Andrews University
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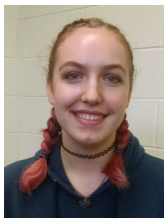
Fall 2018
Volume 15
K. Johnson-McWilliams, Editor

math@andrews

2017-2018 Student Research

Lucinda Ford (Senior BS Mathematics, Phi Kappa Phi, Phi Theta Kappa, PME), after checking that the math in a published predator/prey model was correct, has begun working with Dr. Kang to generalize the model to find the existence of a solution.

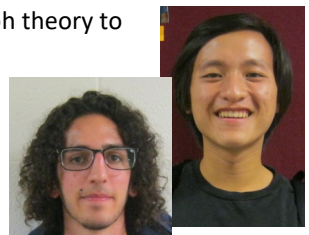
Devin Garcia (Sophomore BSE Chemical Engineering/Mathematical Studies, PME, Sigma Pi Sigma) is working with Dr. Oh on a problem in differential geometry regarding the ratio of torsion to curvature in the case that the ratio of torsion to curvature is 1/s, where s is the arc length. He has been using a series solution to solve a third-order differential equation and obtain the general equation of the curve.



Lisa Johnston (Freshman BS Mathematics, J. N. Andrews Scholar) is doing research under Dr. Weldon. In her research, titled "Using Item Analysis to Identify Common Student Misconceptions on Remedial Mathematics Examinations," Lisa analyzed roughly 400 of exams 3 and 4 from the MATH 091-092 course, cross-referencing each student's answer to identify which misconceptions were prominent across exams. Dr. Weldon and Dr. Prince used the results of Lisa's research in revising the curriculum of the course, and Lisa will to continue this research in Spring 2019.

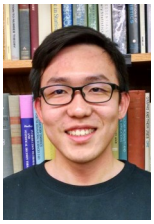
Mykhaylo Malakhov (Junior BS Mathematics, J. N. Andrews Scholar, PME, Sigma Xi) spent his summer at the Williams College SMALL REU as part of the Mathematical Ecology group, working under Julie C. Blackwood from Williams College and Katriona Shea of The Pennsylvania State University on two infectious disease modeling projects: one studying the spatial dynamics of white-nose syndrome in bats and the other investigating optimal ways to manage a generic disease in a transboundary setting with multiple levels of administration. The participants will publish their results in two peer-reviewed publications and present at the Joint Mathematics Meetings in Baltimore in January 2019.

Adrian Negrea (Junior BS Mathematics/Computer Science) is analyzing the snake cube puzzle with Dr. Bosman. Solving this popular puzzle is a known NP-hard problem; he is using tools from graph theory to find necessary conditions for when a solution exists.



Yosia Nurhan (Sophomore BS Mathematics/Pre-Medical, J. N. Andrews Scholar, *far right*) and **Jonathan Watson (**Sophomore BS Music/Mathematical Studies, J. N. Andrews Scholar, *right*) worked as members of the Seabird Ecology Team on a summer REU in which they created a seven-dimensional, time-discrete system that models the egg-laying habits of Glaucous-winged Gulls and keeps track of the order in which the gulls lay eggs.

Jeongjin Park (Senior BSE Mechanical Engineering/Mathematical Studies) began working with Dr. Oh after taking a Special Topics course in Differential Geometry last spring. The two are working to answer two questions concerning rectifying curves under some different settings, trying to pinpoint the conditions under which they rectify again and to formulate the equation that defines their curvatures and torsions.



Qiseng (Francis) Sun (Senior BS Computer Science/Mathematical Studies) is working with Dr. Kang to find the existence and uniqueness of a positive generalized solution for a model of predator/prey interaction.

Jonathan Swerdlow (Junior BS Computer Science/Mathematical Studies, PME) is continuing his work with Dr. Kwon, chair of the Department of Engineering, on a project, "Mobile Electrochemiluminescent (ECL) Biosensor Device," which involves creating a mobile application capable of analyzing a series of ECL reaction images. He has had to find an algorithm to ignore the glare, define the region containing the reaction itself, find the average intensity of this region in each image, and then use a plot of reaction intensity over time to train a machine-learning algorithm to determine reactant concentrations. The goal of this project is eventually to identify various biomarkers using ECL reaction analysis.

Note from the Chair

Dear Friends of the Math Department,

Thank you for being a part of our community. In my life I have found a sense of community to be more fragile than I expected—individual betrayals and collective stubbornness to the point of division have jolted me out of idealistic reveries. This increases my appreciation for friends that have proved loyal and groups that continue to do the hard work to find a shared vision. My colleagues in the Department of Mathematics have persisted in supporting each other, and we are committed to fostering a safe community for our majors and students in each course. I especially thank each of you who have offered mentorship to our majors, financial support, prayers, or loyal words about us to others.

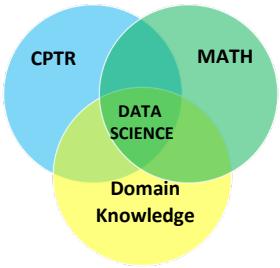
I invite you to consider how you can build up and support every community to which you belong—how you can promote positive and honest communication, forgiveness, and humility within your group.

May God bless others through you,

Lynelle Weldon

News

New Data Science Major Approved—After a period of collaboration, the Departments of Mathematics and Computing will be offering a new major in Data Science beginning Fall 2019. The B.S. in Data Science provides students with a background in computer science, mathematics, statistics, and a chosen domain area. [Currently choices include Accounting, Behavioral Sciences, Biology, Chemistry, Data-driven Development, Finance, Innovation and Entrepreneurship, Marketing, Physics, and Public Health.] A degree in data science provides students with skills for acquiring, managing, visualizing, mining, and modeling data. Students in this program learn tools and techniques for working with Big Data and using machine learning for making predictions. Andrews is one of less than 100 institutions nationwide that offer this major even though the demand for data scientists currently exceeds supply and the McKinsey Report estimates that the shortfall will be 250,000 by 2024.



From left to right around the base of the globe: **Lucinda Ford, Christiane Gallos, Dorothea Gallos**, [senior mathematics majors], **Mark Kent** [sophomore electrical engineering major], **Devin Garcia** [freshman chemical engineering/Math Studies major], **Mykhaylo Malakhov** [sophomore mathematics major], and **Dr. Anthony Bosman**, faculty sponsor. On top of the globe are **Darrick Horton** [sophomore physics and mechanical engineering major and math minor] and his friend **Isaac Hatfield**, who was visiting for the weekend but did not take the exam.

Putnam Competition—On Saturday evening, December 2, 2017, seven Andrews University students (all of whom are now members of Pi Mu Epsilon) participated in the 78th William Lowell Putnam Mathematical Competition: three women—**Lucinda Ford, Christiane Gallos, Dorothea Gallos** (all senior BS Mathematics)—and four men—**Devin Garcia** (freshman Chemical Engineering/Math Studies)**, Darrick Horton** (sophomore BS Physics/BSE Mechanical Engineering)**, Mark Kent** (sophomore BSE Electrical Engineering and Computing)**,** and **Mykhaylo Malakhov** (sophomore BS Mathematics). This is the first time that Andrews University has joined universities across North America for this incredibly hard math exam.

To make preparing for the exam more like fun and fellowship, **Dr. Anthony Bosman**, our new professor of Mathematics, spent several Sunday mornings throughout the Fall 2017 semester, studying with the students and sharing a variety of breakfast foods including pancakes, waffles, and muffins.

The exam includes two three-hour sessions during which students work on six problems per session. Most universities have a session in the morning and one in the afternoon, with a good break between sessions. However, because the competition is always on the first Saturday in December, the Andrews students did not start the competition until after Sabbath was over, meaning that they started at 5:30 and had only a half-hour break between sessions in order to meet the midnight cut-off time.

Begun in 1938, this competition has grown to be the leading university-level mathematics examination in the world, covering undergraduate mathematics topics such as elementary concepts from group theory, set theory, graph theory, lattice theory, and number theory. The participants must be undergraduates who are currently enrolled in a college or university in the US or Canada, who have not previously earned a college degree, and who have not previously competed more than three times. These students work independently on the problems for individual prizes, but the competition also involves a team aspect in that each school picks three students as its team. The Andrews team members were **Christiane Gallos, Mark Kent**, and **Mykhaylo Malakhov**. Each problem receives a score of 0 to 10 points, with points earned according the extent to which students have shown all the necessary work to justify an answer and all the necessary steps of a proof.

Phi Kappa Phi Induction—Among the 2018 Inductees to Phi Kappa Phi, an Interdisciplinary honor society, are mathematics minors **John Michael Bryson** (BSE Engineering, PME), **Edy Gomez** (BS Computer Science, PME), and **Anuya Karnik** (BS Computer Science, PME). BS Mathematics majors **Lucinda Ford** and **Christiane Gallos** also joined the society as did Seabird Ecology Team member **Isabelle Hwang** (BS Biology).

Nathan Jones (BS Mathematics, Pi Mu Epsilon) graduated in December 2017 and is living in Indiana as he works toward becoming an actuary.

Stephanie Nieman (BS Mathematics Education, Pi Mu Epsilon) now works for the New Buffalo, MI, area schools, teaching 7th grade math at the middle school and Algebra II and Geometry at the high school. She also is the sponsor/supervisor for the middle school senate.

2017-18 Graduates

Jesse Snelling (BS Mathematics/BS Physics, J. N. Andrews Scholar, Pi Mu Epsilon, Sigma Pi Sigma) decided to postpone graduate school for a year to work with **Jacob Willard** (BS Physics/BA Music/Mathematics minor, Pi Mu Epsilon, Sigma Pi Sigma, *not pictured*) under the direction of Dr. Jay Johnson. In his project, "A Statistical Analysis of X-Ray Bursts Using Mutual Information," Jesse is trying to show that a current model of x-ray solar flare firing rates may accurately reproduce the distribution well of waiting times, but so far the model has failed accurately to capture some important interrelatedness.

Meylin Tremols-Castillo (BS Mathematics Education/ Spanish Education, Alpha Mu Gamma, Phi Kappa Phi, Pi Mu Epsilon) finished her student teaching in Fall 2017 and took a temporary job teaching special education for Niles High School. This fall she is teaching at Berrien Springs High School, covering all of the Geometry classes.

Zachariah Swerdlow (BS Physics/ Mathematical Studies, Phi Kappa Phi, Pi Mu Epsilon, Sigma Pi Sigma) is currently pursuing a PhD in Physics at the University of Houston. On July 29 he married Valerie Curtis and then moved to the Houston area where school consumes nearly all of his time now that they're settled into their apartment. The couple has recently adopted a black kitten that they named Horizon after the event horizon of a black hole.

Whitney Watson (BS Mathematics/BS Music, J. N. Andrews Scholar) would have graduated with her classmates this year had she not inexplicably died on Mt. Whitney on December 14, 2015. During the graduation ceremony in May, her parents were part of a moving ceremony honoring Whitney and two Engineering majors/Mathematics minors, **Chandler Koerting** and **Austin Currie**, who died in a car accident on November 19, 2016.

News (continued)

Barry Goldwater Scholarship—In March 2018 the Barry Goldwater Scholarship and Excellence in Education Foundation announced 211 scholarship recipients from a field of 1,280 STEM students nominated by colleges and universities nationwide. Six scholarship recipients were from Michigan colleges (4 from the University of Michigan, 1 from Michigan State, and 1 from Andrews University). The AU recipient was **Mykhaylo Malakhov** (Sophomore BS Mathematics, J. N. Andrews Scholar, Pi Mu Epsilon, Sigma Xi) [*on left, shown with Dr. Ryan Hayes and Dr. Mattingly, who presented the award]*. As a Goldwater Scholar, Mykhaylo will receive a two-year scholarship of $7,500 a year to cover the cost of tuition, fees, books, and room and board.

Since the scholarship's inception, Andrews University has submitted 49 applications and has had 7 award recipients and 4 honorable mentions, the last AU student receiving a scholarship being **Libby Megna** (2012 MS Biology/2010 BS Biology, Mathematics minor, Pi Mu Epsilon, Seabird Ecology Team member) in 2008–2009.

The research on which Mykhaylo is working involves the Glaucous-winged Gull populations in the Pacific Northwest, which are sentinels of climate change due to their sensitivity to rising temperatures. Mykhaylo is analyzing a mathematical model to discover how behavioral changes in the gulls affect the long-term survival and dynamics of the population in light of increasing sea surface temperatures. He began working on this project in the summer following his freshman year when he joined the Seabird Ecology Team directed by Dr. Henson and Dr. Hayward.

Since then, Mykhaylo has presented his research at the Joint Mathematics Meetings, at M.A.S.A.L. (the Michigan Academy of Science, Arts, and Letters), and at several gatherings on the Andrews University campus. His goal is to continue working with the results, to use the information in his Honors' thesis, and to finish a paper that he and Dr. Henson plan to publish in a peer-reviewed journal.

Research

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

Presentations

Bosman, A. NAD Teachers Convention. "Fun & Games: Techniques for Active Learning Math." Chicago, IL, August 8, 2018.
Bosman, A. MAA MathFEST. "Video Project for a Discrete Math Course." Denver, CO, August 3, 2018.
Bosman, A. Joint organizer with Angelynn Alvarez, Wen Liu, and Jireh Loreaux. MAA Project NExT. "Engaging Students in Undergraduate Research." Denver, CO, August 1, 2018.
Bosman, A. Michigan Academy of Science, Arts & Letters Conference, Mathematics Section. "Milnor Invariants Vanish for Shake Slice Links." Central Michigan University, Mt. Pleasant, MI, March 9, 2018.
Bosman, A. Colloquium, Department of Mathematics. "The Linking of Links and the Magic of Magicians." Kalamazoo College, Kalamazoo, MI, October 26, 2017.
Bosman, A. Andrews Research Conference, Early Career Researchers in STEM, "The Role of Links in the Study of 3-manifolds." Andrews University, Berrien Springs, MI, May 18, 2017.
Gallos, C., **Gallos, D.**, **Watson, W.**, & **Henson, S.M.** Michigan Academy of Science, Arts & Letters Conference. "Bifurcations in a Discrete-time Model for Synchronous Egg-laying in a Seabird Colony." Central Michigan University, Mt. Pleasant, MI, March 9, 2018.
Gallos, C., **Gallos, D.**, & **Henson, S. M.** Joint Mathematics Meetings. "Backward Bifurcations in a Periodic Matrix Model of Seabird Population Dynamics." San Diego, CA, January 10, 2018.
Henson, S. M. Joint Mathematics Meetings, AMS Special Session on Discrete Dynamical Systems and Applications. "Periodic Matrix Models for Seasonal Dynamics of Stage Structured Populations II: Application to a Seabird Colony." San Diego, CA, January 11, 2018.
Kang, J. H. KKMS-CCMS Joint Conference and Annual Meeting. "A General Elliptic Nonlinear System of Two Functions with Application." Daejin University, Pocheon si, Gyeonggi do, South Korea, June 15, 2018.
Kang, J. H. Michigan Academy of Science, Arts & Letters Conference. "Perturbation of a Nonlinear Elliptic Mathematical Model." Central Michigan University, Mt. Pleasant, MI, March 9, 2018.
Malakhov, M. M., MacDonald, B., **Henson, S. M.**, & Cushing, J. M. Joint Mathematics Meetings. "Backward Bifurcations in a Periodic Matrix Model of Seabird Population Dynamics." San Diego, CA, January 10, 2018.
Malakhov, M. M. Michigan Academy of Science, Arts & Letters Conference. "Cannibalism and Synchrony in a Periodic Matrix Seabird Population Model." Central Michigan University, Mt. Pleasant, MI, March 9, 2018.
McClain, D., **Henson, S. M.**, Hayward, J. L., & Atkins, G. Michigan Academy of Science, Arts & Letters Conference. "What Do Gulls Do at Night?" Central Michigan University, Mt. Pleasant, MI, March 9, 2018.
Oh, Y. M. Kangwon Kyungki Mathematics Society Joint Conference & Annual Meeting. "Involute and Evolute of Rectifying Curves in 3D Space." Daejin University, Pocheon si, Gyeonggi do, South Korea, June 15, 2018.
Oh, Y. M. Michigan Academy of Sciences, Arts & Letters Conference. "Involute and Evolute of Rectifying Curves in R^3." Central Michigan University, Mt. Pleasant, MI, March 9, 2018.
Weldon, L. M. Michigan Academy of Science, Arts & Letters Conference. "Adapting Adaptive Remedial Mathematics." Central Michigan University, Mt. Pleasant, MI, March 9, 2018.
Weldon, L. M. Michigan Academy of Science, Arts & Letters Conference. "Encouraging Mathematical Mindsets Through Assessment." Western Michigan University, Kalamazoo, MI, March 10, 2017.

Publications

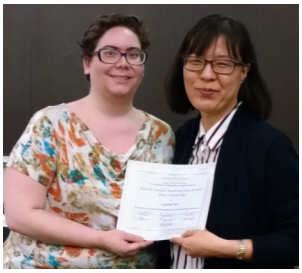
Atkins, G. J., **Reichert, A. A.**, **Henson, S. M.**, & Hayward, J. L. . (2017). Copulation call coordinates timing of head-tossing and mounting behaviors in neighboring Glaucous-winged Gulls (*Larus glaucescens*). *Wilson Journal of Ornithology,* 129:560-567.
Cushing, J. M., & **Henson, S. M.** (2018). 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
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. *Northwestern Naturalist,* 98:180–189.
Kang, J. H. (2017). Estimates of life span of solutions of a Cauchy problem. *International Journal of Pure and Applied Mathematics*, 116.3:637-641. doi: 10.12732/ijpam.v116i3.9
Krzywoń, Ł., & **Oh, Y. M.** (2018). Time-like rectifying curves in E_1^4. *The Pi Mu Epsilon Journal*, to appear.
McWilliams, K. M., ***Sandler, A. G.***, Atkins, G. J., **Henson, S. M**., & Hayward, J. L. (2018). Courtship and copulation in Glaucous-winged Gulls, *Larus glaucescens*, and the influence of environmental variables. *Wilson Journal of Ornithology*,130:270–285.
Robertson, S. L., **Henson, S. M.**, **Robertson, T.**, & 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:e12160. https://doi.org/10.1111/nrm.12160
Robertson, T., & **Kang, J. H.** (2017). Region of smooth functions for positive solutions to an elliptic biological model. *International Journal of Pure and Applied Mathematics*, 116.3:629-636. doi: 10.12732/ijpam.v116i3.8
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.

Awards Galore!

Mathematics Awards Ceremony—On April 27, 2018, the Department of Mathematics held its 2018 Mathematics Award Ceremony to present 45 class awards to honor the excellent academic work of 39 students, 5 of whom are high school students taking dual enrollment courses.

In addition to the class awards given by the professors, the department handed out a large number of scholarship awards this year.

The Harold Buhalts & Jean Stewart Boyd award went to **Lucinda Ford** (senior BS Math), shown below with Dr. Oh.

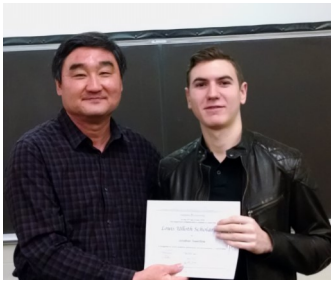


Dr. Meredith Jones Gray, Dr. Jones' daughter, again consented to present the **Harold T. Jones** awards. Awardees are (*counterclockwise from top left*) **Christiane Gallos** (senior BS Math), **Dorothea Gallos** (senior BS Math), **Mateusz Kroczyk** (senior BSE Mech. Engr./Math Studies), and **Mykhaylo Malakhov** (Sophomore BS Math).

Two of the five **Edward J. Specht** awards went to **Darrick Horton** (sophomore BSE Mech. Engr./BS Physics/Math minor) and **Kimberly Park** (2018 BS Biophysics/Math minor) (*pictured left).*

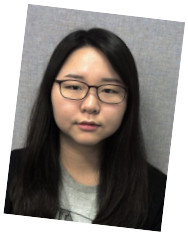
Dr. Henson presented awards the other three awardees (*clockwise from right) :* **Michael Lee** (Junior BS Physics/B.S. Comp. Sci./Math Studies), **Devin Garcia** (Freshman BSE Chem. Engr./Math Studies), and **Jesse Snelling** (2018 BS Physics/BS Math).

Dr. Kang presented the **Luis Ulloth** awards to **Mykhaylo Malakhov** (sophomore BS Math, *below left*) and **Jonathan Swerdlow** (sophomore BS Computer Science/Math Studies, *below right*).



This past spring was the first year that the Department of Mathematics awarded the **Robert C. Moore** award for excellence in student teaching. This year's awardees are **Meylin Tremols-Castillo** (2018 BS Math Ed/BA Spanish Ed) and **Dillon Zimmerman** (2017 BS Chem./Math Studies). Pictured (*at left from L to R)* are Amanda Umlauf (mentor teacher for Stephanie at the RESA Math program), **Dillon Zimmerman**, **Stephanie Nieman** (2018 BS Math Ed), Dr. Moore, and **Meylin Tremols-Castillo** at the teachers' pinning ceremony in the spring.

Also pictured is Dillion receiving his award from Dr. Moore at the Awards Ceremony.

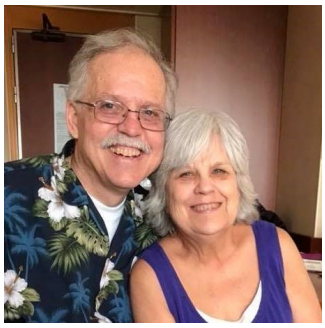


Jisu Choi (2018 BS Computer Science, Mathematics minor) won a **DeHaan** award for excellence as a worker for the Department of Mathematics, grading for Dr. Oh's College Algebra courses during the 2017-18 school year.

Alumni News

Kelsea Allen (Knecht) (2014 BSELED/Mathematics Education and Reading minors) moved to Kansas with her husband, **Rodney Allen** (2014 BS Business Administration), and is the new math teacher at Midland Adventist Academy, teaching Algebra I, Algebra II, Geometry, Precalculus, and Physics to about 60 students. She says that she enjoys the milder weather after her years of Michigan winters.

Tyler Bodi (2011 BS Political Science/Mathematical Studies, PME) passed his California Bar Exam in December 2017. Congratulations!



Fred Christiansen (1975 BS Mathematics) and his wife, **Kathie Ewald** (attended), reside in the greater Boston, MA, area and are active in the Stoneham SDA church. After he graduated from the University of Waterloo with a Master's in Mathematics and Computer Science in 1979, Fred taught math and science at an SDA high school in Zaire (now Congo). Since returning to the States, he has worked for various tech employers including Motorola, Intel, and Honeywell before joining Hewlett Packard Enterprise, where he has worked for the last 23 years as a software engineer. Fred and family have resided in Minnesota, Arizona, Oregon, Colorado, Idaho, and Tennessee. After all his moving, he says that, in retrospect, a yurt would have been easier to move than buying and selling houses multiple times.

Michael Hess (2016 BSE Mechanical Engineering/Mathematics minor, PME) has returned from teaching in Palawan in the Philippines for two years and is now teaching algebra, geometry, and precalculus at Weimar Academy in California.

Andrew Hoff (2011 BS Physics/Mathematics and Engineering minors, PME) has been working at Veloxint, an MIT-spinoff startup in Farmingham, MA (just outside of Boston), since January as a senior materials engineer, developing new metal alloys that will be among the strongest metals in the world. On May 25 he successfully defended his thesis, "Understanding the Origin of Glass Forming Ability in Metallic Glasses," thereby earning his PhD in Materials Science from CalTech. He does not recommend starting a job before finishing a thesis since finishing his thesis on the weekends meant non-stop work.

On April 2, 2018, **Andre Moncrieff** (2014 BS Biology, Seabird Ecology Team) and his current research team members documented a new species of bird—the Cordillera Azul Antbird in Peru. [See Moncrieff, A., Johnson, O., Lane, D. F., Beck, J. R., Angulo, F., & Fagan, J. (2018). A new species of Antbird (*Passeriformes: Thamnophilidae*) from the Cordillera Azul, San Martín, Peru. *The Auk* 135.1:114-126. doi: https://doi.org/10.1642/AUK-17-97.1]

Antbirds are a large family of insect-eating birds found across subtropical and tropical Central and South America, known for habitually following columns of marching ants. Andre gives credit for the initial discovery to a birder named Josh Beck in the forest around the town of Flor de Café in north-central Peru. Andre and ornithologists Dan Lane, Jesse Fagan, and Fernando Angulo met Beck, who told them about the unusual ground-walking antbird that he'd seen. The ornithologists made documenting that bird a top priority and spent an extra week in the area, looking for it. They estimate that the population has between 7,000-34,000 individuals, but clearing the forest is threatening the birds. See the following sites for more information: *The Spectrum*, *The Sci News*, and *The Auk: Ornithological Advances*.

Emily-Jean [Bankes] Ott (2016 BS Mathematics/BS Chemistry [ACS], PME) is doing her graduate studies in Chemistry at Penn State. In the March 26, 2018, edition of the *Journal of Physical Chemistry* [22(15):3819-3828] she and her coauthors—Delanie J. Losey and Miriam Arak Freedman—published an article, "Effects of High Acidity on Phase Transitions of an Organic Aerosol." doi: 10.1021/acs.jpca.8b00399

Emmanuel Scott (2009 BS Chemistry/Mathematical Studies) graduated from medical school in May this year. He and his wife, **Sarah [Fowler]** (2010 BBA International Business/BA Religion), live in Winston-Salem, North Carolina, with their amazing daughter, James.

The Alumni Board honored **Esther Ottley** (1954 BA Mathematics) at the 2018 Spirit of Philanthropy & Homecoming Banquet, presenting her with the Andrews University Alumni Association Medallion in recognition of her outstanding accomplishments and service to community.

Dr. Ottley, who celebrated her 90th birthday in August, was the first person of color to graduate with a BA in mathematics from Andrews University, and she obtained a master's degree in education from Columbia University in New York and a PhD in math/physics education at American University in Washington, D.C., in 1965.

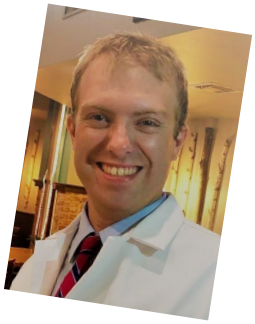
Born in Panama, where her Jamaican parents were serving as missionaries and her father helped to build the Panama Canal, Dr. Ottley later moved with her family to Jamaica, eventually graduating in 1948 with an associate's degree in teacher education from West Indian Training College (now Northern Caribbean University, NCU) and teaching math at the college for several years before moving to the United States to attend Emmanuel Missionary College (EMC, now Andrews University). At EMC she worked for Dr. Specht, for whom she had great admiration, and she continues to credit him with inspiring her to pursue a career in math and physics.

In 1955 Dr. Ottley married **Dr**. **Neville Ottley** (EMC class of 1953) and moved to Washington, D.C., while he finished his last two years of medical school at Howard University and completed his residency in general surgery and she joined the math department at Howard University while completing her PhD at American University. At Howard she received tenure and taught 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. After her retirement in 1994, Howard honored her with an endowed graduate scholarship that bears her name. In addition, she has served on the boards of Andrews University, Loma Linda University, and local Washington, D.C., area Adventist schools.

Ward Arthur Soper (1961 BA Mathematics) was born in Leslie, Michigan, on October 16, 1938. Raised in a country house with no running water, Professor Soper learned the value of hard work and education and developed a life-long love of reading. He graduated as salutatorian from Dansville High school in 1956 and enrolled at Emmanuel Missionary College, now Andrews University, graduating in 1961 with his BA in Mathematics and in 1962 with his Master's from the University of Michigan, Ann Arbor.

Professor Soper married Lois Meseraull on June 2, 1963, and continued to teach at Adelphian Academy through the spring of 1965 when he received the call to Walla Walla College. His career at WWU spanned 43 years, and he holds the all-time longevity record for mathematics faculty by six months. At WWU he rose through the academic ranks and retired as a full professor and then received emeriti status.

Diagnosed with idiopathic pulmonary fibrosis over a decade ago, Professor Soper tackled this illness with quiet determination. As the disease progressed, he became dependent on continuous oxygen, and finally his mobility was severely curtailed. On November 6 he suffered a stroke, and although bedridden, he remained cognizant and alert until he died November 18, 2017. He lived with a deep sense of responsibility and duty, with privacy and dignity, and with a quiet enjoyment of what he loved most.



William Tritch (2014 BS Mathematics/BS Physics, PME, Sigma Xi, Sigma Pi Sigma) is now attending Loma Linda School of Medicine after earning his MS in Mathematics at Texas Tech. Also, his third academic paper was accepted for publication: https://www.sciencedirect.com/science/article/pii/S2468042717300763?via%3Dihub

Cengage, an education and technology company, announced on March 22, 2018, the author team who will continue the best-selling James Stewart Calculus franchise. Lothar Redlin and **Saleem Watson** (1972 BS Mathematics, PME), both of whom received doctorate degrees under Stewart's instruction, and Daniel Clegg, a former colleague of Stewart, will author the revised series, which has been used by more than 8 million students over the last 15 years. The new edition should be released in December 2019.

Dr. Watson is a Professor of Mathematics at California State University, Long Beach, specializing in the field of Functional Analysis. After graduating from Andrews University, he did graduate studies at Dalhousie University and McMaster University, where he received his PhD. Watson co-authored the best-selling *Precalculus: Mathematics for Calculus* with Stewart and Redlin. https://news.cengage.com/corporate/cengage-announces-new-author-team-for-best-selling-james-stewart-calculus-franchise/

Dillon Zimmerman (2017 BS Chemistry [ACS]/Mathematical Studies, Phi Kappa Phi, PME, Sigma Pi Sigma) moved to Texas to teach Physics, Math, Biology, and Bible at Chisholm Trail Academy in Keene.

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
*Christiane Gallos, Vice President
*Dorothea Gallos, Secretary-Treasurer
*Dr. Joon Hyuk Kang, Advisor

eigen *Mathematics & Physics Club*

*Dorothea Gallos, Mathematics President
*Devin Garcia, 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 (kneeling) left to right: Mark Kent (So Elec Engr & Computing) & Trey Bosfield (So Mech Engr). *2nd row*: Mykhaylo Malakhov (So Math); Juliane Johnson (So Biology/PreMed/Math Studies); Anuya Karnik (So CS); Kundani Makimu (Sr CS); Tammy Leong (Sr Chem); Xavier-Kumar Balasingam (Sr Elec Engr & Computing). *Back Row*: Edy Gomez Castillo (So CS); Jonathan Swerdlow (Fr CS/Math Studies); Zachary Verhelle (Sr Chem Engr); Noah Rupert (Jr Elec Engr & Computing); Devin Garcia (Fr Chem Engr/Math Studies); Victoria DeHart (So Nutrition/Math Studies).

Pi Mu Epsilon Induction—On March 29, 2018, in the Whirlpool Room in Chan Shun Hall, the Michigan Gamma Chapter of Pi Mu Epsilon inducted 14 new members (*see above*). The new inductees and the other PME members in attendance voted **Mykhaylo Malakhov** as the president and **Christiane Gallos** as the vice-president for the 2018-19 school year. The two officers chose **Dorothea Gallos** as the new secretary-treasurer.

Left to right: Dr. Martins, Mykhaylo Malakhov, Darrick Horton, Dillon Zimmerman, Christiane Gallos, Dorothea Gallos, Dr. Johnson, Dr. Burdick

Sigma Xi Induction—On September 12, 2017, Sigma Xi, the Scientific Honor Society, inducted six new members. The five students are **Christiane Gallos** (Senior BS Mathematics), **Dorothea Gallos** (Senior BS Mathematics), and **Mykhaylo Malakhov** (Sophomore BS Mathematics) for their work with Dr. Henson's Seabird Ecology Team; **Darrick Horton** (Sophomore BS Physics/BSE Mechanical Engineering) for his work with Dr. Jay Johnson; and **Dillon Zimmerman** (2017 BS Chemistry [ACS]/Mathematical Studies) for his work in various REUs. **Dr. Jay Johnson**, Professor of Engineering, was also inducted. The inductees shared a brief presentation on their research before signing the membership book and receiving a book as a present. **Dr. Lauber De Souza Martins**, Professor of Physics, organized the event, and **Dr. Gary Burdick**, Dean of the Office of Scholarly Research, facilitated the induction.

On October 9, 2017, when he returned to Andrews from the University of Tennessee, Knoxville, where he is pursuing his PhD in Mathematics, **Timothy Robertson** (2017 BS Mathematics) (*left*) gave an eigen*Talk on his graduate school experience. Afterwards, in a private induction ceremony, Sigma Xi inducted Timothy for his work with Dr. Henson's Seabird Ecology Team and his collaborations and publications with Dr. Kang.