Andrews University
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K. M. Johnson-McWilliams, Editor

MATH@ANDREWS

2016-2017 Student Research

Glaucous-winged gulls (*Larus glaucescens*) breed in a large colony on Protection Island, Washington, and exhibit every-other-day egg-laying synchrony in dense areas of the colony. Twin sisters **Christiane Gallos** and **Dorothea Gallos** (both third-year BS Mathematics majors) have worked with Dr. Shandelle Henson and the Seabird Ecology Team in an National Science Foundation (NSF)-sponsored Research Experience for Undergraduates (REU) this past year, developing a discrete-time model of egg-laying behavior and using the Jury Conditions to find the stability criteria of the system as a function of the crowding factor. They found that the system loses stability in a two-cycle bifurcation as the crowding factor increases beyond a critical value, and they also explored the effects of synchrony in the presence of egg predation and showed that synchrony can be advantageous for individuals.

This summer **Mykhaylo Malakhov** (second-year BS Mathematics/BS Computer Science) began working with Dr. Shandelle Henson and the Seabird Ecology Team in an NSF-sponsored REU to investigate the effects of rising sea surface temperatures on the behavior and long-term population dynamics of seabirds in the Pacific northwest. He studied a new cross-season nonlinear matrix population model using various numerical and analytical techniques from dynamical systems theory, demonstrating that egg cannibalism and egg-laying synchrony can result in backward bifurcations and allow the population to survive at lower resource levels than would otherwise be possible. Mykhaylo will present these results at the Joint Mathematics Meetings in January, and his work should result in the publication of a peer-reviewed article next year.

This summer **Jonathan Swerdlow** (first-year Computer Science major, Mathematical Studies) joined Dr. Kwon's NSF-funded research team, which has been experimenting with electrochemiluminescent (ECL) reactions, a project which involves collaboration between engineering, computer programming, and molecular biology. The goal of the project is to enable medical personnel to analyze the light emitted from a reaction to determine certain substances' concentrations. The main application is the analysis of blood samples to reveal the presence of chemical indicators of diseases such as cancer. Jonathan's current role in the research is to use the Raspberry Pi and its Pi Camera Module to create a system capable of both photographing and analyzing ECL. Although the project is ongoing, the team completed the key elements over the summer. The macro photo at the right shows the peak intensity of a reaction that the team was trying to capture and analyze. Using the color and intensity of the reaction as a guide, doctors may be able to predict substance concentrations.

Note from the Chair

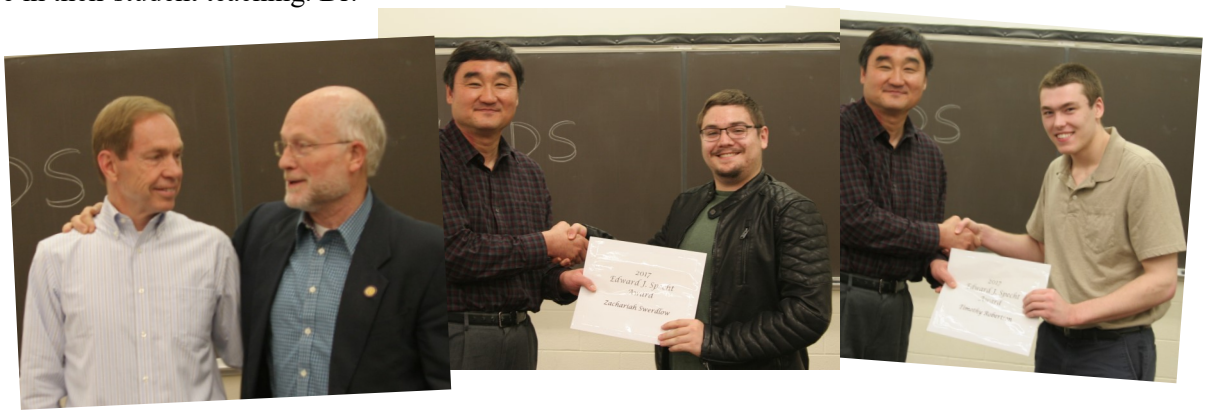
Dear Friends of the Math Department,

When was the last time you left a conversation feeling inspired? I'm repeatedly surprised by how much just one word of affirmation or genuine kindness lifts my spirits and brightens my day. What if everyone I met would feel that way after we talked? At Convocation this fall President Luxton challenged Andrews University to be a campus that models civility and lives the gospel. I invite you to join our campus in reflecting on our habits of conversation and being attentive to the effect of our words on others. Are we communicating to each person with whom we interact the high value that God places on him or her? Whether in person or virtual dialogue, do we treat each other well, especially when we disagree? This is my challenge for you—to allow God's grace to work in you and set you apart from the destructive communication habits of our current society.

Lynelle Weldon, Chair

2016-17 Named Scholarship Winners

At the annual Mathematics Awards in March, the mathematics professors gave out 72 awards in 21 courses to 48 students, four of whom received five awards each: **Dorothea Gallos, Christiane Gallos, Łukasz Krzywon,** and **Timothy Robertson**. Named scholarship winners are (from top left clockwise): **Jesse Snelling** (senior BS Mathematics/BS Physics) received the Louis Ulloth Scholarship for recognition of contribution to the department, and **Meylin Tremols-Castillo** (senior BS Mathematics Education/BA Spanish Education) received the second annual Harold Buhalts and Jean Steward Boyd Scholarship for students who achieved academic excellence while working through their school years. In addition **Meylin,** along with **Stephanie Nieman** (senior BS Mathematics Education), received DeHaan Work Awards for their excellence as employees of the department for their work of grading and tutoring for the past four years. Dr. Meredith Jones Gray, Dr. Jones' daughter handed **Łukasz Krzywon** (2017 BS Mathematics/BS Physics) the Harold T. Jones Scholarship for excellence in mathematics. **Timothy Robertson** (2017 BS Mathematics/Physics minor) and **Zachariah Swerdlow** (BS Physics/Mathematical Studies) received Edward J. Specht Scholarships for excellence in mathematics and physics. The awards ceremony closed with a tribute to Dr. Robert C. Moore, who retired from teaching in June. The Department announced the creation of a new award in his honor to be given to Mathematics Education majors who show excellence in their student teaching. Dr. Keith Mattingly, Dean of the College of Arts and Sciences, was on hand to honor Dr. Moore for his hard work and teaching excellence.



2016-17 Graduates

Viktoria Kolpacoff (BS Mathematics, Beta Beta Beta, J. N. Andrews Scholar, Pi Mu Epsilon) began her undergraduate experience as a Biology major, but after taking Calculus I for Biology, she added Math Studies to her Biology major and eventually switched to BS Math with a Biology minor. Tori is attending Duke University, pursuing a master's degree in Biostatistics.

Łukasz Krzywon (BS Mathematics/BS Physics, J. N. Andrews Scholar, Pi Mu Epsilon, Sigma Pi Sigma) was accepted to graduate school at Kansas State University in Manhattan, Kansas, hoping eventually to focus on number theory, but he has deferred his acceptance at Kansas State until next fall. In the summer he married **Sade Samlalsingh** (2015 BS Mathematics/BS Physics, Pi Mu Epsilon), who is working on her MAT in New York. The couple is living in NYC while Sade finishes her graduate work and Łukasz teaches two sections of AP Calculus, a regular section of Trigonometry and Analysis (pre-calculus content), and a section of 5th grade mathematics at St. Ann's, a school for gifted students. He says that he might talk about cellular automata (e.g. Conway's Game of Life) to the 5th graders.

Karel Marshall (BS Mathematics, J. N. Andrews Scholar, Pi Mu Epsilon) is attending Towson University in the Applied and Industrial Mathematics Graduate Program, hoping to become a data analyst in the private sector.

Timothy Robertson (BS Mathematics, Phi Theta Kappa, Phi Kappa Phi, Pi Mu Epsilon, Sigma Pi Sigma, Sigma Xi), after being accepted at several universities, decided to attend the University of Tennessee, Knoxville, to work toward a PhD in mathematics.

Christa Spieth (BSE Mechanical Engineering/Mathematical Studies, Phi Kappa Phi, Pi Mu Epsilon) is attending Northwestern University in the Master of Science in Analytics program, hoping to work as a data scientist after she graduates.

Erik Vyhmeister (BS Mathematics/BS Physics, J. N. Andrews Scholar, Pi Mu Epsilon) postponed graduate school for a year to gain some practical experience in the fabricating business. He is currently applying to PhD programs in Material Science.

Dillon Zimmerman (BS Chemistry, American Chemical Society emphasis/ Mathematical Studies, Phi Kappa Phi, Pi Mu Epsilon, Sigma Pi Sigma) began his MAT degree here at Andrews this fall in order to obtain his teaching credentials. He hopes to teach high school science courses.

Research

Refereed Journal Articles (names in bold and italics are students)

Atkins, G. J., ***Reichert, A. A.,*** **Henson**, **S. M.**, & Hayward, J. L. 2017. Copulation call coordinates timing of head-tossing and mounting behaviors in neighboring Glaucous-winged gulls (*Larus glaucescens*). *Wilson Journal of Ornithology,* 129:562-569.
Byrne, M., Hanusch, S., **Moore**, **R. C.**, & Fukawa-Connelly, T. 2017. Student interpretations of written comments on graded proofs. *International Journal of Research in Undergraduate Mathematics Education,* 1-26. doi: 10.1007/s40753-017-0059-0 [Published online 30 June 2017, print version to appear.]
Chen, B. Y., & **Oh**, **Y. M.** 2017. Classification of rectifying space-like submanifolds in pseudo-Euclidian spaces. *International Electronic Journal of Geometry*, 10(1): 86-95.
Hayward, J. L., **Henson**, **S. M.**, Bove, J., Bove, C., & Gregory, C. J. 2017. Daily and annual habitat use and habitat-to-habitat movement by Glaucous-winged gulls at Protection Island, Washington. To appear in *Northwestern Naturalist*.
Kang, **J. H.** 2016. Growth conditions for uniqueness of smooth positive solutions to an elliptic model. *Communications in Applied Analysis,* 20:575-584.
Moore, **R. C.**, Byrne, M., Fukawa-Connelly, T., & Hanusch, S. 2016. Interpreting proof feedback: Do our students know what we're saying? In T. Fukawa-Connelly, N. Infante, M. Wawro, and S. Brown (Eds.), *Proceedings of the 19th Annual Conference on Research in Undergraduate Mathematics Education* (pp. 1150-1157).
Moore, **R. C.** 2016. Mathematics professors' evaluation of students' proofs: A complex teaching practice. *International Journal of Research in Undergraduate Mathematics Education, 2*(2), 246-278. doi:10.1007/s40753-016-0029-y
Robertson, T., & **Kang, J. H.** 2016. A general elliptic nonlinear system of multiple functions with application. *International Electronic Journal of Pure and Applied Mathematics*, 10.2:139-150.
Robertson, T., & **Kang, J. H.** 2016. A general elliptic nonlinear system of two functions with application. *International Electronic Journal of Pure and Applied Mathematics,* 10.2:115-125.
Smith, R. S., **Weldon**, **L. M.**, Hayward, J. L., & **Henson**, **S. M.** 2017. Time lags associated with effects of oceanic conditions on seabird breeding in the Salish Sea region of the northern California current system. *Marine Ornithology,* 45:39-42.
Logan, J., & **Oh, Y. M.** 2017. Characterization of rectifying and sphere curves in R^3. *American Journal of Undergraduate Research*, 14.2:91-94.
Sandler, A. G., Megna, L. C., Hayward, J. L., **Henson, S. M.**, Tkachuck, C. M., & Tkachuck, R. D. 2016. Every-other-day clutch -initiation synchrony in ring-billed gulls (*Larus delawarensis*). *Wilson Journal of Ornithology,* 128:760-765.
Vienhage, P., Barcomb, H., ***Marshall, K.,*** Black W. A., Coons, A., Tran, H. T., Nguyen, T.M., Guillen, A.T., Yoh, J., Kizer, J., & Rogers, B.A. 2017. War-gaming application for future space systems acquisition: MATLAB implementation of war-gaming acquisition models and simulation results. *SPIE, Sensors and Systems for Space Applications X*. 10196(9):1-10. doi: 10.1117/12.2263247

Talks (names in bold and italics are students)

Gallos, C. & Gallos, G. Presentation. ""Bifurcations in a Discrete-time Model of Seabird Reproduction." Michigan Academy of Science, Arts & Letters Conference, Western Michigan University, March 10, 2017.
Henson, S. M. Plenary speaker. "Rising Sea Surface Temperatures and Tipping Points for Seabird Colonies." Conference on Biology and Medicine through Mathematics (BAMM!). Richmond, VA, May 18, 2017.
Henson, S. M. Presentation. "El Niño, 'The Blob', and Egg Cannibalism in Glaucous-winged Gulls." Michigan Academy of Science, Arts & Letters Conference, Zoology Section. Western Michigan University, Kalamazoo, MI, March 10, 2017, with J. L. Hayward (contributed).
Henson, S. M. Presentation. "Modeling of Reproductive Synchrony in Colonial Seabirds." Joint Mathematics Meetings, AMS Special Session on Real Discrete Dynamical Systems with Applications. Atlanta, GA, January 6, 2017.
Henson, S. M. Presentation. "Climate Change and Tipping Points in Seabird Colonies." Joint Mathematics Meetings, MAA Invited Paper Session on Role of Modeling & Understanding Environmental Risks. Atlanta, GA, January 4, 2017.
Kang, J. H. Presentation. "Positive Solutions to a General Nonlinear Second Order System with Applications." KKMS-CCMS Joint Conference & Annual Meeting. Dankook University, Cheon-An, South Korea, June 9, 2017.
Kang, J. H. Co-presention. "Estimate of Positive Solutions with Uniqueness." Michigan Academy of Science, Arts & Letters Conference. Western Michigan University, March 10, 2017, with ***T. Robertson***.
Kolpacoff, V. Presentation. "The Relationship Between the Prevalence of HIV/AIDS and Associated Socioeconomic and Behavioral Factors." Michigan Academy of Science, Arts & Letters Conference, Western Michigan University, March 10, 2017.
Kolpacoff, V. Presentation. "The Relationship Between the Prevalence of HIV/AIDS and Associated Socioeconomic and Behavioral Factors." Honors and Undergraduate Research Symposium, Andrews University, Berrien Springs, MI, March 3. 2017.
Krzywon, L. Presentation. "Time-like Rectifying Curves in Minkowski Space." Michigan Academy of Science, Arts & Letters Conference, Western Michigan University, March 10, 2017.
Krzywon, L. Presentation. ""Time-like Rectifying Curves in E^4_1 ." Honors and Undergraduate Research Symposium, Andrews University, Berrien Springs, MI, March 3, 2017.
Marshall, K. ""War-gaming Applications for Achieving Optimum Acquisition of Future Space Systems." Michigan Academy of Science, Arts & Letters Conference, Western Michigan University, March 10, 2017.

Marshall, K. "War-gaming Applications for Achieving Optimum Acquisition of Future Space Systems." Honors and Undergraduate Research Symposium, Andrews University, Berrien Springs, MI, March 3, 2017.
Marshall, K. Presentation. ""War-gaming Applications for Achieving Optimum Acquisition of Future Space Systems." Joint Mathematics Meetings, Atlanta, GA, January 5, 2017.
Moore, R. C. Presentation. "Helping Undergraduate Mathematics Students Learn from Feedback." Annual Conference of the Michigan Academy of Science, Arts and Letters. Michigan State University, Kalamazoo, MI, March 10, 2017.
Oh, Y. M. Presentation. "Rectifying Submanifolds in Pseudo-Euclidean Spaces." KKMS-CCMS Joint Conference & Annual Meeting. Dankook University, Cheon-An, South Korea, June 9, 2017.
Oh, Y. M. Presentation. "Riemannian Submersion Invariant and Geodesics." Michigan Academy of Sciences, Arts & Letters, Mathematics Section. Western Michigan University, Kalamazoo, MI, March 10, 2017.
Oh, Y. M. Research symposia organizer. Michigan Academy of Sciences, Arts & Letters, Mathematics Section. Saginaw Valley State University, Saginaw, MI, March 4, 2016.
Robertson, T. Co-presentation. "Estimate of Positive Solutions with Uniqueness." Michigan Academy of Science, Arts & Letters Conference, Western Michigan University, March 10, 2017, with **J. H. Kang**, presenting.
Robertson, T. Presentation. ""Sufficient Conditions for the Existence of Positive Solutions to an Elliptic Model." Honors and Undergraduate Research Symposium, Andrews University, Berrien Springs, MI, March 3. 2017.
Robertson, T. Presentation. ""Coexistent Conditions for Nonlinear Reaction-diffusion Population Models." Joint Mathematics Meetings, Atlanta, GA, January 5, 2017, with **J. H. Kang**.
Snelling, J. Presentation. "Analysis of Electromagnetic Ion Cyclotron Wave Occurrence Using Van Allen Probes." Honors and Undergraduate Research Symposium, Andrews University, Berrien Springs, MI, March 3. 2017.
Swerdlow, Z. Presentation. ""Interfermometry-based Gravitational Wave Detection." Honors and Undergraduate Research Symposium, Andrews University, Berrien Springs, MI, March 3. 2017.
Tremols-Castillo, M. Presentation. "A Student Activity to Enhance Understanding of Statistical Distributions." Michigan Academy of Science, Arts & Letters Conference, Western Michigan University, March 10, 2017.
Tremols-Castillo, M. Presentation. ""Random Walk Activity to Enhance Understanding of Hypothesis Testing." Honors and Undergraduate Research Symposium, Andrews University, Berrien Springs, MI, March 3, 2017.

Congratulations to Dr. Henson on Becoming Editor-in-Chief of *Natural Resource Modeling* Journal

In addition to maintaining her teaching and her research with Seabird Ecology Team, in January 2017 Dr. Shandelle Henson took over the position of Editor-in-Chief of the Wiley-published, peer-reviewed international research journal *Natural Resource Modeling* (*NRM*), now in its 30th volume. The previous editor (2004-2016) was Dr. Catherine Roberts, Professor of Mathematics and Chair of the Department of Mathematics & Computer Science at the College of the Holy Cross in Worcester, MA. Dr. Roberts stepped down from her position with *NRM* to replace Donald E. McClure (2009-2016) as executive director of the AMS after his retirement. The transition of editors has been smooth since Dr. Henson has been on the editorial board of the *NRM* since 2004 and is familiar with the journal. Bob Fray, Editor of the *RMA*, the official newsletter of the Resource Modeling Association, says in an article about the editorial shift, "Shandelle has many terrific ideas to continue to elevate the impact and reach of *Natural Resource Modeling*." Best wishes to Dr. Henson on her new venture!

Above: Catherine Roberts and Shandelle Henson

Left: Some members of the Resource Modeling Association on a visit to the Grand Canyon during their 2017 conference in Flagstaff, AZ

Gifts for the Department

Dr. Moore with Christiane and Dorothea Gallos in the math office with the new print and clock.

Dr. Robert Moore may have retired from teaching in June, but he hasn't retired from giving gifts to the department. One of the gifts, a fractal print by Kevin J. Gross from Spirit Fire Images (*see right)*, is on the wall in the main office, and the most recent gift, a clock that automatically adjusts to daylight savings time, is now keeping the classes on time in room 113. Thanks for your continued generosity, Dr. Moore.

At the left are the mounted prints which the department purchased last year as a memorial for Vivian Hatcher. We still need to purchase and mount the directional lighting to show off the artwork. Come for a visit and see the prints' details for yourself. This small picture does not do them justice!

Welcome to Our New Professor: Dr. Anthony Bosman

Coming to the department as our new mathematics professor to fill the void left by Dr. Moore's retirement is Anthony Bosman, who just completed his PhD at Rice University in the spring, having earned his Master's at Rice in 2014 and his undergraduate degree from Stanford in 2012. During his five years at Rice, Dr. Bosman taught Calculus I and II as well as classes in Knot Theory and General Topology—areas of particular interest to him (*see the evidence in the posters on his office door—right*). Another of Dr. Bosman's areas of interest is teaching young students about mathematics. While at Rice he formed a chapter of Math Circle for students in grades 8-11 to help them to see how interesting mathematics is and how it is a part of everyday life. Students met selected Sundays for 2½ hours to listen to a lecture on a topic and then to play a game and to work problems related to that concept. He also taught high school students during the summer 2016 Rice Program in Mathematics.

Here at Andrews Dr. Bosman is already meeting outside of the classroom with a group of students to enjoy breakfast while working on problems used in preparation for the William Lowell Putnam Mathematical Competition (*left*), and this semester he is teaching Reasoning with Functions, Calculus I, and Introduction to Linear Algebra and will teach Foundations of Advanced Mathematics (the introductory proof course), Reasoning with Functions, and Calculus I in the spring. In addition, he is helping Dr. Henson with MATH 389, the colloquium series. His enthusiasm for both teaching and mathematics shows in the delight with which he creates innovative worksheets, better to teach ideas such as matrices and misuse of statistics.

Alumni News

A special thanks to all our alumni who are serving as mentors to our current students. We really appreciate your time and insight! If other alumni would like to become mentors, just email math@andrews and let us know your area of expertise and number of students you can mentor.

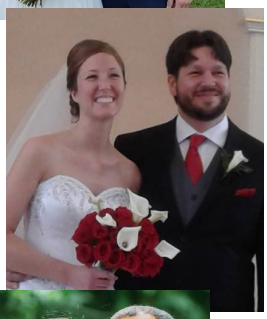
Craig Dujon (2014 BS Mathematics) is Assistant Publications Tech Support Specialist at the American Mathematical Society (AMS) in Providence, RI. Craig makes sure that the LaTeX files of articles and books are coded correctly and produce output for print and online without major problems.

Emily Bankes (2016 BS Mathematics, PME) married **Christopher Ott** (2016 BS Computer Science) in May. She is a graduate student working toward a PhD in chemistry at Penn State, and Chris is a systems engineer at Raytheon in State College.

This summer **Bryan Bankhead** (2013 BSE Mechanical Engineering/Mathematics minor, PME) married Michelle Wildman, a nurse who graduated from Southern. Bryan worked at Dana Systems but is interviewing at Electric Power Research Institute in Knoxville, TN.

Kiana Binford (2009 BS Mathematics Education, PME) married Terry Roat in December 2016. She is still the principal of the Adventist school in Green Bay, WI, and teaches grades 7-10 there.

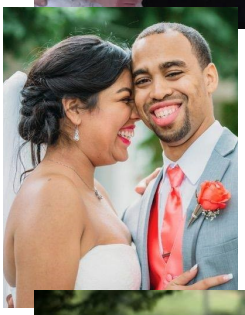
This August **Dwight Byass** (2012 BSE Mechanical Engineering/Mathematical Studies) married Keila Pardo. The couple lives in the DC area.



Sereres Johnston (2009 BS Mathematics/BS Physics) began working at Argonne National Laboratory outside of Chicago after finishing her PhD in Physics. She married Andrew Hashem this June.

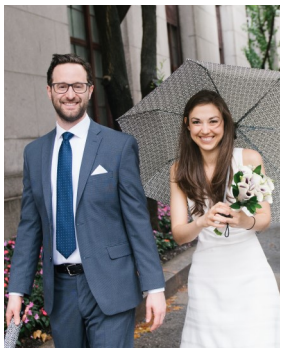
Kami Lizarraga (2005 BS Mathematics/BS English, PME) loves her job as a staff attorney at the Office of the Appellate Defender, which provides free legal appellate representation to indigent people convicted of felonies in New York. This July she married Christopher Sharp.

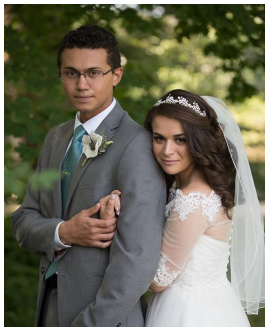
Daniel Marsh (Senior BSE Electrical Engineering/ Mathematics Minor, PME [2017-18 Vice President]) and **Nina Isabelle DePalma** (Senior BBA Information Systems) were married this August and are continuing their studies at Andrews University.

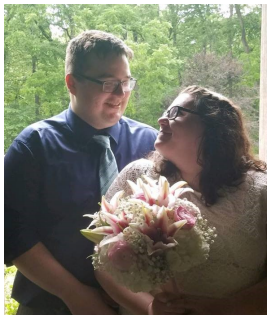


Bryan Pearson (2015 BS Physics/Mathematical Studies, PME) married Katie Chance in June and is working as a math interventionist at Buchanan High School in Buchanan, MI.

Jonathan Penrod (2017 BSE Mechanical Engineering/Mathematics minor, PME) and **Shaly Torres** (2017 BS Pre-professional Psychology) were married in August. Jonathan works for Tekna, Inc., in Kalamazoo, MI.







Andrews University

Department of Mathematics

Programs

BS in Mathematics
BS in Mathematics Education
Mathematical Studies Major
Mathematics Minor
Mathematics Education Minor
Minor in Mathematics of Economics and Finance
Behavioral Neuroscience Mathematics Track

PME Michigan Gamma Chapter

*Jesse Snelling, President
*Daniel Marsh, Vice President
*Kimberly Park, Secretary-Treasurer
*Dr. Joon Hyuk Kang, Advisor

eigen* Mathematics & Physics Club

*Mykhaylo Malakhov, Mathematics President
*Michael Lee, Physics President
*Sarah Watson, Poster Secretary

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 (left to right): **Greg Fuhrman** (CS), **Greg Zdor** (Elec. Engr.), **Alastair Acre** (Chem.), **Patryk Czajkowski** (Elec. Engr.), **Michael Bryson** (Elec. Engr.). *Middle Row (left to right):* **Michael Lee** (CS/Physics/Math Studies), **Kimberly Park** (Biophysics), **Michael Filkoski** (Mech. Engr.), **Lucinda Ford** (Math), **Jisu Choi** (CS), **Mateusz Kroczyk** (Elec. Engr.). *Back row (left to right):* **Sara McLean** (Math Ed), **Daniel Marsh** (Elec. Engr.), **Will Allen** (Elec. Engr.), **Noah Chun** (Chem.), **Nathan Jones** (Math), **Joel Paea** (Biophysics). Inset pictures: **Viktoria Kolpacoff** (Math), **Jacob Willard** (Music/Physics).

2017 Pi Mu Epsilon Inductees

On March 30, 2017, the Michigan Gamma chapter of Pi Mu Epsilon inducted nineteen new members. **Jesse Snelling** (senior BS Mathematics/BS Physics) is the new president, and new inductee **Daniel Marsh** (senior BSE Electrical Engineering/ mathematics minor) is the new vice-president. **Kimberly Park** (senior BS Biophysics/mathematics minor), also one of the new inductees, is the secretary-treasurer. The keynote speakers were **Timothy Robertson** (2017 BS Mathematics) and **Łukasz Krzywon** (2017 BS Mathematics/BS Physics, 2016-17 PME president), who gave some examples of the problems that they and a group of students had been working on for the Pi Mu Epsilon problem-solving competition.

Who's Who 2016-17

Of the 41 students whom Andrews University nominated for Who's Who in 2016-17, 13 are associated with the Department of Mathematics and are member of Pi Mu Epsilon. Four are BS Mathematics majors: **Viktoria Kolpacoff**, **Łukasz Krzywon**, **Karel Marshall**, and **Timothy Robertson**, and three are Mathematical Studies majors: **Zachariah Swerdlow**, **Christa Spieth**, and **Dillon Zimmerman**. The other six have mathematics minors: **Gregory Fuhrman** (Computer Science), **Noah Chun** (Chemistry), **Jacob Willard** (Music/Physics), **Nathan Verrill** (Electrical Engineering), and **Jonathan Penrod** and **Thomas Winnard** (Mechanical Engineering). We are proud of our outstanding students!