searched for the sufficient conditions to guarantee the uniqueness of positive solutions.

Yaser Monterrey (Junior BS Mathematics) began working with Dr. Oh in late spring 2019 on the evolutes of rectifying curves, finding the ratio of torsion to curvature and the characterization of said curves. After spending the summer reviewing materials, he began working on the project in fall 2019.

Yosia Nurhan (Junior BS Mathematics/Physics Studies; J. N. Andrews Scholar; PME) is doing research with the Seabird Ecology Team under Dr. Henson. His project, "A Model for Glaucous-winged Gull Egg-laying Habits: Tracking the Egg Order," focuses on looking at the relationship of high sea-surface temperature on food resources for glaucous-winged gulls (*Larus glaucescens*) and the subsequent cannibalization of eggs of neighboring gulls by males. When this occurs, female gulls in dense areas of the colony adopt a tactic called egg-laying synchrony, in which they lay eggs synchronously on an every-other-day schedule. Field observations show that the first-laid egg of each clutch is the most likely to be cannibalized, so Yosia analyzed the equilibrium of a discrete-time model of egg-laying behavior that tracks egg order. Using Jury Conditions to find the stability criteria, he found that the equilibrium stability fails at a certain colony density and a two-cycle bifurcation occurs.

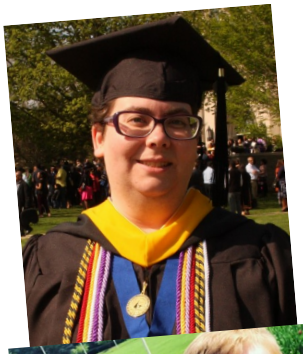
In addition to his work with Dr. Henson and the Seabird Team, Yosia conducted chemistry research with Dr. Murray over the summer. Titled "Synthesis of Hybrid Lipometallo Molecular Transporters," his project attempted to synthesize a molecule that can have the best capabilities of both lipid and calcium phosphate, i.e. a lipid that is also able to mimic what calcium phosphate does.

Jeongjin Park (2019 BSE Mechanical Engineering/Mathematical Studies) worked with Dr. Oh on a work titled "Involute of Rectifying Curves in R^3." The paper hasn't been published yet, but Jeongjin presented her work at the Andrews Poster Symposium and at MASAL in the spring.



Ceiling Tiles—On the ceiling of the hallway in the department, students and visitors can now enjoy colorful artwork highlighting the beauty of mathematics. Dr. Bosman has painted 13 ceiling tiles with mathematical illustrations including the hypercube, golden spiral, and fractals such as Cantor's middle third set. In addition, several tiles illustrate visual proofs such as a pair of panels that demonstrate the Pythagorean Theorem.

2018-19 Graduates



Lucinda Ford (2019 BS Mathematics; Phi Kappa Phi; Pi Mu Epsilon) is at Texas State, San Marcos, working toward a PhD in Mathematics Education. She is an instructor's assistant for two back-to-back precalculus courses, in charge of the labs, material preparation, and grading.

Twin sisters **Christiane Gallos** (2019 BS Mathematics; J. N. Andrews Scholar; Phi Kappa Phi; Pi Mu Epsilon; Sigma Xi) (upper right) and **Dorothea Gallos** (2019 BS Mathematics; J. N. Andrews Scholar; Phi Kappa Phi; Pi Mu Epsilon; Sigma Xi) (lower right) are now in at Indiana University, Bloomington, working toward their Master's degrees in mathematics.

Samantha (Kissinger) Gusky (2019 BSELED Elementary Education/ Elementary Certification/BS Mathematics Education) and her new husband **Michael Gusky** (2018 BSELED Elementary Education/Elementary Certification) are teaching at Indianapolis Junior Academy. Michael is teaching 6-7 homeroom and science as well as social studies for grades 4-8th while Sami is teaching all subjects for grades K-1.

Mateusz Kroczyk (2019 BSE Electrical & Computer Engineering/ Mathematical Studies; Pi Mu Epsilon) is currently pursuing work in video game programming/design and studying on his own to learn more about programming and software through practice and experience.

Jeongjin Park (2019 BSE Mechanical Engineering/Mathematical Studies) is working for JTEKT in Vonore, Tennessee, for her OPT (*optional practical training* which allows non-U.S. citizens who have just graduated to work in the U.S. for 1-3 years, depending on their majors—3 years for engineers.) She is a quality engineer for this company that engineers and manufactures automotive systems, bearing solutions, and high-performance machine tools.

News

Stryker Competition—*On* March 21-22, 2019, second-year BSE Chemical Engineering/Physics Studies/Mathematical Studies major **Devin Garcia** (far right) was a member of a team consisting of fellow Andrews student **Jeremy Barrett** (sophomore BSE Mechanical Engineering;), Denise Roorda from Calvin College, and Joshua Cormier from University of Detroit Mercy. This team from the three smaller schools competed against teams from the larger universities: the University of Michigan, Michigan State University, Michigan Technological University, Western Michigan University, the University of Notre Dame, and Purdue University. The teams competed in the 9th annual Stryker Engineering Challenge, hosted by the University Recruiting department at Stryker Medical in Kalamazoo. For the competition, teams of four sophomore engineering students competed against each other for an opportunity to receive a $1,000 scholarship and an interview for a Stryker internship position for summer 2020. The challenge began around 7 p.m. on Thursday and ended with a competition on Friday afternoon. The main part of the challenge was to design a remotely controlled vehicle from a supplied build kit. The teams used their vehicle in a 30-minute competition where all teams worked simultaneously first to pick up Lego people, then in an obstacle course race where two to three teams raced at a time to see who could complete the course the fastest. Each team was required to use three different drivers during the race. This year the vehicle created by the team with Andrews students won first place in the competition!

Putnam Competition—In December 2018, Andrews again competed in The William Lowell Putnam Mathematical Competition--the preeminent mathematics competition for undergraduate students in the United States and Canada. To compete, students individually take a 6-hour exam comprising legendarily hard proof-based problems. Our team—which scored in the 49th percentile, competing against the best mathematical talent from the nation's top universities—consisted of **Devin Garcia** (2nd-year BSE Chemical Engineering/Physics Studies/Mathematical Studies)**, Mykhaylo Malakhov** (3rd-year BS Mathematics)**,** and **Adrian Negrea** (2nd-year BS Computer Science/Mathematical Studies). **Lucinda Ford** (senior BS Mathematics), **Yaser Monterrey** (3rd-year BS Mathematics), and **Yosia Nurhan** (2nd-year BS Mathematics) also participated in the competition. Our top scorer, Mykhaylo, placed in the top third of test takers. We are incredibly proud of all of our students, who represented Andrews University well with their ingenuity and persistence!

Research

*(Names in **blue and bold** are AU undergraduate students; names in **blue, bold, and italics** are AU graduate students.)*

Presentations

Bosman, A. M. Presentation. "The Miracle of Mathematics." Seminary Scholarship Symposium, SDA Theological Seminary, Andrews University, Berrien Springs, MI, February 14-16, 2019.

Bosman, A. M. Presentation. "Every Student a YouTuber: Video Projects." Teaching and Learning Conference, Andrews University, Berrien Spring, MI, March 28, 2019.

Bosman, A. M. Presentation. "Shake Concordance and Homotopy of Links." Michigan Academy of Science, Arts & Letters Annual Conference, Alma College, Alma, MI, March 1, 2019.

Bosman, A. M. Presentation. "Link Shake Concordance and Link Homotopy." Joint Mathematics Meetings, Baltimore, MD, January 16, 2019.

Carrizo, A., Dimitric, I., **Oh, Y. M.**, Suceava, B., Van der Veken, J., & Vrancken, L. Co-organizer. AMS Special Session on Geometry of Submanifolds, University of Michigan, Ann Arbor, MI, October 20 -21, 2018.

Ford, L. L., & **Kang, J. H.** Presentation. "Positive Solutions to a General Predator-Prey System with Combined Self-Limitation and Competition." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Garcia, D. G. Presentation. "A Curve Satisfying $\tau/\kappa = 1/s$ with Constant $\kappa > 0$." Joint Mathematics Meetings, Baltimore, MD, January 18, 2019.

Garcia, D. G. Presentation. "A Curve Satisfying $\tau/\kappa = 1/s$ with Constant $\kappa > 0$." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Henson, S. M. Presentation. "A Predator-prey Model for Bald Eagles and Colonial Seabirds in the Pacific Northwest of North America." World Conference on Natural Resource Modelling, Montreal, Quebec, Canada, May 23, 2019.

Henson, S. M. Presentation. "Climate Change and Tipping Points for Seabird Colonies in the Pacific Northwest." Colloquium, Department of Applied and Computational Mathematics and Statistics, University of Notre Dame, Notre Dame, IN, April 15, 2019.

Henson, S. M. Contributed. "A Predator-prey Model for Bald Eagles and Seabirds." Michigan Academy of Science, Arts & Letters Conference, Mathematics Section, Alma College, Alma, MI, March 1, 2019.

Henson, S. M. Presentation. "Climate Change and Tipping Points for Seabird Colonies in the Pacific Northwest." National Institute for Mathematical and Biological Synthesis, Knoxville, TN, September 4, 2018.

Johnston, L. L., & **Weldon L. M.** Poster. "Using Item Analysis to Identify Common Algebra Misconceptions." Undergraduate Research Poster Symposium. Andrews University, Berrien Springs, MI, March 8, 2019.

Kang, J. H. Presentation. "Perturbation of Nonlinear Elliptic Biological Interacting Model." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Kang, J. H., & **Oh, Y. M.** Co-organizers, Mathematics Section. Michigan Academy of Science, Arts & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Malakhov, M. M., & Phadke, I. Presentation. "Federalism in Epidemic Modeling: Multi-objective Management of Interconnected Populations." AMS-MAA-SIAM Special Session on Research in Mathematics by Undergraduates and Students in Post-Baccalaureate Programs. Joint Mathematics Meetings, Baltimore, MD, January 18, 2019.

Malakhov, M. M. Presentation. "Modeling the Impact of Bat Dispersal on White-nose Syndrome Control Strategies." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Malakhov, M. M. Presentation. "Managing White-nose Syndrome in Bats: A Spatially Dynamic Modelling Approach." 2019 Honors Thesis Symposium, Andrews University, Berrien Springs, MI, April 12, 2019.

Miller, A. M. Presentation. "Aggregation Induced Emission in PAMAM Dendrimers." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Moore, R. C. Presentation. "Geometry Is More Than Proof: Engaging Students in Visual, Verbal, Drawing, Logical, and Applied Skills." North American Division Teachers Convention, Chicago, IL, August 2018.

Moore, R. C. Seminar. "Geometry Is More Than Proof." The Professional Learning Community of the Lake Union Conference Mathematics Teachers, Berrien Springs, MI, April 2017.

Nurhan, Y. I., & **Watson, J.** Presentation. "Model for Gull Egg-laying Behavior: Tracking the Egg Order." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Oh, Y. M. Poster presentation with **J. J. Park**. "Involute and Evolute of Rectifying Curves." Michigan Academy of Science, Arts & Letters Conference, Mathematics Section, Alma College, Alma, MI, March 1, 2019.

Oh, Y. M. "Rectifying Submanifolds of Riemannian Manifolds." Michigan Academy of Science, Arts & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Oh, Y. M. Presentation. "Rectifying Submanifolds in Pseudo-Euclidean Spaces and Rectifying Curves in Minkowski Space E_1^4." Fall Central Sectional Meeting, University of Michigan, Ann Arbor, MI, October 20-21, 2018.

Park, J. J. Poster. "An Involute and Evolute of a Rectifying Curve." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.

Prince, M. V. Presentation. "Is This a System of Equations or Crashing Robots?" MCTM, Grand Valley State University, Grand Rapids, MI, July 25, 2018.

Research (cont.)

Prince, M. V. Presentation. "Teach D=RxT in a Whole New Way." MCTM, Grand Valley State University, Grand Rapids, MI, July 25, 2018.
Prince, M. V. Presentation. "*Principles to Action*: Productive Struggle in Learning Mathematics." MCTM, Grand Valley State University, Grand Rapids, MI, July 25, 2018.
Prince, M. V. Presentation. "Using TI-Rover to Teach D=RxT." Math In Action, Grand Valley State University, Allendale, MI, February 23, 2019.
Prince, M. V. Presentation. "Solving a System of Equations with TI-Rover." Math In Action. Grand Valley State University, Allendale, MI, February 23, 2019.
Prince, M. V. Presentation. "Integrating STEM with Science." MSTA, Grand Rapids Amway Grand Plaza, Grand Rapids, MI, March 2, 2019.
Prince, M. V. Presentation. "Helping Students with D=RxT." MSTA, Grand Rapids Amway Grand Plaza, Grand Rapids, MI, March 2, 2019.
Prince, M. V. Presentation. "Animation on the TI-84+CE Graphing Calculator." Teachers Teaching with Technology International Conference, Baltimore, MD, March 8, 2019.
Prince, M. V. Presentation. "Summer Camps Immerse Students in STEM." Teachers Teaching with Technology International Conference, Baltimore, MD, March 8, 2019.
Prince, M. V. Presentation. "STEM for the Younger Crowd." National Science Teaching Association, St. Louis, MO, April 13, 2019.
Spiro, B., Hanusch, S., Miller, D., **Moore, R. C**., & Fukawa-Connelly, T. Presentation. "Categorizing Professors' Feedback on Student Proofs in Abstract Algebra and Real Analysis." The 22nd Annual Conference on Research in Undergraduate Mathematics Education, Oklahoma City, OK, February 2019.
Sun, Q., with **Kang, J. H.** Poster. "A Predator-prey Biological Model with Combined Birth Rates and Self-limitation." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.
Swerdlow, J. J. Presentation. "Developing a Mobile Application for Electrochemiluminescent Biosensor Control and Analysis." Michigan Academy of Science, Arts, & Letters Conference, Alma College, Alma, MI, March 1, 2019.
Weldon, L. M. Presentation. "If I Could Teach Only One Concept." Workshop for Math Teachers Professional Learning Community. Lake Union Conference Offices, Berrien Springs, MI, October 30, 2018.

Publications

Bosman, A. (2018). Baptizing the devil: Evolution and the seduction of Christianity [review] / Goldstein, Clifford. *Andrews University Seminary Studies (AUSS)* 56(1), 186-189. Available at https://digitalcommons.andrews.edu/auss/vol56/iss1/20

Byrne, M., Hanusch, S., **Moore, R. C.,** & Fukawa-Connelly, T. (2018). Student interpretations of written comments on graded proofs. *International Journal of Research in Undergraduate Mathematics Education, 4*(2), 228-253.

Cushing, J. M., & **Henson, S. M.** (2018). Periodic matrix models for seasonal dynamics of structured populations with application to a seabird population. *Journal of Mathematical Biology*. https://doi.org/10.1007/s00285-018-1211-4

Gallos, D., **Gallos, C.**, **Watson, W. W.**, & **Henson, S.M.** (2018). A note on synchronous egg laying in a seabird behavior model. *Journal of Difference Equations and Applications*, 24(12), 953-1966. https://doi.org/10.1080/10236198.2018.1544633

Henson, S. M., Desharnais, R. A., Funasaki, E. T., Galusha, J. G., Watson, J. W., & Hayward, J. L. (2019). Predator-prey dynamics of bald eagles and glaucous-winged gulls at Protection Island, Washington, USA. *Ecology and Evolution,* 9(7), 3850–3867. DOI:10.1002/ece3.5011

Krzywoń, Ł. J., & **Oh, Y. M.** 2018. Time-like rectifying curves in E_1^4. *The Pi Mu Epsilon Journal*, to appear.

Robertson, S. L., **Henson, S. M.**, **Robertson, T. E.**, & Cushing, J. M. (2018). A matter of maturity: To delay or not to delay? Continuous-time compartmental models of structured populations in the literature 2000-2016. *Natural Resource Modeling* 31(1), e12160. https://doi.org/10.1111/nrm.12160

News (cont.) Budapest study-abroad program—During Fall semester 2019 **Mykhaylo Malakov** (senior BS Mathematics; J. N. Andrews Scholar; PME; Sigma Xi) is participating in the Budapest Semesters in Mathematics (BSM) program. Widely considered the premier opportunity to study math abroad, BSM is a very selective program with a reputation for providing an ideal balance between fun and rigor, cultural experience and mathematical focus. Mykhaylo is enjoying Europe while taking advanced courses from eminent Hungarian mathematicians in areas such as combinatorics, analysis, and cryptography. He will be back at Andrews University for his final semester, Spring 2020.

Liberal Arts Committee—Dr. Henson and Dr. Bosman, along with Honors Director Dr. Monique Pittman, spent the summer co-chairing a faculty committee on the liberal arts in the 21st century. This committee studied the strength and future possibilities for a broad liberal arts education at Andrews University. Working with administration, the faculty are looking forward to continuing to invest in Andrews' legacy of research, mentoring, and broad education to prepare students with the resilience and skills they need for the rapidly changing 21st-century economy.

Alumni News

Joelle Acre (2014 BS Mathematics/BS Biology; Beta Beta Beta, Phi Kappa Phi, PME) started PhD studies in Applied Mathematics at the University of Toledo this August after teaching for a few years in Alabama. She works as a teaching assistant, helping with Calculus I classes.

Christopher Greenley (2013 BS Physics/Mathematical Studies) got a job this year at Xbox to work on microcontroller firmware for the Xbox controller. His job involves writing C and C++ for low-level hardware drivers as well as higher-level RTOS (real-time operating system) functionality. He assured us that, although he essentially is paid to play games, he does so only as a part of testing the new code.

Joshua (Hansol) Kim (2016 BS Computing/Computer Science/Mathematical Studies; PME) left Whirlpool Corporation to move to Orange, California to do back-end Web development for Automatic Data Processing, Inc. (ADP), an American provider of human resources management software and services for employers. He mainly works on development of APIs (application program interfaces) that different teams use within ADP.

Viktoria Kolpacoff (2017 BS Mathematics; J. N. Andrews Scholar; PME) (not pictured) graduated with her MS in Biostatistics from Duke University in May 2019. She is slated for an executive position on a pending contract with the Defense Health Agency, which works with the medical services of the Armed Forces to provide a medically ready force.

Karel Marshall (2017 BS Mathematics, J. N. Andrews scholar, PME) will finish her MS in Applied and Industrial Math on December 18, 2019, and move to El Segundo, CA, in January to be a Modeling and Simulation Engineer at The Aerospace Corporation. She will work with the DoD group with which she has worked on the projects for her undergraduate honors thesis as well as for her MS project. In her new job she will work on aerospace projects such as modeling the average number of commercial aircraft in the sky and using machine learning to automate Spacebus operations.

Potential future mathematician James Wesley Meyer was born to **Clara (Logan) Meyer** (2005 BS Mathematics) and **Matthew Meyer** (2002 BS Computing [Computer Science]/Mathematical Studies) on June 30, 2018. James weighed 9 lbs. 11.6 oz. and was 20.5 inches long. His big sister Lillianna is awesome at making him laugh!

Christa Spieth (2017 BSE Engineering [Mechanical Engineering]/Mathematical Studies; J. N. Andrews Scholar; PME) (not pictured) graduated from Northwestern University in December 2018 with her M.S. in Analytics.

Facts About the 2019-2020 Department of Mathematics Student Body

Major	Total	F	M	FR	SO	JR	SR	Dual Majors	Triple Majors	Majors other than Mathematics
BS Data Science	4	1	3	0	2	1	1	2	0	2 Finance
BS Mathematics	16	5	11	2	7	6	1	11	1	3 Computer Science, 3 Music, 2 Physics Studies, 2 Premedical, 1 Biophysics, I Chemistry
BS Math Ed	3	3	0	0	0	1	2	3	0	3 Secondary Certification
Math Studies	17	4	13	0	4	7	6	17	0	9 Computer Science, 2 Engineering, 3 Physics, 1 Biochemistry [ACS], 1 Biomedical, 1 Infor-
Math Minor	36	18	18	3	5	3	26	3	0	17 Engineering (2 Computer, 5 Electrical, 10 Mechanical), 5 Elementary Ed, 3 Computer Science, 1 Computing, 2 Chemistry, 1 Physics, 1 Biology, 1 English, 1 Finance, 1 Psychology, 1 Public Health, 1 Religion, 1 Theology and Physics

2019 Awards

Mathematics Awards Ceremony—On April 26, 2019, the Department of Mathematics held its 2019 Mathematics Award Ceremony to present 49 class awards to honor the excellent academic work of 37 students, 2 of whom are high school students taking dual enrollment courses.

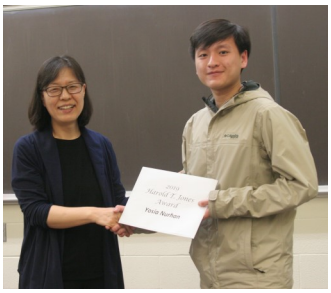
Teacher of the Year Award—At the end of each school year, the Andrews University Student Association (AUSA) polls students and then presents a Teacher of the Year Award to a professor whom students have nominated as being capable, understanding, and helpful. This past spring Dr. Shandelle Henson received this award. In our department awards ceremony we took some time to honor Dr. Henson and affirm her for her work. **Christiane** and **Dorothea Gallos** (2019 BS Mathematics) (pictured right) read tributes to Dr. Henson, with whom they worked all four years of their college experience as members of the Seabird Ecology Team. Congratulations to Dr. Henson on this honor!

NEW AWARD! Whitney Wang Watson Endowed Scholarship Award—The initial Whitney Wang Watson award went to **Lucinda Ford** (2019 BS Mathematics) (top left) in Fall 2018, and **Sara McLean** (Senior BS Mathematics Education) (bottom left) received the award for the spring semester. Hereafter this stackable award will be given yearly to two students, one from the Department of Music and the other from the Department of Mathematics. Her family funded this award to honor **Whitney Wang Watson**, a mathematics and music major at Andrews University who had committed her life to serving God. After graduating from academy in 2014, Whitney spent a month doing medical mission work at Aenon Health Center in Malaysia, an experience that affirmed her calling to be a missionary doctor. She began her studies at Andrews as a pre-med math major, but soon added a music major, thanks to the encouragement of her viola teacher, Dr. Claudio Gonzalez. She continued to develop her interest in missions by volunteering at ASAP Ministries, which supports mission work in Southeast Asia. Whitney died in her sleep the evening of December 14, 2015, after a day's climb on Mt. Whitney. The recipients of the Whitney Wang Watson Endowed Scholarship are students who will continue what Whitney began in her brief life—serving God by helping others, easing suffering, and improving lives.

The Harold Buhalts & Jean Stewart Boyd award recipient this year was **Anthony Miller** (Senior BS Biochemistry [ACS]/ Mathematical Studies, PME), shown below with Dr. Bosman.

Jonathan Homan (Sophomore BS Mathematics/Physics Studies, PME) was the **Edward J. Specht** award winner.

The student awarded the **Harold T. Jones** scholarship was **Yosia Nurhan** (Junior BS Mathematics/Physics Studies, PME), pictured below with Dr. Oh.



Qizeng Sun (Senior BS Computer Science/Mathematical Studies, PME) was the receipient of the **Louis Ulloth** award for 2019 for his contributions to the department as a reader and for his excellence in his mathematics courses. He is pictured above, receiving his award from Dr. Kang.

New Five-minute Promotional Video for the Department of Mathematics at Andrews

On the Department of Mathematics homepage (https://www.andrews.edu/math) is a link to a new promotional video highlighting the benefits of pursuing a mathematics degree at Andrews University. The videographer, Mark Paden, is currently working on similar videos for the Department of Biology and the Department of Chemistry. Take a look at the video and spread the word about our department!

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*

*Mykhaylo Malakhov, President
*Yosia Nurhan, Vice President
*Lisa Johnston, Secretary-Treasurer
*Dr. Joon Hyuk Kang, Advisor

eigen *Mathematics & Physics Club*

*Yosia Nurhan, Mathematics President
*Jonathan Homan, 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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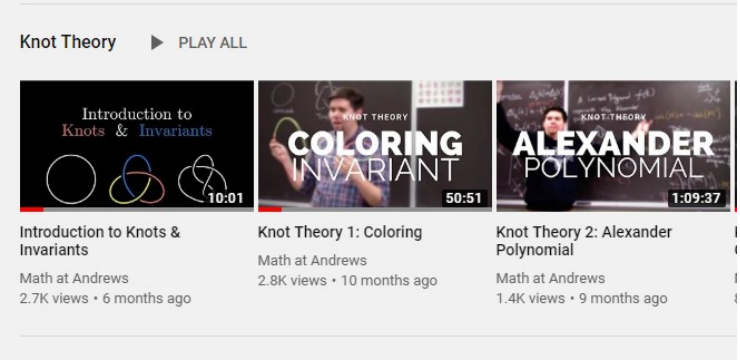
Front row: Jesse Gray (2019 Biochemistry/Music), Justin Wiley (junior Mechanical Engineering/ Physics Studies), Gabriella Carcamo (junior Mechanical Engineering), Andrea Carcamo (junior Mechanical Engineering) . ***2nd row:*** Sol Shim (2018 Business Administration), Jonathan Homan (freshman Mathematics/Physics Studies), Travis Calhoun (senior Mechanical Engineering). ***3rd row:*** Adrian Negrea (junior Computer Science/Mathematical Studies), Jared Rawlings (senior Electrical & Computer Engineering), Jonathan Watson (sophomore Music/Mathematics), Lisa Johnston (freshman Mathematics/Biophysics), TJ Hunter (junior Computer Science). ***Back row:*** Anthony Miller (senior Biochemistry/Mathematical Studies), Yosia Nurhan (sophomore Mathematics/Physics Studies), Eric Anderson (senior Electrical & Computer Engineering), Samuel Dronen (senior Mechanical Engineering). *Not pictured:* Kelsey Rook (junior Computer Science/ Mathematical Studies), Qizeng Sun (senior Computer Science/Mathematical Studies).

Pi Mu Epsilon Induction—On March 7, 2019, in the Whirlpool Room in Chan Shun Hall, the Michigan Gamma Chapter of Pi Mu Epsilon inducted 18 new members (*see above*). The new inductees and the other PME members in attendance voted **Mykhaylo Malakhov** in for a second term as the president and **Yosia Nurhan** in as the vice-president for the 2019 -20 school year. The two officers chose **Lisa Johnston** as the new secretary-treasurer.

***YouTube* Channel**—The Department of Mathematics now has a *YouTube* channel, *Math at Andrews*, with a growing collection of content. In addition to featuring student-produced videos on various topics, the channel offers complete lecture series including Dr. Bosman's series on Knot Theory and Dr. Oh's series on Differential Geometry. So far the channel has received close to 25,000 views by people all over the world—from Kenya to India—who are learning from the videos. Look for new videos in the upcoming months.



https://www.youtube.com/mathatandrews